



Fatima Mata National College **(Autonomous)** **Kollam**

Scheme & Syllabus of
First Degree Programme in Physics
2019 Admission Onwards

First Degree Programme in Physics

Table I : Course structure, Scheme of Instruction and Evaluation

Semester	Study component	Course Code	Course Title	Instructional Hrs/Week		Credit	Duration of Sem Exam	Evaluation marks		Total Credit
				T	P			CE	ESE	
I	English I	19UEN111.1	Language Skills	5		4	3hrs	20	80	16
	Additional Language I	19UFR/HN/ML111.1	Additional Language I	4		3	3hrs	20	80	
	Foundation Course I	19UEN121	Writings on Contemporary Issues	4		2	3hrs	20	80	
	Core Course I	19UPH141	Basic Mechanics and Properties of Matter	2	2	2	3hrs	20	80	
	Complementary Course I	19UMM131.1	Calculus with applications in Physics - I	4		3	3hrs	20	80	
	Complementary Course II	19UCH131.1	Theoretical Chemistry	2	2	2	3hrs	20	80	
II	English II	19UENS211	Environmental Studies	5		4	3hrs	20	80	17
	English III	19UEN212.1	English Grammar and Composition	4		3	3hrs	20	80	
	Additional Language II	19UFR/HN/ML211.1	Additional Language II	4		3	3hrs	20	80	
	Core Course II	19UPH241	Heat and Thermodynamics	2	2	2	3hrs	20	80	
	Complementary Course III	19UMM231.1	Calculus with applications in Physics - II	4		3	3hrs	20	80	
	Complementary Course IV	19UCH231.1	Physical Chemistry - I	2	2	2	3hrs	20	80	
III	English IV	19UEN311.1	Readings in Literature I	5		4	3hrs	20	80	18
	Additional Language III	19UFR/HN/ML311.1	Additional Language III	5		4	3hrs	20	80	
	Core Course III	19UPH341	Electrodynamics	3	2	3	3hrs	20	80	
	Complementary Course V	19UMM331.1	Calculus and Linear Algebra	5		4	3hrs	20	80	
	Complementary Course VI	19UCH331.1	Physical Chemistry - II	3	2	3	3hrs	20	80	
IV	English V	19UEN411.1	Readings in Literature II	5		4	3hrs	20	80	25
	Additional Language IV	19UFR/HN/ML411.1	Additional Language IV	5		4	3hrs	20	80	
	Core Course IV	19UPH441	Classical and Relativistic Mechanics	3		3	3hrs	20	80	
	Core Course V	19UPH442	Mechanics, Properties of Matter, Error Measurements, Heat and Acoustics		2	3	3hrs	20	80	
	Complementary Course VII	19UMM431.1	Complex Analysis, Special Functions and Probability Theory	5		4	3hrs	20	80	
	Complementary Course VIII	19UCH431.1	Spectroscopy and Material Chemistry	3		3	3hrs	20	80	
	Complementary Course IX	19UCH432.1	Complementary Course Lab of 19UCH131.1, 19UCH231.1, 19UCH331.1 & 19UCH431.1		2	4	3hrs	20	80	

Semester	Study component	Course Code	Course Title	Instructional Hrs/Week		Credit	Duration of Sem Exam	Evaluation marks		Total Credit
				T	P			CE	ESE	
V	Core Course VI	19UPH541	Quantum Mechanics	4		4	3hrs	20	80	18
	Core Course VII	19UPH542	Statistical Physics, Research Methodology and Disaster Management	4		4	3hrs	20	80	
	Core Course VIII	19UPH543	Electronics	4		4	3hrs	20	80	
	Core Course IX	19UPH544	Atomic and Molecular Physics	4		4	3hrs	20	80	
		19UPH645	Optics, Electricity and Magnetism		3	-	-	-	-	
		19UPH646	Electronics and Computer Science		3	-	-	-	-	
	Open Course	19UPH551	Open Course	3		2	3hrs	20	80	
VI	Core Course X	19UPH641	Solid State Physics	4		4	3hrs	20	80	26
	Core Course XI	19UPH642	Nuclear and Particle Physics	4		4	3hrs	20	80	
	Core Course XII	19UPH643	Classical and Modern Optics	4		4	3hrs	20	80	
	Core Course XIII	19UPH644	Digital Electronics and Computer Science	4		3	3hrs	20	80	
	Core Course XIV	19UPH645	Optics, Electricity and Magnetism		3	2	3hrs	20	80	
	Core Course XV	19UPH646	Electronics and Computer Science		3	3	3hrs	20	80	
	Elective Course	19UPH661	Elective Course	3		2	3hrs	20	80	
	Project	19UPH647	Project			4	Viva	-	100	

A) Language Courses = 9, B) Foundation Courses = 1, C) Complementary Courses = 9,
D) Core Courses = 15, E) Open Course = 1, F) Elective Course = 1,
G) Project = 1 Total Courses = 9+1+9+15+1+1+1 = 37. Total Credits = 16+17+18+25+18+26 =120.

Open Courses

Course Code	Course Title	Instructional Hrs/Week	Credit
19UPH551.1	Bio Physics	3	2
19UPH551.2	Astronomy and Astrophysics	3	2
19UPH551.3	Applied Physics	3	2
19UPH551.4	Environmental Physics	3	2
19UPH551.5	Energy Physics	3	2

Elective Courses

Course Code	Course Title	Instructional Hrs/Week	Credit
19UPH661.1	Electronic Instrumentation	3	2
19UPH661.2	Space Science	3	2
19UPH661.3	Photonics	3	2
19UPH661.4	Nanoscience and Technology	3	2
19UPH661.5	Computer Hardware & Networking	3	2

GENERAL ASPECTS OF EVALUATION

MODE OF EVALUATION

Evaluation of each course shall consist of two parts:

1. Continuous Evaluation (CE), and
2. End Semester Evaluation (ESE)

The CE to ESE ratio shall be 1:4 for both Courses with or without practical. There shall be at maximum of 80 marks for ESE and maximum of 20 marks for CE. A system of performance based, indirect grading will be used. For all courses (Theory and Practical), grades are given on a 7-point scale based on the total percentage of mark (CE+ESE) as given below:

Criteria for Grading

Percentage of marks	CCPA	Letter Grade
90 and above	9 and above	A+ Outstanding
80 to <90	8 to <9	A Excellent
70 to <80	7 to <8	B Very Good
60 to <70	6 to <7	C Good
50 to <60	5 to <6	D Satisfactory
40 to <50	4 to <5	E Adequate
Below 40	<4	F Failure

1.1. CONTINUOUS EVALUATION FOR LECTURE COURSES

The Continuous evaluation will have 20 marks and will be done continuously during the semester. CE components are

- i. Attendance for lecture and laboratory sessions (to be noted separately where both lecture and laboratory hours have been specified within a course);
- ii. Assignment /seminar and
- iii. Test

The weightage is shown in Table I.1. There will be two Internal exams with 3 marks for Class Test Evaluation (Test I) and 7 marks for Centralized Internal Exams (Test II) and the total of the two marks obtained for Test I & Test II will be awarded. Seminar for each course to be organized by the course teacher and assessed along with a group of teachers in the Department. The topic selection by the student for assignments/seminar will be with the approval of the course teacher.

No	Component	Marks
1	Attendance	5
2	Assignment / Seminar	5
3	Tests	10
	Total	20

1.1.1. ATTENDANCE:

The allotment of marks for attendance shall be as follows:

Attendance less than 75%	0 mark
75% & less than 80 %	1 mark
80% & less than 85 %	2 marks
85% & less than 90 %	3 marks
90% & less than 95%	4 marks
95% & above	5 marks

1.1.2. EVALUATION OF THE ASSIGNMENTS/SEMINAR

Each student shall be required to do one assignment or one seminar for each Course. Seminar for each course shall be organized by the course teacher and assessed by a group of teachers in the Department. The topic selection by the student for assignments/seminar shall be with the approval of the course teacher. The

assignment typed/written on A4 size paper shall be 4-6 pages. The minimum duration of the seminar shall be fifteen minutes and the mode of delivery may use audio-visual aids if available. Both the assignment and the seminar shall be evaluated by giving marks based on each of the four components shown in table 1.1.2.1. The seminar is to be conducted within the contact hours allotted for the course.

1.1.2.1. Mode of Assignments/Seminar Evaluation (maximum 5 marks)

No	Components	Marks
1	Adherence to overall structure & submission deadline	2
2	Content & grasp of the topic	1
3	Lucidity /clarity of presentation	1
4	References, interaction/overall effort	1

The explanatory guidelines in Table 1.1.2.2. are suggested (tentatively) for the assessment of each of the above main components:

1.1.2.2. Guidelines for Assignments/Seminar Evaluation		
No	Main Component	Sub –Components
1	Adherence to overall structure & submission deadline	<ul style="list-style-type: none"> i. Punctual submission ii. Adequate length/duration iii. Inclusion of introduction, discussion & summary sections iv. Absence of errors/mistakes
2	Content & grasp of the topic	<ul style="list-style-type: none"> 1. Coverage of topic 2. Understanding of topic 3. Logical organization 4. Originality (No copying from a source or plagiarism)
3.	Lucidity/Clarity	<ul style="list-style-type: none"> i. Clarity ii. Effective presentation/delivery iii. Neatness of presentation iv. Inclusion of appropriate diagrams/equations/structures etc.
4	References/Interaction/Overall effort	<ul style="list-style-type: none"> 1. Listing of references 2. Use of more than one reference source/Use of Web resource 3. Correct response to quiz/questions 4. Overall effort in preparing assignment/seminar

1.1.3. DETAILS OF THE CLASS TEST

The weightage is shown in Table I.1. There will be two Internal exams with 3 marks for Class Test Evaluation (Test I) and 7 marks for Centralized Internal Exams (Test II) and the total of the two marks obtained for Test I & Test II will be awarded. Seminar for each course to be organized by the course teacher and assessed along with a group of teachers in the Department. The topic selection by the student for assignments/seminar will be with the approval of the course teacher.

1.2. CONTINUOUS EVALUATION FOR LABORATORY COURSES

The CE components are: (i) Attendance for laboratory sessions, (ii) Experiment (Lab) report on completion of each set of experiments, (iii) Laboratory skill and (iv) Quiz/test.

The marks for the components of practical for continuous evaluation shall be as shown below:

1	Attendance	5 marks
2	Record (lab report)	5 marks
3	Test	5 marks
4	Performance, punctuality and skill	5 marks

1.2. Components of CE for Lab Courses

1.2.1. Attendance:

The allotment of marks for attendance shall be as follows:

Attendance less than 75%	0 mark
75% & less than 80 %	1 mark
80% & less than 85 %	2 marks
85% & less than 90 %	3 marks
90% & less than 95%	4 marks
95% & above	5 marks

The guidelines for evaluating the three main components 2-4 using sub-components are presented below.

1.2.2. EVALUATION OF THE EXPERIMENT (LAB) REPORT

On completion of each experiment, a report shall be presented to the course teacher. It should be recorded in a bound note-book (not on sheets of paper). The experimental description shall include aim, principle, materials/ apparatus required/used, method/procedures, and tables of data collected, equations, calculations, graphs, and other diagrams etc. as necessary and final results. Careless experimentation and tendency to cause accidents due to ignoring safety precautions shall be considered as demerits.

1.2.2.1. Mode of Experiment (Lab) Report Evaluation

No	Sub components	Marks
1	Punctual submission and neat presentation	1
2	Inclusion of aim, materials, procedure, etc.	1
3	Calculations and absence of errors/mistakes	1
4	Accuracy of the result	2

1.2.3. EVALUATION OF THE LAB SKILL

1.2.3.1. Mode of Lab Skill Evaluation

No	Sub components	Marks
1	Punctuality and completion of experiment on time	2
2	Lab skill and neat arrangements of table and apparatus in the lab	1
3	Prompt and neat recording of observations in the lab note book	1
4	Experimental skill and attention to safety	1

1.2.3. EVALUATION OF THE LAB QUIZ/TEST

For each lab course there shall be one lab test during a semester. The test for a lab course may be the form of a quiz / practical examination. Two teachers (one of the teachers should be the course teacher) shall conduct the quiz/test within the assigned lab contact hours. The marks obtained should be converted to 5 marks for consolidating the CE.

II.1.1. END SEMESTER EVALUATION FOR LECTURE COURSES

The end semester evaluation conducted at the end of the semester shall have 80 marks. The end semester theory examination shall be of 3 hours duration. Grades A+ to F shall be awarded as per the regulations and the general aspects of evaluation.

II.1.1. END SEMESTER QUESTION PAPER PATTERN

QuestionNo	Typeof Question	Marks
Part A: 1-10	10 one word/one sentence	10
Part B: 11-22	8 out of 12; Short Answer	16
Part C: 23-31	6 out of 9; Short Essay	24
Part D: 32-35	2 out of 4; Essay	30
		Total = 80-80 marks

II.2. END SEMESTER EVALUATION FOR LABORATORY COURSES

The scheme of valuation of ESE of Lab courses and their marks are discussed along with the syllabi for each of such laboratory courses in the subsequent sections. Total marks for the ESE of each practical course are 80.

II.3. CONSOLIDATION OF MARKS

The marks of a course are consolidated by combining the marks of ESE and CE (80+20). A minimum of 40% marks is required for passing a course with a separate minimum of 35% for CE and ESE.

III. Project/Dissertation, Factory/R&D Institute Visit and Project based Viva-voce Evaluation of the Project & Factory/Research institution visit report (Semester VI)

The Project work may be conducted individually or by a group comprising of a maximum of 5 students during the semesters V and VI. The work of each student/ group shall be guided by one faculty member. After the completion of the work, the student shall prepare 2 copies of the project report. The copies certified by the concerned guide & the Head of the Department shall be submitted prior to the completion of the sixth semester. The typed copy of the report may have a minimum of 25 pages comprising the title page, introduction, literature review, result and discussion and references. These reports shall be evaluated by a board of two examiners. The examiners shall affix their dated signatures in the facing sheet of the project report. The evaluation/viva voce of the project report shall be conducted on a separate day. The number of students may be a maximum of 16 per day or as per regulations and the general aspects of project evaluation. The students have to present their work individually before the examiners on the day of the viva-voce. The examiners shall consult each other and award grades based on the various components given in the table below. There shall be no continuous assessment for the dissertation/project work.

The Factory/research institution visit report shall be submitted during the lab course examination/viva voce. The examiners who evaluate the report (of 16 students per day) shall affix their dated signatures in the facing sheet.

Aim and objectives of the Programme

In this programme, we aim to provide a solid foundation in all aspects of physics and to show a broad spectrum of modern trends in physics and to develop experimental, computational and mathematical skills of students. The syllabi are framed in such a way that it bridges the gap between the plus two and post graduate levels of physics by providing a more complete and logical framework in almost all areas of basic physics.

The programme also aims

- i. to provide education in physics of the highest quality at the undergraduate level and generate graduates of the caliber sought by industries and public service as well as academic teachers and researchers of the future.
- ii. to attract outstanding students from all backgrounds.
- iii. to provide an intellectually stimulating environment in which the students have the opportunity to develop their skills and enthusiasms to the best of their potential.
- iv. to maintain the highest academic standards in undergraduate teaching.
- v. to impart the skills required to gather information from resources and use them.
- vi. to equip the students in methodology related to physics.

Objectives

By the end of the first year (2nd semester), the students should have,

- i. attained a common level in basic mechanics and properties of matter
- ii. been introduced to powerful tools for tackling a wide range of topics in Thermodynamics
- iii. developed their experimental and data analysis skills through a wide range of experiments in the practical laboratories.

By the end of the fourth semester, the students should have

- i. Been introduced to various laws and theories of electrodynamics
- ii. Become familiar with Lagrangian and Hamiltonian formalisms and the theory of relativity
- iii. Further developed their experimental skills through a series of experiments which also illustrate major themes of the lecture courses.

By the end of the sixth semester, the students should have

- i. covered a range of topics in almost all areas of physics including quantum physics, statistical mechanics, disaster management, solid state physics, basic /digital electronics . C++ programming language, Optics, Nuclear physics, spectroscopy etc.
- ii. an experience of independent work such as projects, seminars etc.
- iii. developed their understanding of core physics.

Program Outcome

- Nationalistic Outlook and contribution to National development
- Fostering global competencies, and Technical and Intellectual proficiency
- Inculcating values and Social Commitment
- Affective skills and integrity of character
- Critical Thinking, Problem solving and Research-related skills
- Environment and sustainability
- Quest for excellence

Program Specific Outcome

The PSOCs are:

- To demonstrate an understanding of principles and theories of Physics. These including the following: Basic Mechanics & Properties of Matter, Research Methodology, Thermodynamics & Statistical Mechanics, Electromagnetism, Spectroscopy, Optics, Classical Mechanics & Special Theory of relativity, Quantum mechanics, Atomic physics, Solid state physics, Digital Electronics & Programming in C etc.
- To articulate the fundamental principles of electrostatics and magnetostatics.
- An ability to apply principles of algebra and trigonometry to electricity and magnetism.
- An ability to demonstrate comprehension of similarities and differences among electric and magnetic systems.
- An ability to compute basic quantities in rotational mechanics.
- An ability to demonstrate comprehension of similarities and differences among mechanical systems.
- An ability to formulate, analyze and solve a multi-level problem in mechanics.
- An ability to apply basic knowledge of science to explain observable phenomena.
- Apply algebra and calculus, as well as graphical methods to solve physics problems.
- Demonstrate the ability to do simple lab experiments that apply the principles learned in theory classes.

Semester I
Language Course I
19UEN111.1: LANGUAGE SKILLS

No of Credits: 4

No of hours: 90 hours (5/week)

COURSE OUTCOMES

1. Demonstrate all the four basic skills – listening, speaking reading and writing.
2. Listen to lectures, public announcements and news on TV and radio.
3. The students will perform reading comprehension skills and enhance vocabulary.
4. The students are expected to identify with the mechanism of writing, and presentation.

COURSE OUTLINE

Module 1 Phonetics (1 hr)

Introduction to Phonetics – The need for phonetics – Learning Phonetics – Phonemic symbols – vowels-consonants- syllables – word stress – strong and weak forms – Practice sessions in the Language Lab

Module 2 Listening and Speaking (1hr)

Listening – Importance of communication – difference between Listening and Hearing – barriers to listening – listening for details – listening to public announcements – news bulletins and weather forecast – listening to instructions and directions – listening to lectures and talks

Greetings and Introductions, Participating in Small Talk/ Social Conversations, Request and seeking permission, Making enquiries and suggestions, Expressing gratitude and apologizing, Complaining – Practice sessions with the enclosed CD

Module 3 Reading Skills (2 hrs)

Reading – Definition – skimming/ scanning – intensive/ extensive – Barriers – Methods to improve reading – exercises –

1. Alfred Noyes : *The Highwayman*
2. Ruskin Bond : *Sounds I like to Hear*
3. Eryn Paul : *Why Germans work few hours but produce more: A Study in Culture*
4. Edited Articles : Technology:
 - a. *Mangalyaan: India's Mars Odyssey*
 - b. *The Evolution of Smart Phones*
5. Edgar Allen Poe : *The Tell-Tale Heart*

Module 4 Writing Skills

Greetings and Introduction, Description of person, places, things – Note taking and Note Making - outline story – dialogues – proverb expansion – paragraph writing.

Core Text: Hart, Steven, Aravind R. Nair and Veena Bhambhani. *Embark English for Undergraduates*. CUP, 2016.

Further Reading

1. Kenneth, Anderson, Tony Lynch, Joan MacLean. *Study Speaking*. New Delhi: CUP, 2008.
2. Das, NK Mohan, Gopakumar R. *English Language Skills for Communication I*. New Delhi; OUP, 2015.
3. Sreedharan, Josh. *The Four Skills for Communication*. New Delhi, CUP, 2016.
4. Smalzer, William R. *Write to be Read*. New Delhi, CUP, 2014.
5. Gardner, Peter S. *New Directions*. New Delhi, CUP, 2013.
6. Jones, Daniel. *English Pronouncing Dictionary 17th Edition*. New Delhi: CUP, 2009.

MODEL QUESTION PAPER
19UEN111.1: Language Skills

Time: Three hours

Maximum Marks: 80

Section-A

Answer **all** the questions, each in a word or a sentence. Each question carries 1 mark.

1. How many sounds are there in RP?
2. Which sound is common to the following words – union, yes, Europe?
3. How is the word ‘beige’ pronounced?
4. Give an expression of a phrase used to introduce oneself.
5. State the most common expression used for making a request.
6. In weather parlance, solid precipitation in the form of ice is known as _____.
7. Why was Bess plaiting a love-knot?
8. When does the croaking of frogs sound beautiful?
9. What are most Americans reminded of when they think of Germany?
10. Why did the narrator decide to murder the old man?

(10 x 1 = 10 marks)

Section-B

Answer any **eight** of the following. Each question carries 2 marks.

11. Differentiate between listening and hearing.
12. State two tips to maintain small talk.
13. Give two responses that can be used when somebody thanks you.
14. What does the phrase ‘a cold front is moving in’ indicate in weather parlance?
15. Describe the attire of the highwayman.
16. What are the sounds that ‘walketh upon the wings of the wind’??
17. How do Germans spend their time off from work?
18. What is extensive reading?
19. How did the narrator dispose of the old man’s corpse?
20. How did Apple’s iPhone influence the smartphone design?
21. Differentiate between skimming and scanning.
22. Give two phrases used to express regret.

(8 x 2 = 16 marks)

Section-C

Answer any **six** of the following. Each question carries 4 marks.

23. Imagine you are the cook in a popular cookery show. Give instructions on how to prepare a dish of your choice.
24. What are the barriers to listening?
25. Divide the following words into syllables – bitterly, quite, elastic, satisfaction, session, illogical, lyrical, zoology
26. You have moved to a new neighbourhood. Frame a dialogue to find out the location of the grocery and bakery from a neighbour.
27. Describe the colours and sounds that lend life to the poem ‘The Highwayman’.
28. How does Bond describe the many sounds made by water?
29. List a few things that can be borrowed from German work ethics to increase efficiency in the workplace,
30. Describe the atmosphere of dread in ‘The Tell-Tale Heart’.
31. What is the primary purpose of MOM and how would its success help Indian scientists in the future?

(6 x 4 = 24 marks)

Section- D

Answer any **two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Read the short lecture below and prepare notes:

The work of the heart can never be interrupted The heart’s job is to keep oxygen rich blood flowing through the body. All the body’s cells need a constant supply of Oxygen, especially those in the brain. The brain cells like only four to five minutes after their oxygen is cut off, and death comes to the entire body. The heart is a specialized muscle that serves as a pump. This pump is divided into four chambers

connected by tiny doors called valves. The chambers work to keep the blood flowing round the body in a circle. At the end of each circuit, veins carry the blood to the right atrium, the first of the four chambers. 2/5 oxygen by then is used up and it is on its way back to the lung to pick up a fresh supply and to give up the carbon dioxide it has accumulated. From the right atrium the blood flows through the tricuspid valve into the second chamber, the right ventricle. The right ventricle contracts when it is filled, pushing the blood through the pulmonary artery, which leads to the lungs – in the lungs the blood gives up its carbon dioxide and picks up fresh oxygen. Then it travels to the third chamber the left atrium. When this chamber is filled it forces the blood through the valve to the left ventricle. From here it is pushed into a big blood vessel called aorta and sent round the body by way of arteries. Heart disease can result from any damage to the heart muscle, the valves or the pacemaker. If the muscle is damaged, the heart is unable to pump properly. If the valves are damaged blood cannot flow normally and easily from one chamber to another, and if the pacemaker is defective, the contractions of the chambers will become un-coordinated. Until the twentieth century, few doctors dared to touch the heart. In 1953 all this changed after twenty years of work, Dr. John Gibbon in the USA had developed a machine that could take over temporarily from the heart and lungs. Blood could be routed through the machine bypassing the heart so that surgeons could work inside it and see what they were doing. The era of open heart surgery had begun. In the operating theatre, it gives surgeons the chance to repair or replace a defective heart. Many patients have had plastic valves inserted in their hearts when their own was faulty. Many people are being kept alive with tiny battery operated pacemakers; none of these repairs could have been made without the heart – lung machine. But valuable as it is to the surgeons, the heart lung machine has certain limitations. It can be used only for a few hours at a time because its pumping gradually damages the blood cells.

33. Frame dialogues for the following situations
 - a. Setting up an appointment by telephone at a doctor's clinic.
 - b. Debating with a friend which movie to watch and the reason for your choice
 - c. Two old friends who meet accidentally in a park.
34. Attempt a critical summary of the poem 'The Highwayman'.
35. Comment on Bond's choice of sounds and what they convey about life in India.

(15 x 2 = 30 marks)

Language course II (Additional Language I)

19UFR111.1: COMMUNICATION SKILLS IN FRENCH

No of Credits: 3

No of hours: 4 Hrs/week

COURSE OBJECTIVES:

1. To make the students conversant with a modern foreign language.
2. To introduce the students to the sounds of French.
3. To encourage students to use French for basic communication in everyday situations.
4. To acquaint students with the basics of writing simple sentences and short compositions.

COURSE OUTCOME:

The students would be able to perceive conversational French and to use French for basic communication in daily life.

SYLLABUS:

NAME OF TEXT: **ECHO-A1 méthode de français**

Authors: J. Girardet & J. Pecheur

Publisher: CLE INTERNATIONALE

- Leçon- 0 : Parcours d'initiation (Pages : IX – XVI)
- Leçon – 1 : Vous Comprenez ? (Pages : 6 – 13)
- Leçon 2 : Au Travail ! (Pages : 14 – 21)

Reference books :

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER
19UFR111.1: COMMUNICATION SKILLS IN FRENCH

TIME: 3HRS

MAX MARKS: 80

PART-A

Répondez à toutes questions suivantes:

1. Nommez une avenue française ?
2. Est-ce que vous parlez français ?
3. Comment vous appelez-vous ?
4. Quelle est votre nationalité ?
5. Tu habites où ?
6. Quelle profession aimez-vous ?
7. Où est la tour de Londres ?
8. Nommez un pays francophone ?
9. Qu'est-ce que c'est « Le Monde » ?
10. Quel est le nom du chant national français ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Complétez avec « un, une, des ou le, la, l', les »:
 - Bono, qui est-ce ?
 - C'estchanteur. C'estchanteur du groupe U2.
 - Qui est Nicolas Sarkozy ?
 - C'estprésident de la France.
 - Comment s'appelleguide de groupe ?
 - Elle s'appelle Marie.
12. Complétez avec « à, au, en » :
 - Où habite Adriano ?.....Brésil ?Argentine ?
 - Il habiteSao Paulo,Brésil.
13. Complétez avec « un, une, des » :
 - a.rue
 - b.quartier
 - c.restaurants
 - d.théâtre.
14. Répondez :
 - a. Tu aimes les chansons françaises ?
Non,
 - b. Tu apprends une langue étrangère ?
Oui,
15. Complétez avec « de, du, de la, de l', des » :
 - a. La pyramideLouvre.
 - b. Le nom.....étudiant.
 - c. Un tableauMonet.
 - d. Un professeuruniversité de Mexico.
16. Ecrivez quatre petits mots de politesse.
17. Reliez :

a. Renault	-	des avions
b. Jean-Paul Gaultier	-	des montres
c. Airbus	-	des voitures
d. Rollex	-	des parfums
18. Complétez « le, la, l' les » :
 - a.rue de Rivoli à Paris.
 - b.hôtel Daneli à Venise
 - c.Parlement européen de Strasbourg.
 - d.musée du Louvre à Paris.

19. Mettez les phrases aux négatifs :
- Marie parle français.
 - Je parle italien.
 - Vous comprenez l'italien ?
 - Melissa connaît Florent.
20. Ecrivez les numéros en lettres :
- 18
 - 25
 - 30
 - 12
21. Quelle est leur nationalité ?
- Céline Dion
 - Michael Jackson
22. Associez :
- | | | |
|-------------------|---|----------|
| a. Un journal | - | la BBC |
| b. Un film | - | le Prado |
| c. Un musée | - | le Times |
| d. Une télévision | - | Titanic |

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Répondez :
- Vous êtes français ?
 - Vous parlez bien français ?
 - Vous comprenez le mot « Bonjour » ?
 - Vous habitez à Paris ?
24. Conjuguez les verbes :
- Ils (parler) français.
 - Nous (connaître) Marseille.
 - Je (être) secrétaire du festival.
 - Elles (comprendre) bien italien.
25. Complétez avec le masculin et le féminin :
- Un étudiant -
 - Un Brésilien -
 - Une artiste -
 - Un acteur – une
26. Accordez le group du nom :
- Les [bon] [restaurant]
 - Les [grand] [voiture]
 - Les [femme] [beau et célèbre]
 - Les [hôtel] [international]
27. Remplissez la fiche de renseignements ci-dessous :
- Nom :
- Nom de jeune fille :
- Prénoms :
- Nationalité :
- Adresse :
- N° de téléphone :
- Adresse électronique :
28. Associez les personnes et les professions :
- | | | |
|--------------------|---|-----------------|
| a. Pablo Picasso | - | scientifique |
| b. Beethoven | - | homme politique |
| c. Albert Einstein | - | artiste |
| d. Barack Obama | - | musician |

29. Complétez avec « un, une, des, le, la, l', les » :
- J'aiamis à Aix-en-Provence. Je connaisprofesseurs de français deuniversité etdirecteur de l'hôtel Ibis.
30. Vous êtes dans la rue avec votre ami(e). Il/elle dit bonjour à un garçon ou à une fille que vous ne connaissez pas. Vous lui demandez « Qui est-il/elle ? ». Rédigez un court dialogue.
31. Vous cherchez des amis français. Vous écrivez un message pour le site « Contact France ». Rédigez ce message.

(6x4=24)

PART-D

Répondez à 2 questions suivantes :

- 32. Présentez-vous.
- 33. Présentez votre ville.
- 34. Ecrivez une brève carte postale à un(e) ami(e) française.
- 35. Vous interrogez votre voisin(e) de vos goûts. Rédigez ce dialogue.

(2x15=30)

Language course II (Additional Language I)
19UHN111.1: PROSE AND ONE ACT PLAYS

No of Credits: 3

No of hours: 4 Hrs/week

Aims of the Course / Objectives

To sensitize the student to the aesthetic and cultural aspects of Literary appreciation and analysis. To introduce modern Hindi prose to the students and to understand the cultural, social and moral values of modern Hindi prose. To understand the One Act Plays.

Course Outcome

Students could get knowledge about the various forms of prose like Kahani, Atmakatha, Sansmaran, Rekhachitra, Vyangya, Jeevani etc. understanding various trends in Hindi and get an awareness of theatre in the context of One Act Plays.

Module 1 & 2

Prose & One Act Play

Prescribed textbook : ‘Gadya Prathibha Evam Ekanki’

Edited by Dr. Girijakumari R.

Published by Lokbharathi Prakashan, Allhabad

Lessons to be studied

Gadya Prathibha

- | | |
|-------------------------------|---------------------|
| 1. Manthra | - Premchand |
| 2. Shishtachar | - Bheeshma Sahni |
| 3. Chori aur Prayachith | - Mahatma Gandhi |
| 4. Gurudev | - Haribhau Upadyay |
| 5. Mein Narak se bol raha hum | - Harisankar Parsai |

Ekanki (One Act Play)

1. Ande ke chilke – Mohan Rakesh
2. Mahabharath ki ek Sanch – Bharathbhooshan Agarval
3. Bahoo ki Vida – Vinod Rasthogi

Books for General Reading

- | | |
|---------------------------|---|
| 1. Hindi ka Gadya Sahitya | - Ramachandra Tivari
Rajkamal Prakashan |
| 2. Hindi Ekanki | - Siddhnath Kumar
Radhakrishna Prakashan |
| 3. Ekanki aur Ekankikar | - Ramcharan Mahendra
Vani Prakashan |

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM
First Semester B.A/B.Sc Degree Examination
Language Course (Additional Language I) - HINDI
19UHN 111.1 Prose and One Act Plays
(2019 Admission onwards)

Time : 3 Hrs.

Max.Marks : 80

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. 'चोरी और प्रायश्चित' गद्य की किस विधा की रचना है?
2. 'गुरुदेव' नामक निबन्ध के रचनाकार कौन है?
3. 'आषाढ का एक दिन' किसका नाटक है?
4. महाभारत युद्ध में परास्त दुर्योधन कहाँ छिप गये?
5. प्रेमचन्द का जन्म कहाँ हुआ?
6. भीष्म साहनी की आत्मकथा का नाम लिखिए?
7. 'बहु की विदा' की बहुएँ कौन-कौन हैं?
8. 'संगीत नाटक अकादमी' पुरस्कार से सम्मानित विनोद रस्तोगी का नाटक कौन सा है?
9. 'सत्य के मेरे प्रयोग' किसकी आत्मकथा है?
10. डाक्टर चड्ढा किस कहानी का पात्र है? (1×10=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. भीष्म साहनी का परिचय दीजिए?
12. 'नहीं-नहीं कैलाश, ईश्वर के लिए इसे छोड़ दो। तुम्हारे पैरों पडती हूँ।" यह किसने किससे किस अवसर पर कहा?
13. गोपाल ने अंडा खाने के लिए कमरे में क्या प्रबन्ध किया है?
14. आत्मकथा और जीवनी में कौन-सा अन्तर है?
15. युधिष्ठिर दुर्योधन को कैसे ललकारा?
16. गाँधीजी के प्रायश्चित का पिताजी पर कौन-सा प्रभाव पडा?
17. कविवर टैगोर ने अंग्रेजी शासन की किस नीति की निन्दा की है?
18. अपने कुत्ते को स्वर्ग में देखकर आदमी की प्रतिक्रिया क्या थी?
19. बहु और बेटी के प्रति जीवनलाल का दृष्टिकोण क्या था?
20. 'मंत्र' कहानी का सन्देश क्या है?
21. "मेरी चोट का इलाज बेटी की ससुरालवालों ने दूसरी चोट से कर दिया है।" जीवनलाल ऐसा क्यों कहता है?
22. परिवार के सब लोग एक-दूसरे से छिपाकर क्यों अंडे खाते हैं? (2×8=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. "मैं तो न जाऊँ, चाहे वह दस लाख भी दें। मुझे दस हजार या दस लाख लेकर क्या करना है? कल मर जाऊँगा फिर कौन भोगनेवाला बैठा हुआ है।" सप्रसंग व्याख्या कीजिए?
24. हेतु की चरित्रगत विशेषताओं पर प्रकाश डालिए?
25. 'अंडे के छिलके' एकांकी का उद्देश्य क्या है?
26. "युधिष्ठिर जाओ, जाओ मुझे मरने दो, तुम अपनी महत्वाकांक्षा को फलते-फूलते देखो। जाओ गुरुजनों और बन्धु-बान्धवों के रक्त से अभिषेक कर राजसिंहासन पर विराजो।" सप्रसंग व्याख्या कीजिए।
27. भगत ने कैलाश को कैसे बचाया?
28. प्रेमचन्द के कहानी साहित्य का परिचय दीजिए?
29. कविवर टैगोर के गार्हस्थ जीवन पर प्रकाश डालिए?
30. भूखे आदमी और कुत्ते की मौत की तुलना कीजिए?
31. दहेज की प्रथा एक अभिशाप है - 'बहू की विदा' एकांकी के आधार पर इस उक्ति की चर्चा कीजिए।

(4×6=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. एकांकी के तत्त्वों के आधार पर 'महाभारत की एक साँझ' एकांकी की समीक्षा कीजिए?
33. 'शिष्टाचार' कहानी का सारांश लिखकर उसकी विशेषताओं पर प्रकाश डालिए?
34. 'बहू की विदा' एकांकी में चित्रित समस्याओं पर प्रकाश डालिए?
35. 'मैं नरक से बोल रहा हूँ' में मनुष्य की अकर्मण्यता और खोखले आदर्शों पर व्यंग्य किया है। इस कथन की पुष्टि कीजिए।

(15×2=30 marks)

സെമസ്റ്റർ : I
 കോഴ്സ് കോഡ് : 19UML111.1
 ലാംഗ്വേജ് കോഴ്സ് : II (അഡീഷണൽ ലാംഗ്വേജ് : I)
 സമയക്രമം : ആഴ്ചയിൽ 4 മണിക്കൂർ (18x4=72മണിക്കൂർ)
 ക്രെഡിറ്റ് : 3

മലയാള കവിത
പുസ്തകം : കാവ്യമാലിക
(കേരള സർവ്വകലാശാലാ പ്രസിദ്ധീകരണം)

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ: (1) മലയാള കവിതയെ സംബന്ധിച്ച് സാമാന്യജ്ഞാനം നൽകുക. (2) പഠിതാക്കളിൽ കാവ്യഭിരുചി വളർത്തുക. (3) ആസ്വാദനത്തിനും വിശകലത്തിനും സജ്ജരാക്കുക. (4) മേൽപ്പറഞ്ഞ ലക്ഷ്യങ്ങൾ മുൻനിറുത്തി സെമിനാർ/അസൈൻമെന്റ് നൽകുക

പാഠ്യപദ്ധതി:

മൊഡ്യൂൾ ഒന്ന് (18 മണിക്കൂർ) കവിത -ആധുനിക കവിത്രയം വരെ

1. എഴുത്തച്ഛൻ - ജരിതാവിലാപം: ഖാണ്ഡവദഹനം
(അരണ്യം തന്നിൽ.....കല്പിച്ചു പോയാളവൾ) 36 വരി
2. വടക്കൻ പാട്ട് - ഉണ്ണിയാർച്ചകൂത്ത് കാണാൻ പോയ കഥ(ആറ്റുംമണമേലൈ വേഗത്തിൽ പോകുന്നു ഉണ്ണിയാർച്ച)
3. കുമാരനാശാൻ - ചണ്ഡാലഭിക്ഷുകി - (തുമതേടും....തെല്ലിട സുന്ദരി 96 വരി)

മൊഡ്യൂൾ ര് (18 മണിക്കൂർ) കവിത്രയാനന്തര കവിത

4. ചങ്ങമ്പുഴ - മനസിനി
5. വൈലോപ്പിള്ളി - ജലസേചനം
6. ഇടശ്ശേരി - പുത്തൻകലവും അരിവാളും
7. എൻ.വി. കൃഷ്ണവാര്യർ - എലികൾ

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ) ആധുനിക പൂർവ്വ- ആധുനിക ഘട്ടം

8. ഒ.എൻ.വി - ഒരു തൈ നടുമ്പോൾ
9. സുഗതകുമാരി - കാളിയമർദ്ദനം
10. അയ്യപ്പപ്പണിക്കർ - ഗോപികാദണ്ഡകം
11. എൻ.എൻ.കക്കാട് - സഫലമീ യാത്ര

മൊഡ്യൂൾ നാല്(18 മണിക്കൂർ) ആധുനിക - ആധുനികാനന്തരഘട്ടം

12. കടമ്മനിട്ട രാമകൃഷ്ണൻ - കുഞ്ഞേ മൂലപ്പാൽ കുടിക്കരുത്
13. ശ്രീകുമാരൻതമ്പി - അമ്മയ്ക്കൊരു താരാട്ട്
14. എ. അയ്യപ്പൻ - നിനക്ക്
15. റോസ്മേരി - ചാഞ്ഞുപെയ്യുന്ന മഴ
16. റഫീക്ക് അഹമ്മദ് - മൊബൈൽഫോൺ
17. വി.എം. ഗിരിജ - ജീവജലം

സഹായകഗ്രന്ഥങ്ങൾ

1. ആധുനിക സാഹിത്യ ചരിത്രം
പ്രസ്ഥാനങ്ങളിലൂടെ - ഡോ.കെ.എം.ജോർജ്ജ് (എഡിറ്റർ)
2. കൈരളിയുടെ കഥ - എൻ. കൃഷ്ണപിള്ള
3. മലയാള കവിതാസാഹിത്യ ചരിത്രം - ഡോ.എം. ലീലാവതി
4. കവിയും കവിതയും രാം വാല്യം - പി.നാരായണക്കുറുപ്പ്
5. കവിയരങ്ങ് - കെ.എസ്. നാരായണപിള്ള
6. കുമാരാനാശാന്റെ കാവ്യപ്രപഞ്ചം - മലയാളവിഭാഗം,
കേരള സർവ്വകലാശാല
7. ഖണ്ഡകാവ്യ പ്രസ്ഥാനം - എം.വി. പണിക്കർ
8. ചങ്ങമ്പുഴ കൃഷ്ണപിള്ള - എൻ.മുകുന്ദൻ
9. ചങ്ങമ്പുഴ കൃഷ്ണപിള്ള
നക്ഷത്രങ്ങളുടെ സ്നേഹ ഭാജനം - എം.കെ.സാനു
10. കുമാരനാശാന്റെ രചനാശില്പം - എം.എം. ബഷീർ
11. കാല്പനികത - ഹൃദയകുമാരി
12. ആധുനിക മലയാളസാഹിത്യം - പി.കെ. പരമേശ്വരൻ നായർ
13. ഇടശ്ശേരിക്കവിത - മേലത്തു ചന്ദ്രശേഖരൻ
14. സിംബലിസം മലയാളകവിതയിൽ - ഡോ.കെ.എം. വേണുഗോപാൽ
15. ആധുനികത മലയാളകവിതയിൽ - ഡോ.എൻ.അജയകുമാർ
16. കേരളകവിതയിലെ കലിയും ചിരിയും - പ്രസന്നരാജൻ
17. ഉത്തരാധുനികത - ബി.ഉണ്ണികൃഷ്ണൻ
18. മലയാളകവിതാപഠനങ്ങൾ - സച്ചിദാനന്ദൻ
19. മലയാളകവിതയിലെ
ഉയർന്നശിരുകൾ - ഡോ.എം.എൻ. രാജൻ
20. കടമ്മനിട്ടയിലെ കവി - ഡോ.കെ.എസ്.രവികുമാർ
21. ദലിത് പഠനം സ്വത്വം,സംസ്കാരം
സാഹിത്യം - ഡോ. പ്രദീപൻ പാമ്പിരിക്കുന്ന്
22. ആധുനിക മലയാള കവിതയിലെ
സ്ത്രീപക്ഷസമീപനങ്ങൾ - ഡോ.പി.ഗീത
23. പാഠങ്ങൾ പഠനങ്ങൾ - സച്ചിദാനന്ദൻ
24. കവിതവായനയും പ്രതികരണവും - എൻ.രാജൻ
25. കവിതയിലെ പുതുവഴികൾ - നെല്ലിക്കൽ മുരളീധരൻ

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

First Semester BA Degree Examination May 2019

CBCSS

19UML 111.1

മലയാള കവിത (കാവ്യമാലിക)

Time : 3 Hrs.

Max.Marks : 80

Section A

I. ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്ക് വീതം

1. ആശാനെ വിപ്ലവത്തിന്റെ ശുക്രനക്ഷത്രം എന്ന് വിശേഷിപ്പിച്ച നിരൂപകൻ ആര്?
2. ആധുനിക കവിത്രയം ആരെല്ലാം?
3. കാല്പനിക പ്രസ്ഥാനത്തിലെ പ്രധാനപ്പെട്ട രണ്ട് കവികളുടെ പേരെഴുതുക.
4. 'ശക്തിയുടെ കവി' എന്ന് വിശേഷിപ്പിക്കുന്നതാരെ?
5. ആധുനിക മലയാള ഭാഷയുടെ പിതാവ് ആര്?
6. 'ആർദ്രമീ ധനുമാസ രാവുകളിലൊന്നിൽ' - ഏത് കവിതയിലെ വരികളാണ്?
7. മലയാളത്തിലെ രണ്ട് പരിസ്ഥിതി കവിതകളുടെ പേരെഴുതുക.
8. ഉണ്ണിയാർച്ച കൂത്ത് കാണാൻ പോയ കഥ ഏത് സാഹിത്യശാഖയിൽ പെടുന്നു?
9. അധികാരം കൊയ്യണമാദ്യം നാം-
അതിനു മേലാകട്ടെ പൊന്നാര്യൻ” - ഏതു കവിതയിലേതാണ് ഈ വരികൾ?
10. “സ്വന്തമെന്ന പദത്തിനെന്തർത്ഥം
ബന്ധമെന്ന പദത്തിനെന്തർത്ഥം” - ഈ വരികൾ മലയാളികൾക്കു സമ്മാനിച്ച കവിപ്രതിഭ ആര്?

(1×10=10)

Section B

II. ഏതെങ്കിലും 8 ചോദ്യത്തിന് അരപ്പുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 2 മാർക്ക് വീതം.

11. “നിർഘൃണനായ പിതാവിവറെയുപേക്ഷിച്ചാൻ”-വിവക്ഷിതമെന്ത്?
12. “പെണ്ണായ ഞാനും വിറയ്ക്കുന്നില്ല-
ആണായ നിങ്ങൾ വിറപ്പതെന്തേ?” - ആരുടേതാണീ വാക്കുകൾ?
13. “അല്ലെല്ലെന്തു കഥയിതു കഷ്ടമേ?” - വിവക്ഷിതം വ്യക്തമാക്കുക.
14. ഒറ്റപ്പത്തിയൊടായിരമുടലുകൾ
കെട്ടുപിണഞ്ഞൊരു മണിനാഗം” - പരാമർശമെന്ത്?

PTO

15. “സങ്കടം കാൺകിലും കാണാതെ പോകയോ
മംഗലേ നീയൊരു മങ്കയല്ലേ?” - സന്ദർഭമേത്?
16. “നിങ്ങൾക്കിതൊന്നും മനസ്സിലാകുന്നില്ല” - ഈ ഉപഹാസത്തിന്റെ അർത്ഥമെന്ത്?
17. ‘ഒരു തൈ നടുമ്പോൾ’ എന്ന കവിതയുടെ പ്രമേയമെന്ത്?
18. ‘വരളുന്ന ചുണ്ടിലെ നനവാർന്ന ഓർമ്മ’യെന്നു കവി വിശേഷിപ്പിച്ചതെന്തിനെ?
19. “അന്യോന്യമുന്നു വടികളായ് നിൽക്കാം” - വിവക്ഷിതമെന്ത്?
20. ‘പുതനാമന്ത്രം പുരണ്ടതായി’ കവി കാണുന്നതെന്തെല്ലാം?
21. ‘നിനക്ക്’ എന്ന കവിതയുടെ കേന്ദ്രതലമെന്ത്?
22. ‘അമ്മയ്ക്കൊരു താരാട്ട്’ എന്ന കവിതയുടെ രചനാ പശ്ചാത്തലം വ്യക്തമാക്കുക.

(8×2=16)

Section C

III. ഏതെങ്കിലും 6 ചോദ്യത്തിന് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 4 മാർക്ക് വീതം.

23. എഴുത്തച്ഛനെ ആധുനിക മലയാളഭാഷയുടെ പിതാവ് എന്ന് വിശേഷിപ്പിക്കുന്നതിനുള്ള കാരണമെന്ത്?
24. നാടൻപാട്ടുകളെ കുറിച്ച് ഒരു ലഘുവിവരണം തയ്യാറാക്കുക.
25. കാല്പനികതയുടെ സവിശേഷതകൾ മനസ്സിലാക്കിയെ ആസ്പദമാക്കി വിശദീകരിക്കുക.
26. ജനങ്ങളിൽ പുതിയ കർമ്മവീര്യം ഉണർത്തുന്നതാണ് ഇടശ്ശേരി കവിതകൾ. പുത്തൻ കലവും അതി വാളും ആസ്പദമാക്കി വിചിന്തനം ചെയ്യുക.
27. സുഗതകുമാരി കവിതകളിലെ ബിംബകല്പന കാളിയമർദ്ദനത്തെ ആസ്പദമാക്കി വിശകലനം ചെയ്യുക.
28. കുഞ്ഞേ മൂലപ്പാൽ കുടിക്കരുത് ഉണർത്തുന്ന സാമൂഹ്യമായ വെല്ലുവിളികൾ പരിശോധിക്കുക.
29. അമ്മയ്ക്കൊരു താരാട്ട് എന്ന കവിതയ്ക്ക് ഒരു ലഘു ആസ്വാദനം തയ്യാറാക്കുക.
30. റഫീക്ക് അഹമ്മദിന്റെ കവിതകളിലെ സമകാലീന ബിംബങ്ങൾ പരിശോധിക്കുക.
31. ചുഷണം ചെയ്യപ്പെടുന്ന പരിസ്ഥിതിയും സ്ത്രീയും ജീവജലത്തിൽ എപ്രകാരം ആവിഷ്കൃതമാകുന്നു എന്ന് ചർച്ച ചെയ്യുക.

(6×4=24)

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ രണ്ടുചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

32. ആശാന്റെ സ്നേഹസങ്കല്പം ചണ്ഡാലഭിക്ഷുകിയെ ആസ്പദമാക്കി വിശകലനം ചെയ്യുക.
33. ആക്ഷേപഹാസ്യ പ്രവണത ‘എലികൾ’ എന്ന കവിതയെ ആസ്പദമാക്കി ചർച്ച ചെയ്യുക.
34. അയ്യപ്പ പണിക്കരുടെ ഗോപികാദണ്ഡകം എന്ന കവിതയ്ക്ക് ഒരു ആസ്വാദനം തയ്യാറാക്കുക.
35. റോസ്മേരിയുടെ ചാഞ്ഞുപെയ്യുന്ന മഴയിലെ സ്ത്രീ സ്വത്വാവിഷ്കാരം ചർച്ചചെയ്യുക.

(15×2=30)

Foundation Course I

19UEN121: WRITINGS ON CONTEMPORARY ISSUES

No of Credits: 2

No of hours: 72(4 per week)

Course Outcome:

1. To sensitize students to the major issues in the society and the world.
2. To encourage them to read literary pieces critically.
3. To have an overall understanding of some of the major issues in the contemporary world.
4. To respond empathetically to the issues of the society.
5. To understand the grave issues of the society, respond to it and to bring about positive changes in individual outlook
6. To read literary texts critically.

Module I: Human Rights

Grim Realities, Hopeful Hues	: V.R Krishna Iyer
Poverty is the Greatest Threat	: N.R Madhava Menon
The Little Black Boy	: William Blake

Module II: Globalization

Going Local; the Economics of Happiness	: Helene Norberg-Hodge
Towards Sustainable and Beneficial Co-existence	: Christabel P.J
Freedom	: Balachandran Chullikkad

Module III: Gender

Violence Against Women	: Gail Omvedt
The Goddess of Revenge	: Lalithambika Antharjanam

Module IV: Intoxicants/ Drug Abuse

The Ban of Alcoholism	: Dr Adithi.N
The Substance Use Disorders in Children	: Dr Ajeesh PR and Adolescents
The Alcoholic at the Dawn	: Jeet Thayil

Core Text: 'Perspectives on Contemporary Issues' Publisher: : 'Emerald' Chennai.

MODEL QUESTION PAPER
19UEN121: Writings on Contemporary Issues

Time: Three hours

Maximum Marks: 80

Section-A

Answer **all** the questions, each in a word or a sentence. Each question carries 1 mark.

1. Expand NHRC.
2. What according to Dr Menon is the foundation of all rights?
3. What is the cloud referred to in the poem, "The Little Black Boy"?
4. What has been the focus of the women's liberation movement in India since its inception?
5. What information did Tatri hide from the men who were attracted towards her?
6. What is TRIPS?
7. What is meant by the term, "food miles"?
8. Why is sleep a kind of freedom?
9. What is pre-alcoholic phase?
10. Why does the cup rattle?

(10 x 1 = 10 marks)

Section-B

Answer any **eight** of the following. Each question carries 2 marks.

11. What is the significance of PILS in our society?
12. How can Third World economies counter the ill effects of globalisation?
13. What does the poet convey by the phrase "bereav'd of light"?
14. What do you know of the "virangana" in Indian culture?
15. According to the woman who appears in the story, what kind of a woman was Tatri?
16. Explain the process by which globalisation occurs in a country.
17. What is the Breakaway Strategy advocated by Hodge?
18. In the poem, 'Freedom', what does the train running north stand for?
19. How does alcohol affect the nervous system?
20. What are the after effects of the misuse of depressants?
21. How can substance abuse be diagnosed in adolescence?
22. What does the phrase "beached whale convey"?

(8 x 2 = 16 marks)

Section-C

Answer any **six** of the following. Each question carries 4 marks.

23. According to V.R. Krishna Iyer, what are the grim ground realities in India at the close of the millennium?
24. Explain the mother's worldview in "The Little Black Boy".
25. How does the social structure influence violence perpetuated against women in India?
26. How did the woman try to avenge her mother, her sisters, and countless other women who had been weak and helpless?
27. What does Joseph E. Stiglitz say about pro-globalisation policies worldwide?
28. Comment on the biblical overtones in 'Freedom'.
29. How is alcoholism categorised?
30. Write a note on the treatment of adolescent substance abuse?
31. Explore the impact of the unusual imagery in 'The Alcoholic at Dawn'.

(6 x 4 = 24 marks)

Section- D

Answer any **two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Write an essay on the imagery and symbolism in the poem, 'The Little Black Boy'.
33. How does Gail Omvedt examine violence against women in India?
34. Explain Hodge's views on globalisation as outlined in the article, 'Going Local'.
35. "Jeet Thayil's poems are honest in their autobiographical touch, unique in their imagery and attention to form." Explain this statement in the light of 'The Alcoholic at Dawn'.

(15 x 2 = 30 marks)

Core course I

19UPH141: BASIC MECHANICS & PROPERTIES OF MATTER

No. of credits: 2

No. of instructional hours per week: 2

Course Outcome

- Understand of concepts and principles related to mechanics and properties of matter.
- Analyze various oscillating systems obeying simple harmonic motion
- Examine the basic principles of mechanics
- Understand the conservation of energy and associated theory
- Understand the basic laws and theorems of fluid dynamics.

Mechanics (22 hrs)

Unit 1– Dynamics of Rigid Bodies (7 hrs)

Equations of motion for rotating rigid bodies–Angular momentum and M.I– Theorems on M.I–Calculation of M.I. of bodies of regular shapes–Uniform rod, ring, disc, annular ring, solid cylinder, hollow cylinder and solid sphere– KE of rotating and rolling bodies –Torque– Determination of M.I of a fly wheel (theory, experiment and applications)

Unit 2– Conservation of Energy (3 hrs)

Energy Conservation law–Work Energy theorem (Proof)–Conservative Forces – potential energy– Conservation of energy for a particle– energy function

Unit 3–Oscillations and Waves (12 hrs)

Simple harmonic motion – Energy of harmonic oscillators– Simple pendulum– Mass on a spring– Oscillation of two particles connected by a spring–Compound bar pendulum –Interchange ability of suspension and oscillation– Four points collinear with C.G about which the time period is the same– Conditions for maximum and minimum periods – Determination of g using symmetric bar pendulum–Mechanical and electromagnetic wave motion–General equation of a wave motion – Expression for a plane progressive harmonic wave–Energy density for a plane progressive wave

Properties of Matter (14hrs)

Unit 4– Elasticity (8 hrs)

Modulus of elasticity (revision)–Relations connecting the three elastic moduli– Poisson’s ratio–Bending of beams–Bending moment – Cantilever– Centrally loaded beams and uniformly bent beams–I section girders– Torsion of a cylinder– Expression for torsional couple – Work done in twisting a wire– Torsion pendulum– Static torsion–Theory and experiment

Unit 5– Surface Tension (3hrs)

Surface Tension– Molecular explanation of ST.– Angle of contact (revision)– Shapes of drops – Expression for excess of pressure on a curved liquid surface – Variation of ST. with temperature– Determination of surface tension by Jaeger’s method.

Unit 6 – Fluid Dynamics (3 hrs) Streamline and turbulent flow–equation of continuity–Bernoulli’s theorem (statement only) –venturi meter – viscosity–Newton’s law–Stoke’s formula–Theory and experiment

Books for Study

1. *Mechanics*: Hans H. S. and Puri S. P, TMH, Second Edn.
2. *Mechanics*: J.C. Upadhyaya and Ram Prasad S. Chand Publications, 2017
3. *Elements of Properties of Matter*: D.S. Mathur, S. Chand Publications, 2008
4. *Fundamentals of Physics*: Halliday and Resnick, Wiley India Pvt. Ltd., 2006

Books for Reference:

1. *Properties of Matter*: Brijlal and Subramaniam, S.Chand & Co., 2004
2. *Principles of Physics*: P.V.Naik, PHI, 2010

MODEL QUESTION PAPER
19UPH141: BASIC MECHANICS & PROPERTIES OF MATTER

Time: 3 hours

Max.Marks:80

Section A

(Answer all questions; one mark each)

1. What is meant by neutral surface?
2. What is the reciprocal of bulk modulus?
3. What is the moment of inertia of a solid sphere of mass M and radius R about tangent?
4. Define theorem of Parallel Axes.
5. At what position will the kinetic energy of a harmonic oscillator be maximum ?
6. What is a compound pendulum?
7. Give the expression for the workdone in twisting a wire.
8. How will the surface tension of a liquid changes with rise in temperature?
9. State the work energy theorem.
10. Give the equation of continuity.

(10×1= 10 Marks)

Section B

(Answer any eight questions; Two mark each)

11. What is an I section girder? What is its importance?
12. What is torsional rigidity of a wire?
13. State Bernoulli's theorem
14. Give a note on non- conservative force
15. State and Prove theorem of Perpendicular Axes.
16. Compare translational and rotational motions.
17. Differentiate 'center of suspension' and 'center of oscillation'.
18. Derive the equation for total kinetic energy of a rolling circular symmetry body.
19. Mention any two uses of Jaegar's method
20. Derive the differential equation of motion for a simple harmonic oscillator.
21. Why smaller liquid drops are spherical in shape?
22. Explain Newton's law of viscosity

(8×2= 16 Marks)

Section C

(Answer any six questions; Four mark each)

23. Find the moment of inertia of (a) a solid cylinder about an axis perpendicular to its axis and passing through its centre of mass (b) a solid sphere about a diameter.
24. A solid sphere of mass 100gm and radius 2.5cm rolls without sliding with a uniform velocity of 10cm/s along a straight line on a smooth horizontal table. Calculate its total energy.
25. A particle executing SHM has a maximum displacement of 4 cm and its acceleration at a distance of 0.01 m from its mean position is 0.03 m/s^2 . What will be its velocity when it is at a distance of 0.02 m from its mean position?
26. What fraction of total energy of a simple harmonic oscillator is kinetic and what fraction is potential when its displacement is half the amplitude?
27. A cantilever of breadth 2 cm and depth 1 cm and 100 cm in length is supported at its ends and a load of 2 kg is applied at its middle point. Calculate the depression at the middle point, if Young's modulus of the beam is 200 GPa.
28. A copper wire 3 m long for which Young's modulus is $1.25 \times 10^{11} \text{ N/m}^2$ has a diameter 1mm. If a weight of 10 kg is attached to one end, what extension is produced? If Poisson's ratio is 0.26, calculate what lateral compression is produced?
29. Two soap bubbles in vacuum having radii 3 cm and 4 cm respectively coalesce under isothermal conditions to form a single bubble. What is the radius of the new bubble?
30. Show that the surface tension of a liquid is numerically equal to the surface energy.

31. The terminal velocity of the copper ball of radius 2mm falling through a tank of oil is 6.5cm/s. Find the viscosity of the oil. Given density of Cu = $8.9 \times 10^3 \text{ kg m}^{-3}$, Density of oil is $1.5 \times 10^3 \text{ kg m}^{-3}$

(6×4=24 Marks)

Section D

(Answer any two questions). Each question carries 15 marks

32. Derive an expression for moment of inertia of solid cylinder i) about its own axis and ii) about an axis passing through its centre and perpendicular to its length.

33. What is a cantilever? Derive an expression for the depression at the free end of a cantilever clamped at one end and loaded at the other end?

34. Explain the Jaegers method for determination of surface tension of a liquid.

35. Obtain an expression for the i) period of oscillation ii) minimum period of oscillation and hence iii) find the length of the equivalent simple pendulum

(15x2=30 Marks)

Complementary Course I

19UMM131.1: Calculus with Applications in Physics-I

No. of Credits:3

Instructional hours per week: 4

Aim:

To provide students the knowledge of differentiation, integration with applications to physics, infinite series and limits, and vector algebra.

Course outcome:

Students will be able to utilize their problem-solving skills in specified areas of Physics.

Module 1: Differentiation with applications to Physics (18 Hours)

(The following topics should be quickly reviewed before going to advanced topics; students should be asked to do more problems from exercises, and these problems should be included in assignments:) Differentiation of products of functions; the chain rule; quotients; implicit differentiation; logarithmic differentiation; Leibnitz theorem

The following topics in this module should be devoted more attention and time.

Special points of a function (especially, stationary points); curvature; theorems of differentiation - Rolles', Mean Value Theorems

Chapter 2, sections 2.1.2 to 2.1.7, (Re-view of ideas through problems), sections 2.1.8, 2.1.9, 2.1.10

More exercises related to the topics in this module can be found in chapter 2 and chapter 3 of reference [1] which is not to be included in ESE.

Module 2: Integration with applications to Physics (18 Hours)

Integration by parts; reduction formulae; infinite and improper integrals; plane polar coordinates; integral inequalities; applications of integration (finding area, volume etc)

Chapter 2, sections 2.2.8 to 2.2.13

More exercises related to the topics in this module can be found in chapter 4, chapter 5 and chapter 7 of reference [1], which is not to be included in ESE.

Module 3: Infinite series and limits (18 Hours)

Definition, Summation of series of various types (Arithmetic series; geometric series; arithmetico-geometric series; the difference method; series involving natural numbers; transformation of series) Convergence of infinite series (Absolute and conditional convergence; series containing only real positive terms; alternating series test) Operations with series (Sum and product)

Power series (Convergence of power series; operations with power series)

Taylor series (to be explained through problems); approximation errors; standard Maclaurin series

Chapter 4, sections 4.1 to 4.6

More exercises related to the topics in this module can be found in chapter 9 of reference [1] and chapter 1 of reference [2], which is not to be included in ESE.

Scalars and vectors, Addition and subtraction of vectors, Multiplication by a scalar, Basis vectors and components, Magnitude of a vector, Multiplication of vectors (Scalar product; vector product; scalar triple product; vector triple product), Equations of lines, planes and spheres, using vectors to find distances (Point to line; point to plane; line to line; line to plane)

Chapter 7, sections 7.1 to 7.8

More exercises related to the topics in this module can be found in chapter 11 of reference [1] and chapter 6 of reference [2], which is not to be included in ESE.

Note: In all modules, proofs of theorems are to be omitted

Text

K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

References

Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons

Ref. 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley

Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press

MODEL QUESTION PAPER
19UMM131.1: Calculus with Application in Physics – I

Time : 3 Hrs

Max 80 Marks

Section A

Answer all questions. Each question carries one mark.

1. Find the derivative of e^x with respect to x .
2. The derivative with respect to x at $f(x) = 2at$, where $x = at^2$ is
3. Give an example of an implicit function.
4. Find the mean value of the function $f(x) = x^2$ between the limits $x = 2$ and $x = 4$.
5. Define geometric series.
6. Evaluate the limit $\lim_{x \rightarrow 0} \frac{\sin x}{x}$.
7. Find the magnitude of the vector $-3i + 4j + 6k$.
8. Write the power series expansion for $\sin x$ at $x = 0$.
9. State the Mean Value Theorem.
10. Find a unit vector parallel to the vector $2i - j + 3k$.

Section B

Answer any 8 questions. Each question carries 2 marks.

11. Find the third derivative of the function $f(x) = x^3 \sin x$, using Leibnitz theorem.
12. Find the radius of curvature at the point (x, y) on the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.
13. Evaluate the integral $\int \frac{6x+2 \cos x}{x^3+\sin x} dx$.
14. Find the length of the curve $y = x^{3/2}$ from $x = 0$ to $x = 2$.
15. Evaluate the sum $\sum_{n=1}^N \frac{1}{n(n+1)}$.
16. Show that if $a = b + \lambda c$, for some λ , then $a \times b = b \times c$.
17. Find the area of the parallelogram with sides $a = i + j + k$ and $b = 4i + 5j + 6k$.
18. Two particles have velocities $v_1 = i + 3j + 6k$ and $v_2 = i - 2j$ respectively. Find the velocity u of the second particle relative to the first.
19. If $2y + \sin y + 5 = x^4 + 4x^3 + 2\pi$, show that $\frac{dy}{dx} = 16$ when $x = 1$.
20. Find the real values of x for which the following series is convergent $\sum_{n=1}^{\infty} \frac{x^n}{n+1}$.
21. Evaluate the integral $\int e^{2x} \cos 3x dx$.
22. Evaluate the triple scalar product $a \cdot (b \times c)$ of the vectors $a = 2i$, $b = j + k$ and $c = i + k$

Section C

Answer any 6 questions. Each question carries 4 marks.

23. Find the positions and nature of the stationary points of the function $f(x) = 2x^3 - 3x^2 - 36x + 2$.
24. Evaluate the integral $\int x^2 dx$ using first principle.
25. Evaluate the integral $\int (\sin x)^5 dx$.
26. Sum the series $\frac{x^4}{3(0!)} + \frac{x^5}{4(1!)} + \frac{x^6}{5(2!)} + \dots$
27. Test the convergence of $\sum_{n=1}^{\infty} \frac{1}{n!} = 1 + \frac{1}{2} + \frac{1}{6} + \dots$
28. Find the angle between the vectors $a = i - 2j + 3k$, $b = 2i + 3j + 4k$.
29. Find the volume of the parallelopiped with sides $a = i - 2j + 3k$, $b = i + 5j + 6k$ and $c = 7i + 8j + 10k$.
30. Evaluate $\int_0^{\infty} x \ln x dx$.
31. Show that the function $y(x) = e^{-|x|}$ is not differentiable at $x = 0$.

Section D

Answer any 2 questions. Each question carries 15 marks

32. (a) Evaluate the integral $\int \frac{2}{1+3 \cos x} dx$ (7)
- (b) Find the surface area of the cone formed by rotating about the x -axis, the line $y = 2x$ between $x = 0$ and $x = h$. (8)
33. (a) Use the difference method to sum the series $\sum_{n=2}^N \frac{2n-1}{2n(n-1)}$. (10)
- (b) Sum the even umbers between 1000 and 2000 inclusive. (5)
34. Find the radius ρ of the circle that is the intersection of the plane $\hat{n} \cdot r = \rho$ and the sphere of radius centered on the point with position vector c .
35. (a) A line is inclined at an angle to x, y and z axes and passes through the origin. Another line passes through the point $(1,2,4)$ and $(0,0,1)$. Find the minimum distance between the two lines. (10)
- (b) If you invest 1000 on the first day of each year, and interest is paid at 5% on your balance at the end of each years, how much money do you have after 25 years. (5)

Complementary Course II

19UCH131.1: THEORETICAL CHEMISTRY

No. of credits: 2

No. of instructional hours per week: 4

Total hours: 36

Course outcome

CO1: To impart a concrete idea of the structure of atoms

CO2: To get an understanding of the basics of bonding in molecules

CO3: To inculcate an overview of radioactivity

CO4: To impart knowledge on the principles of analytical chemistry

CO5: To study the applications of radioactivity and biological hazards of radiation

Module I –Atomic Structure

9hrs

Atomic spectrum of Hydrogen – different series, Rydberg equation, Bohr theory – postulates – statement of Bohr energy equation – derivation of spectral frequency from Bohr equation. Schrodinger wave equation (no derivation mention only) concept of orbitals, the four quantum numbers and their significances. Orbital wise electron configuration, energy sequence rule – Pauli's principle, Hund's rule, stability of filled and half filled orbitals.

Module II - Chemical bonding

9hrs

Energetic of bond formation – Types of Chemical bonds – Energetics of ionic bond formation – Lattice energy – Born Haber Cycle - Fajan's rules.

Polarity of covalent bond its relation with electronegativity – electro negativity scales – Paulings and Mullikan's approaches, factors influencing polarity, dipole moment – its relation to geometry. Hydrogen bond – inter and intra molecular – its consequences on boiling point – volatility and solubility.

Hybridisation and structure of molecules – sp , sp^2 , sp^3 , dsp^2 , dsp^3 , $sp^3 d^2$, and $sp^3 d^3$

hybridisation with examples. Explanation of bond angle in water and ammonia VSEPR theory, geometry of molecules with bond pairs of electrons only, geometry of molecules containing bond pairs and lone pairs of electrons, limitations. A brief review of molecular orbital approach, LCAO method – bond order, bond distance and stability of O_2 , O_2^{2+} , O_2^{2-} , NO , NO^+ , CO and HF .

Module III - Radioactivity

9hrs

Radio active equilibrium (qualitative idea only) detection of radio activity by Wilson's cloud chamber and Geiger Muller, Scintillation counter – units of radio activity – curie and rutherford – Radio carbon dating, Rock dating, Neutron activation analysis. Applications in agriculture and medicine. A brief study of the biological effects of radiation such as pathological and genetic damage, Dosimetry – Units – rad, gray and roentgen. Fricke dosimeter and ceric sulphate dosimeter. Nuclear Chemistry – stability of Nucleus – n/p ratio, artificial transmutation and radio activity, mass defect, binding energy, atomic fission and fusion.

Module IV: Analytical principles

9 Hrs

Analytical methods in Chemistry – principles of volumetric analysis, primary standard, standard solution, normality and molarity, theory of acid - base titration, permanganometric and dichrometric titration, theory of acid – base and redox indicators.

Inorganic qualitative analysis, common ion effect- solubility product- precipitation of cations- chromatography- principle and applications of paper and thin layer chromatography.

References

1. Atomic structure and chemical bonding with introduction to molecular spectroscopy- Manas Chanda, TMH Publishers, 1991.
2. Inorganic chemistry- Puri, Sharma and Kalia, Vishal Publishing Company, 2017
3. Fundamental Concepts of Inorganic Chemistry- E S Gilreath, McGraw Hill, 2015
4. Inorganic chemistry-Madan, S. Chand, 1987.
5. Basic inorganic chemistry-F A Cotton, G Wilkinson and P L Guas, Wiley student Edn,
6. Elements of nuclear chemistry- Arnickar, New Age International, 1995.
7. Text book of qualitative analysis- A I Vogel, Longman, 1979
8. Text book of Quantitative Inorganic Analysis- A I Vogel, Longman, 1989.
9. Quantitative analysis: Laboratory manual- Day and Underwood, Prentice hall, 1980.

MODEL QUESTION PAPER
19UCH131.1: THEORETICAL CHEMISTRY

Time: Three Hours

Maximum Marks: 80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. Write the electronic configuration of Chromium?
2. Name the principle according to which an orbital can accommodate only two electrons?
3. What is the shape of IF_7 molecule?
4. Write the hybridization of Boron in BF_3 ?
5. What is the bond order of O_2^+ ?
6. Emission of ----- from a radioactive element does not bring any change in charge or mass.
7. What is the base of radiocarbon dating.
8. What is the result of the beta emission of group 15 element?
9. A useful indicator for the titration of acetic acid versus sodium hydroxide is -----.
10. Calculate the normality of 10% NaOH solution.

SECTION B

(Answer any eight questions. Each question carries 2 mark)

11. State Hund's rule.
12. Give the general equation for the frequency of the lines in the Balmer series for hydrogen?
13. Write the Schrodinger wave equation and explain the terms?
14. NH_3 and CH_4 have sp^3 hybridization. Shapes of these molecules are different. Why?
15. Distinguish between intermolecular and intramolecular hydrogen bonding?
16. The bond energy of NO^+ is larger than that of NO . Why?
17. Define Soddy's group displacement law?
18. The half life period of Ra^{226} is 1620 years. Calculate the value of K for its decomposition in years^{-1} ?
19. What are beta rays? Which element is formed when beta particle is emitted from Cl-38 ?
20. Phenolphthalein is not suitable for the titration of strong acid X weak base. Why?
21. How would you prepare 100 ml of 0.05M Mohr's salt solution?
22. What are primary standards? Give two examples.

SECTION C

(Answer any six questions. Each question carries 4 mark)

23. Why is Bohr model of atom considered inadequate?
24. Explain hydrogen spectrum?
25. Explain why CO_2 and CCl_4 molecules are non polar but CHCl_3 molecule is polar?
26. Explain the shape of SF_6 molecule.
27. Water exists as liquid at room temperature while H_2S is a gas at the same temperature. Account for the reason.
28. Explain neutron activation analysis and its application?
29. Write a note on (i) Geiger-Muller counter and (ii) Wilson cloud Chamber.
30. Explain the principle and application of paper chromatography?
31. Explain the theory of redox indicators.

SECTION D

(Answer any two questions. Each question carries 15 mark)

32. (i) What are quantum numbers? Give the significance of each? (5 marks)
(ii) Write the postulates of Bohr model of atom? (5 marks)
(iii) Define Aufbau principle with example and explain the stability of half-filled and fully filled orbital? (5 marks)
33. (i) write a short note on Born- Haber cycle?
(ii) Draw and explain the MO diagram for O_2 molecule.
(iii) Describe the different approaches of electronegativity?
34. (i) Derive an equation for the decay constant of a radioactive material.
(ii) If at the end of 67.5 years only 3.125% of a radioactive material remains without decay. What is the half life of the decay?
(iii) Give an example each for proton, neutron and deuteron induced reactions.
35. (i) what are acid base indicators?
(ii) Explain the use of indicators in acid base titrations.
(iii) Discuss the titration curves for the titration of strong acid – strong base and weak acid –strong base?

Semester II

Language Course III

19UENS211: ENVIRONMENTAL STUDIES

Credits: 4

Total Lecture Hours: 90 (5/week)

Course Outcome

The course seeks to introduce students to the major concepts of environmentalism, conservation, intellectual property rights and human rights.

The Course aims to develop a world population that is aware of and concerned about the environment and its associated problems and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively towards solutions of current problems and prevention of new ones.

COURSE OUTLINE

MODULE 1

Unit 1: The Multidisciplinary Nature of Environmental Studies

Significance of Environmental Studies, Definition, scope and importance, WED - Need for public awareness.

Literary Section: Matthew Olzmann's *Letter to Someone Living Fifty Years from Now*

Unit 2: Natural Resources

History of our Global Environment, Changes in Land and Resource use, Earth's Resources and Humans – Atmosphere, Hydrosphere, Lithosphere, Biosphere

Natural cycles between the spheres, Renewable and Non-renewable resources, Natural Resources and Associated problems – Sustainable lifestyles

- Forest resources: Importance, Functions, Use and over-exploitation, deforestation.
- Water resources: Sources of Water, Use and over-utilization of surface and ground water, Global climate change – floods, drought, conflicts over water, Sustainable water management, Dams.
- Mineral resources: Strategic Mining, Mining, Conservation of Mineral Resources, Use and exploitation
- Food resources: World food problems, Food security, Fisheries, Loss of Genetic Diversity, Alternate food sources

Assignment Topic: Energy resources: Growing energy needs, Types of energy – Conventional or Non-renewable Energy sources, Oil and its environmental impacts, Coal and its environmental impacts., Renewable energy – hydroelectric power – drawbacks, Solar energy, Photovoltaic energy, Solar thermal electric power, Biomass energy, Biogas, Wind power, Tidal and Wave power, Geothermal energy, Nuclear power, Energy conservation

- Land resources: Land as a resource, land degradation. Soil Erosion

Role of an individual in the conservation of Natural Resources – Equitable use of Resources for Sustainability.

Literary Section: Sugatha Kumari's *Hymn to the Tree*

MODULE 2

Unit 3: Ecosystems

Concept of an Ecosystem, Understanding Ecosystems, Ecosystem degradation, Resource Utilisation, Structure and functions of an ecosystem, Biotic components – Producers, consumers and decomposers. Abiotic components – Physical factors – Chemical Factors – Biotic community and Tropic level – Food chains, food webs and ecological pyramids. Energy Flow in the Ecosystem – The Water Cycle, The Carbon Cycle, The Nitrogen cycle – Integration of Cycles in Nature, Ecological Succession - Types of Ecological succession.

Assignment Topic

Types of Ecosystem: Terrestrial and Aquatic - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Cropland Ecosystem, Mangrove Ecosystem, Aquatic ecosystems – Pond, lake, wet land, River, Delta and Marine – Threats to Aquatic Ecosystems, Conservation of Aquatic Ecosystems – Mullaperiyar Issue - Assignment

Literature: Wangari Maathai's *Unbowed*

Unit 4: Biodiversity and Its Conservation

Introduction to Biodiversity, definition, Classification: Genetic, Species and Ecosystem diversity. Evolution and the Genesis of Biodiversity, Biogeographic classification of India, India's Biogeographic zones, Value of Biodiversity – Consumptive Use Value and Productive Use Value, Social Values, Ethical and Moral values, Aesthetic value, Option Value. Biodiversity at Global, National and Local levels, India as a Mega Diversity Nation. Hot-spots of

biodiversity.

Assignment Topic: Threats to biodiversity: habitat loss, poaching of wildlife, human/wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity. Humans and the Web of life, Rights of Species
Literature: Olivia Judson's *Big Bird*

MODULE 3

Unit 5: Environmental Pollution

Definition of Environmental pollution, Classification of Pollutants.

Major forms of Pollution: Air pollution – Causes, Effects, Ozone Depletion, Control Measures, Water pollution – Causes, Consequences, State of India's Rivers, Ganga Action Plan- Assignment Topic. Control Measures, Soil pollution – Causes, Effects, Control measures. Marine pollution – Causes, Effects, Control Measures. Pollution due to organic wastes, Control measures, Noise pollution – Causes, Effects, Control Measures. Acid rain, Greenhouse Effect, Thermal pollution – Causes, Effects, Controlling Thermal Pollution. Nuclear hazards – Sources, Effects, Radiation Control Measures.

Waste: Solid Waste Management Classification, Role of Individuals, Disaster management – **Case Study:** Endosulfan Tragedy, "Marble Cancer" of Taj Mahal, Chernobyl disaster in Ukraine, The Exxon Valdez Oil Spill, Chandigarh as "City Beautiful", The Swachh Bharat Abhiyan, Plachimada struggle in Palakkad

Literature: *God's Own Country*, an extract from Arundhati Roy's *God of Small Things*

Unit 6: Social Issues and the Environment

Introduction to Social Issues and the Environment – From unsustainable to sustainable development. Think Globally, Act Locally. Urban problems related to energy, Water conservation and Strategies, Rain water harvesting, Watershed management. Resettlement and Rehabilitation of people: Problems and concerns, Environmental ethics: Issues and possible solutions, Equity-Disparity in the Northern and Western Countries, Urban and Rural Equity, Gender Equity, Preservation of resources for future generations. The Ethical Basis of Environmental Education and Awareness. Conservation Ethic and Traditional value systems of India,

Assignment Topic: Environmental Issues of Grave Consequences: Climate change, Global warming, Acid rain, Ozone Layer depletion, Nuclear Accidents and Nuclear Holocaust, Wasteland reclamation, Consumerism and Waste Products, The Environment Protection Act, Issues involved in Enforcement of Environmental Legislation – Environment Impact Assessment, Citizen actions and Action Groups, Environmental Clearance. Public Awareness
Literature: Salim Ali's *Man and Nature in India: The Ecological Balance*

MODULE 4

Unit 7: Human Population and the Environment

Introduction to Human Population and the Environment, Urbanisation, Environment day and Human health, Human Rights, Value Education, Women and Child Welfare. Role of Information technology in Environment and Human health

Literature: Sujatha Devi's *Government Protocol*

Books for Reference: Core Text: 'Our Fragile Earth - Home' [To be published by the Dept]

- Adams, W.M. Future Nature: A Vision for Conservation. London: Earthscan, 2003.
- Arnold, David and Ramachandra Guha, ed. Nature, Culture and Imperialism: Essays on the Environmental History of South Asia. New Delhi: Oxford UP, 2001.
- Bahuguna, Sunderlal. "Environment and Education". The Cultural Dimension of Ecology. Ed. Kapila Vatsyayan. New Delhi: D.K. Printworld. 1998.
- Crson, Rachel. Silent Spring. Boston: Houghton Mifflin, 1962.
- Guha, Ramachandra- Environmentalism: A Global History, New Delhi: Oxford UP, 2000.
- Hayward, Tim. Ecological Thought: An Introduction: Cambridge; polity, 1994.
- Merchant, Crolyn. The Death of Nature. New York: Harper, 1990.
- Gleick H.P. 1993. Water in Crisis, Pacific Institute for Studies in development Environment and security. Stockholm Env Institute. OUP 473 p.
- Heywood V and Watson R.E. 1995. Global biodiversity Assessment. CUP 1140p
- Odum FP. 1971. Fundamentals of Ecology. W.B Saunders Co. USA 574p
- Rao. M. N and Dutta A.K. 1987. Waste Water Treatmentt. Oxford and IBH Publ Co Pvt.
- Wagner K.D. 1998. Environmental Management. WB Saunders Co. Philadelphia, USA. 499p.

MODEL QUESTION PAPER
19UENS211: Environmental Studies

Time: Three hours

Maximum Marks: 80

Section-A

Answer **all the questions**, each in a word or a sentence. Each question carries 1 mark.

1. Define the term environment.
2. Name the three 'R' s.
3. What forms the abiotic part of nature?
4. Bhopal Gas Leak Tragedy was caused by the release of _____ gas.
5. Expand IUCN.
6. What is ecocriticism?
7. What, according to Salim Ali, is the most important remedy for ecological balance?
8. How did the river appear in Rahel's eyes??
9. Why are humans called "ungrateful ones"?
10. What sinks to grief according to Frost?

(10 x 1 = 10 marks)

Section-B

Answer **any eight** of the following. Each question carries 2 marks.

11. Write a brief note on the four dynamic constituents of the environment.
12. What is deforestation?
13. Write a note on Women and Child Welfare
14. Explain watershed management.
15. What are the main characteristics of biodiversity hotspots?
16. What is Municipal Solid Waste?
17. Why is the History House described as having turned its back on Ayemenem?
18. What is Chandiram's complaint against the narrator?
19. How are frogs useful in paddy cultivation?
20. What were Wangari Maathai's mother's views about the fig trees?
21. Why is the tree compared to Lord Neelakanta?
22. What does the phrase "seagulls rippled with jet fuel" refer to?

(8 x 2 = 16 marks)

Section-C

Answer **any six** of the following. Each question carries 4 marks.

23. Define alternate food sources.
24. What are the important methods of conservation of biodiversity?
25. Write a short note on rainwater harvesting.
26. Write a note on AIDS.
27. Why is Environmental Studies considered multidisciplinary in scope?
28. Why is the Australian rainforest described as a living museum?
29. What does Salim Ali mean by saying that senseless use of advanced technology has tended to boomerang on humans?
30. Describe the ambience around the stream named Kanungu.
31. How does the narrator seek to establish that her generation was capable of refined thinking?

(6 x 4 = 24 marks)

Section- D

Answer **any two** of the following, each in about three hundred words. Each question carries 15 marks.

32. Discuss the various types of pollution and the effective strategies to contain them.
33. What is an ecosystem? What are the main types of ecosystems?
34. How does Sugatha Kumari present the importance of tree to the environment as a whole and to humans in particular?
35. Why does Sujatha Devi say, "Summits should take place inside the mind. Not at Rio"?

(15 x 2 = 30 marks)

Language Course IV

19UEN212.1: ENGLISH GRAMMAR AND COMPOSITION

Credits: 3

Total Lecture Hours: 72 (4/week)

Course Outcome:

On completion of the course, the students should be able to

1. Have an appreciable understanding of English grammar.
2. Produce grammatically and idiomatically correct spoken and written discourse.
3. Spot language errors and correct them.
4. Have a good understanding of modern English grammar.
5. Produce grammatically and idiomatically correct language.
6. Improve their verbal communication skills.
7. Minimise mother tongue influence.
8. Write essays and letters on general topics enabling them to excel in competitive exams
9. Write CVs and Resumes to apply for various posts

COURSE OUTLINES

Module 1

Parts of Speech – Infinitive – gerund – nouns – pronouns- adjectives – verbs – adverbs – prepositions – conjunctions – determiners

Module 2

Sentence types – simple – complex – compound – sentence types based on sense – interrogative – assertive –negative – imperative – exclamatory – modal verbs– conditional clauses.

Module 3

Tenses – articles – voices – active – passive – reported speech. Subject verb agreement – Remedial grammar

Module 4

Précis writing – comprehension – letters – CV – cover letter – reports – essays.

Core Text: Hart, Steven, Aravind R. Nair and Veena Bhambhani. *Embark English for Undergraduates*. CUP, 2016.

Further Reading:

1. Moothathu, V. K. Concise English Grammar. Oxford University Press, 2012.
2. Leech, Geoffrey et al. English Grammar for Today: A New Introduction. 2nd Edition. Palgrave, 2008.
3. Carter, Ronald and Michael McCarthy. Cambridge Grammar of English. CUP, 2006.
4. Greenbaum, Sidney. Oxford English Grammar. Indian Edition. Oxford University Press, 2005.
5. Sinclair, John ed. Collins Cobuild English Grammar. Harper Collins Publishers, 2000.
6. Driscoll, Liz. Common Mistakes at Intermediate and How to Avoid Them. CUP, 2008.
7. Tayfoor, Susanne. Common Mistakes at Upper-intermediate and How to Avoid Them. CUP, 2008.
8. Powell, Debra. Common Mistakes at Advanced Level and How to Avoid Them. CUP, 2008.
9. Burt, Angela. Quick Solutions to Common Errors in English. Macmillan India Limited, 2008.
10. Turton. ABC of Common Grammatical Errors. Macmillan India Limited, 2008.
11. Leech, Geoffrey, Jan Svartvik. A Communicative Grammar of English. Third Edition. New Delhi: Pearson Education, 2009.

MODEL QUESTION PAPER
19UEN212.1/19UEN211.2: English Grammar and Composition

Time: **Three hours**

Maximum Marks: **80**

Section A

Fill in the blanks as directed. **Answer all the questions.**

1. She plays the violin well,.....? (Add a suitable question tag)
2. The leaves fluttered _____ in the breeze. (Use the correct adverbial form of “slight”)
3. Chinese is a language I find difficult. (Fill in with a suitable relative pronoun)
4. Gayathri _____ sing at the concert ((Choose will/could))
5. Sanjay has been living here 2000. (Choose for/since)
6. It is a deserted street. (Identify the adjective)
7. Neither of the boys absent. (Choose is/are)
8. Prevention is..... than cure. (Fill in with the suitable comparative)
9. The teacher put the papers the drawer.(Supply a suitable preposition)
10. Pass the salt, please. (Identify the type of sentence)

(10 x 1 = 10 marks)

Section B

Answer any eight of the following questions as directed:

11. Fill in the blanks using “a”, “an”, “the’ or the “zero article”, wherever they are appropriate
_____ chair I am sitting on is hard. But with _____ couple of pillows, I can make myself comfortable.
Do you mind giving me _____ red pillow placed on _____ cot there?
12. Correct the following sentences:
 1. Despite of his illness he came to school.
 2. I am still remembering his service.
13. Rewrite the sentences beginning with “It”:
 1. To smoke too much is dangerous.
 2. This problem is not easy to solve.
14. Convert the following sentences as directed:
 1. How cold it is today! (Change into assertive)
 2. She obeys her parents. (Change into a question.)
15. Change into comparative and positive:
Bangalore is the cleanest city in India.
16. Use the correct form of Question tag:
 1. She expects to meet him at the station.
 2. He hid behind the door.
17. Use the correct tense form of the verbs given in brackets:
 1. He never (talk) while he (drive) a car.
 2. By next year, he..... (complete) this novel and started the next.
18. Rewrite as directed.
 1. She came back. (Put the following adverbs – at six; hurriedly; to her room – in the right order)
 2. She has a ribbon. (Put the following adjectives – blue, long – in the right order)
19. Do as directed.
 1. When I saw her last, she (live) with her aunt. (Use the correct tense form)
 2. He was killed by a robber by a knife. (Correct the sentence)
20. Rewrite as directed
 1. I am interested in cooking, and _____ prepare a feast in two hours. (Use can/could)
 2. The thief saw the police. He fled. (Combine the sentences using no sooner . . . than)
21. Rewrite the sentences.
 1. He talks English in a fluent way. (Convert the underlined phrase into an adverb)
 2. He is known for his honesty. (Convert the underlined noun into an adjective)
22. Fill in the blanks with the appropriate adverb or adjective
 1. The drunkards behaved _____ towards one another. We are experiencing _____ weather today. (rough/roughly)
 2. I can _____ understand what you have written. You have to work _____ to improve your handwriting. (hard/hardly)

(8 x 2 = 16 marks)

Section C

Answer **any six** questions from the following sections (23 to 31):

23. Correct the following sentences: (All questions should be attempted)
1. The chief guest gave a brilliant speech.
 2. When I entered the room, I found my watch is stolen.
 3. Ooty is notorious for its sceneries.
 4. He carried all his luggages alone.
24. Fill in the blanks with appropriate tense forms
I _____ just _____ (finish) my project here in the US. Now I _____ (go) back to Nigeria. I _____ (stay) there for the rest of my life. It _____ (be) summer in Nigeria this time of the year. I _____ (know) this but all my life I _____ (think) of “overseas” as a cold place of woollen coats and snow. So I _____ (buy) the thickest sweaters I could find.
25. Rewrite as directed. (All questions should be attempted)
1. On Teacher’s Day, students of our school handle all the classes (Change into passive)
 2. The Redfort is a very fascinating historical monument in India. (Change into the Comparative Degree)
 3. Among all the professions, medicine is the oldest. (Change into Positive)
 4. Vivek said, “The boys in the room are practicing a song to be sung at the Annual Day”. (Change into indirect speech)
26. Rewrite as directed. (All questions should be attempted)
1. Prakash said, “My parents are coming home tomorrow so I have arranged a party”. (Rewrite into reported speech)
 2. She said, “What a lovely flower!” (Change into indirect speech)
27. Change the voice:
1. The teacher has given a book to Ravi.
 2. The CEO is briefing the Secretary on the corrections to be made in the speech.
 3. My friend stole my watch.
 4. Ravi buys chocolates for me from the newly opened Bakery.
28. Your parents have visited you in your boarding school. Introduce your best friend to your parents.
29. Write five sentences on the “Importance of Value Education Classes”.
30. Write a paragraph on “Reading”.
31. Imagine you are the headmaster of a school. Write a letter to a book distributor regarding the purchase of books for the school library, requesting information about the price, availability of discounts etc.

(6x 4 = 24 marks)

Section D

Answer **any two** of the following:

32. You are Abhisekh Sharma, a postgraduate in Journalism. Prepare a cover letter and resume for the post of Sub-editor in “The Indian Chronicles”, leading English daily.
33. (i) Write a précis on the following passage. (7 marks)
- Differences, big or small, can always be noticed even within a national group, however closely bound together it may be. The essential unity of the group becomes apparent when it is compared to another national group, though often the differences between two adjoining groups fade out or intermingle near the frontiers, and modern developments are tending to produce a certain uniformity everywhere. In ancient and medieval times, the idea of the modern nation was non-existent, and feudal, religious, racial or cultural bonds had more importance. Yet I think that at almost at any time in recorded history an Indian would have felt more or less at home in any part of India and would have felt as a stranger and alien in any other country. He would certainly have felt less of a stranger in countries which had partly adopted its culture or religion. Those who professed religion of non-Indian origin, or, coming to India, settle down here, became distinctively Indian in the course of a few generations, such as Christians, Jews, Parsees, Muslims. Indian converts to some of these religions never ceased to be an Indian on account of their change of faith. They were looked upon in other countries as Indians and foreigners, even though there might have been a community of faith between them. (217 words)
- (ii) Answer the following questions from the passage given above: (8 marks)
1. Which phenomenon is noticed at the frontiers of different nations?
 2. What features were prominent in ancient times?
 3. What happened to the immigrants in India in the course of a few generations?
 4. What is the quality of Indian converts?
- (7+ 8 = 15 marks)
34. Write an essay on “The Role of Media” (Answer in about two to three pages) (15 marks)
35. Write a report on the following topic in about 300 words. (15 marks)
- Stray dog menace in your locality.**

Language course V (Additional Language II)

19UFR211.1: TRANSLATION AND COMMUNICATION IN FRENCH

No of Credits: 3

No of hours: 4 Hrs/week

COURSE OBJECTIVES:

1. To ameliorate the level of language proficiency
2. To analyse the translated texts.
3. To enhance the ability to translate to the target language.

COURSE OUTCOME:

The students would be able to enhance their communication skills with the assistance of translation.

SYLLABUS:

NAME OF TEXT: ECHO-A1 méthode de français

Authors: J. Girardet & J. Pecheur

Publisher: CLE INTERNATIONALE

- Leçon 3 : On se détend ? (Pages : 22 -29)
- Leçon 4 : Racontez-moi (Pages : 30 – 44)
- Leçon 5 : Bon Voyage ! (Pages : 46 – 53)

Reference books:

- Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
- Le Nouveau Sans Frontières Vol I by Philippe Dominique
- Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER
19UFR211.1: TRANSLATION & COMMUNICATION IN FRENCH

TIME: 3HRS

MAX MARKS: 80

PART-A

Répondez à toutes questions suivantes:

1. Quels loisirs aimez-vous ?
2. Qui est Jean Paul Sartre ?
3. Qu'est-ce que c'est « TV5 Monde » ?
4. Nommez un monument français ?
5. Qu'est-ce que c'est « SNCF » ?
6. Qu'est-ce que c'est « le Nouvel Observateur » ?
7. Quelles villes connaissez-vous en France ?
8. Quelle heure est-il maintenant ?
9. Nommez deux moyens du transport ?
10. Qui est le président actuel de la France ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Ecrivez en chiffres:
 - a. Trois heures dix
 - b. Cinq heures et quart
 - c. Huit heures moins vingt-cinq
 - d. Midi
12. Répondez par « vrai » ou « faux » :
 - a. Le français est très utilisé en Suisse et au Maroc.
 - b. Le Québec est une région de France.
 - c. Une commune est un petit village.
 - d. Les Français déjeunent entre 14h et 15h 30.
13. Complétez avec les prépositions qui conviennent :
 - a. Antonio est né Espagne.
 - b. Il est venu Paris pour passer une semaine de vacances.
 - c. Il est arrivé hier 10 heures.
 - d. Il habiteun ami.
14. Choisissez le bon article :
 - a. Le week-end, Marie fait [le/du] sport. Elle aime [le/du] tennis. Elle fait aussi [un/du] vélo avec des amis.
 - b. Je connais [le/un] bon restaurant sur l'avenue des Champs-Élysées.
15. Quels sont les jours de la semaine ?
16. Rédigez un message de deux phrases :
 - a. Vous recevez l'invitation d'une amie pour la soirée au Saturne. Vous refusez.
17. Traduisez en français :
 - a. Are you interested ?
 - b. Clermont is a pleasant city.
 - c. See you soon.
 - d. Paul and Sophie work together.
18. Faites des comparaisons:
 - a. Entre L'Australie et La France
 - b. Entre Paris et Milan
19. Complétez avec « ce, cet, cette, ces » :
 - a. Qui sontpersonnages ?
 - b. Je connais.....acteur. c'est Depardieu.
 - c. Etchanteuse, c'est Laurie.
 - d. Regardevisiteur. C'est un personnage de cire !

20. Complétez avec « moi, toi, lui, elle, nous, vos, eux, elles » :
- Flore fait du sport avec Pierre et Antoine ?
- Oui, elle fait du tennis avec
 - Flore habite chez Marie ?
- Oui, elle habite chez
 - Elle travaille pour M. Dumont ?
- Oui, elle travaille pour
 - Elle vient en vacances avec nous ?
- Oui, elle vient avec
21. Complétez avec « pouvoir, vouloir, devoir » :
- Tufaire du ski ?
- Je voudrais bien mais je nepas skier.
 - Et toi, Flore, tu viens ?
- Désolée. Je nepas. Jetravailler tout le week-end.
22. Formulez les informations suivantes comme dans l'exemple :
Ex : 03-02-1970. Naissance de Celia. → Celia est née le 3 février 1970.
1992. Entrée à l'université.
 - Juin 1995. Diplôme de professeur d'anglais.
 - 25-08-1994. Rencontre avec William
 - Septembre 1998. Départ pour l'Australie.

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Mettez les verbes au passé composé :
« Je (aller) au cinéma avec Pierre. Nous (voir) un film très amusant. Puis nous (faire) une promenade au jardin des Tuileries. Après, je (rentrer) chez moi. »
24. Ecrivez l'heure :
- 09 :20
 - 15 :30
 - 16 :45
 - 00 :15
25. Trouvez les questions:
-? Non, Je n'ai pas compris.
 -? Non, Je n'ai pas lu le texte.
 -? Oui, J'ai travaillé bien.
 -? Oui, j'ai écouté bien.
26. Accordez les mots entre parenthèses :
« [Cher] Eva,
Je suis à Paris pour quinze [jour] avec des [copain]. C'est une très [beau] ville. »
27. Répondez :
- Est-ce que Tina est française ? Non, elle.....
 - Est-ce qu'elle parle bien français ? Non, elle.....
 - Est-ce qu'elle apprend le français ? Oui, elle
 - Est-ce qu'elle a des amis à Paris ? Oui,
28. Traduisez en anglais :
« Chers amis,
Il fait beau. La mer est bonne et l'île d'Oléron est magnifique. Laurent fait du gold. Moi, du vélo. On rencontre des gens sympas. Voulez-vous venir le week-end du 24 ? On a envie de découvrir deux ou trois restos avec vous. »
29. Complétez avec les adjectifs possessives :
« Noémie montre des photos à Lucas »
- Regarde ! Voiciappartement à Laval.
 - Ici, c'est la maison de.....parents avecjardin.

- Voici, amie Charlotte.

30. Traduisez en anglais :

« Je me suis inscrite à une école de langue pour travailler mon français. J'ai eu mon premier cours. Je suis rentrée à 10 heures, fatiguée. Je suis allée sur Internet et J'ai chatté jusqu'à minuit. J'adore parler avec Tom. Il connaît le monde entier. »

31. Traduisez en français :

- a. Of course! We can also take a taxi.
- b. Do you want to come to discover the region?
- c. They do a lot of activities.
- d. I am very happy.

(6x4=24)

PART-D

Répondez à 2 questions suivantes:

32. Vous allez habiter en France chez madame et monsieur Duval. Ils ne vous connaissent pas. Ecrivez-leur pour vous présenter. Indiquez votre nom, votre âge, votre profession, votre nationalité, votre niveau en français, vos loisirs.
33. Vous avez visité la ville de Cannes. Vous écrivez une carte postale à une amie. Rédigez cette carte postale.
34. Choisissez un voyage que vous avez fait et présentez-le.
35. C'est vendredi soir. Vous êtes seul(e). vous n'avez pas envie de rester chez vous. Vous avez envie de sortir. Vous téléphonez à vos amis. Rédigez ce dialogue.

(2x15=30)

Language course V (Additional Language II)
19UHN211.1: FICTION, SHORT STORY & NOVEL

No of Credits: 3

No of hours: 4 Hrs/week

Aims of the Course / Objectives

To guide the students to the world of Hindi Fiction (Novel and short story). To develop the capacity of creative process and communication skills.

Course Outcome

The fiction generally activates the consciousness among young people. To facilitate in students a love for reading, assessing the character and the use of language. Develop many essential skills of vocabulary enhancement and sentence structure.

Module 1

Short story – ‘Swarna Kahaniyam’ – edited by

Dr. Girijakumari R.

Published by Lokbharathi Prakashan, Allahabad

Stories to be studied (Detailed)

- | | |
|---------------------------|----------------------|
| 1. Dooth ka Dam | - Premchand |
| 2. Heelibone ki Bathakein | - Agyeya |
| 3. Hathiyare | - Amarkanth |
| 4. Nail cutter | - Udaya Prakash |
| 5. Hari Bindi | - Mridula Garg |
| 6. No Bar | - Jayaprakash Kardam |

Module 2

Novel (Non-Detailed)

Mobile - Kshama Sharma

Rajkamal Prakashan, Delhi

Books for General Reading

- | | |
|------------------------------------|---|
| 1. Adhunik Hindi Kahani | - Dr. Lakshmi Narayan Lal
Vani Prakashan |
| 2. Hindi Kahani ka Ithihas 1, 2, 3 | - Gopal Rai
Raj kamal Prakashan |
| 3. Hindi Upanyas ka Ithihas | - Gopal Rai
Rajkamal Prakashan |
| 4. Adhunikatha aur Hindi Upanyas | - Indranath Madan, Rajkamal Prakashan |
| 5. Kahani, Nayi kahani | - Namvar Singh, Rajkamal Prakashan |

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM
Second Semester B.A/B.Sc Degree Examination
Language Course (Additional Language II) - HINDI
19UHN 211.1 Fiction, Short Story & Novel
(2019 Admission onwards)

Time : 3 Hrs.

Max.Marks : 80

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. प्रेमचन्द का जन्म कहाँ हुआ?
2. मधु का पूरा नाम क्या है?
3. 'नदी के द्वीप' किसका उपन्यास है?
4. नवीन खन्ना क्या काम करता है?
5. चन्द्रा कौन है?
6. मधु और फरहत कहाँ काम करती थी?
7. 'पालगोमरा का स्कूटर' किसका कहानी संग्रह है?
8. मधु की बेटियों के नाम लिखिए?
9. राजेश किस कहानी का पात्र है?
10. फरहत के अनुसार आजकल टी.वी. पर कैसी सीरियलों की बाढ़ आयी है? (1×10=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. मधु ने टी.वी में युद्ध का कौन-सा दृश्य देखा?
12. प्रेमचन्द के चार उपन्यासों के नाम लिखिए?
13. मधु की माँ ने अपनी नौकरी क्यों छोड़ दी?
14. बाबु महेशनाथ कौन थे? गाँव के जच्चेखानों के सुधार में क्या-क्या बाधाएँ थीं?
15. फरहत क्यों कहती है कि 'घर की राजनीति, देश की राजनीति से ज़्यादा मुश्किल है'?
16. शिकार की तलाश में गये हीली-बोन और कैप्टन दयाल ने लोमड़ी के बिल में क्या देखा?
17. फरहत की पारिवारिक स्थिति कैसी है?
18. कहानीकार जयप्रकाश कर्दम का परिचय दीजिए?
19. मधु मोबाइल क्यों खरीदना चाहती है?
20. महिला स्वतंत्रता का चित्रण हरी बिन्दी में कैसे किया है?
21. दफ़्तर के लोग मधु को सत्य हरिश्चन्द्र की नातिन क्यों कहते थे?
22. माँ अपनी हथेली कथावाचक के सामने क्यों फैला दी? (2×8=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. 'प्रेमचन्द अब भी समकालीन है' - पठित कहानी के आधार पर विचार कीजिए।

24. विट्ठल भैया और मधु के संबन्ध पर प्रकाश डालिए?
25. कैप्टन दयाल ने हीली-बोन की क्या सहायता की?
26. "वह एक रात को चुपके से मेरे घर आ पहुँचा। गिडगिडाकर बोला जब तक मदद न करेंगे, मेरी किताब लिखी नहीं जाएगी। मुझे दया आ गई कि आदमी शरीफ है और इस के लिए कुछ कर देना चाहिए।" सप्रसंग व्याख्या कीजिए।
27. फरहत का चरित्र-चित्रण कीजिए।
28. हरी बिन्दी की नायिका पात्र की विशेषताएँ लिखिए?
29. 'नो बार' कहानी का उद्देश्य क्या है?
30. मधु को इन्क्रीमेन्ट मिलने पर साथियों की प्रतिक्रिया क्या थी?
31. क्षम शर्मा के व्यक्तित्व और कृतित्व पर प्रकाश डालिए?

(4×6=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. उपन्यास के तत्वों के आधार पर 'मोबाइल' उपन्यास की समीक्षा कीजिए?
33. 'दूध का दाम' कहानी सामाजिक रीति-रिवाजों पर तीखा प्रहार है।" इस उक्ति की आलोचन कीजिए?
34. 'हत्यारे' कहानी की कथावस्तु संक्षेप में लिखकर उसकी विशेषताओं पर प्रकाश डालिए?
35. मधु का चरित्र-चित्रण कीजिए?

(15×2=30 marks)

സെമസ്റ്റർ	:	II
കോഴ്സ് കോഡ്	:	19 UML 211.1
ലാംഗ്വേജ് കോഴ്സ്	:	V (അഡീഷണൽ ലാംഗ്വേജ് : II)
സമയക്രമം	:	ആഴ്ചയിൽ 4 മണിക്കൂർ
ക്രെഡിറ്റ്	:	3

ഗദ്യസാഹിത്യം

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ:

1. വിദ്യാർത്ഥികളുടെ ആശയവിനിമയശേഷി വർദ്ധിപ്പിക്കുക.
2. ഔദ്യോഗിക/ഭരണകാര്യങ്ങളും ശാസ്ത്രവിഷയങ്ങളും മലയാളഭാഷയിലൂടെ അവതരിപ്പിക്കാനുള്ള കഴിവാകുക.
3. ഭാഷാപരമായ പാകപ്പിഴകൾ പരിഹരിക്കുക, ഭാഷാശുദ്ധിനിലനിർത്തുക
4. വിവർത്തനത്തിൽ പ്രായോഗിക പരിശീലനം നൽകുക:
5. മാധ്യമ മലയാളത്തിൽ വിനിമയലോകം മനിലാക്കുക.
6. മലയാള ഗദ്യസാഹിത്യത്തിലെ പ്രധാനസാഹിത്യ കൃതികൾ പരിചയപ്പെടുത്തുക
7. രചനകളെ സ്വയം വിശകലനത്തിന് വിധേയമാക്കുക.

പാഠ്യപദ്ധതി

മൊഡ്യൂൾ ഒന്ന് (27 മണിക്കൂർ) മാധ്യമ മലയാളം, ഉപന്യാസം

മാധ്യമങ്ങൾ-സമൂഹവും മാധ്യമങ്ങളും - മാധ്യമങ്ങൾ തുറന്നുതരുന്ന വിനിമയസാധ്യതകൾ - സൈബർമലയാളം - സൈബർസാഹിത്യം - സാഹിത്യേതര രചനകൾ താഴെപ്പറയുന്ന ലേഖനങ്ങളുടെ വിശദപഠനം

1. മാധ്യമഭാഷ ഇന്ന് (മലയാളഭാഷയും ആഗോളവത്കരണവും) കേരള യൂണിവേഴ്സിറ്റി പ്രസിദ്ധീകരണം ഡോ. അനിതകുമാരി
2. മലയാളകാല്പനികത - ഡോ.പി.വി. വേലായുധൻപിള്ള
3. ജീവിതമെന്ന അത്ഭുതം - (ആമുഖം) ഡോ. വി.പി.ഗംഗാധരന്റെ അനുഭവങ്ങൾ
4. നമ്മുടെ ലോകം നാം സൃഷ്ടിക്കുന്നു - കെ.പി. കേശവമേനോൻ
5. വാക്കിന്റെ വരവ് - (ആലോചന എന്ന സമാഹാരത്തിൽ നിന്ന്) എം.എൻ. കാരശ്ശേരി

മൊഡ്യൂൾ രണ്ട് (27 മണിക്കൂർ)

ചെറുകഥ

മലയാള ചെറുകഥയുടെ വികാസപരിണാമങ്ങളെപ്പറ്റിയുള്ള സാമാന്യജ്ഞാനം. ആഖ്യാന തന്ത്രങ്ങളുടെ വൈചിത്ര്യം. പ്രമേയത്തിലും രൂപശിൽപ്പത്തിലും സംഭവിച്ച മാറ്റങ്ങൾ എന്നിവ മനിലാക്കുന്ന തരത്തിലുള്ള ബോധനസമ്പ്രദായങ്ങൾ സ്വീകരിക്കുക.

1. എനിക്ക് ആത്മഹത്യ ചെയ്യാൻ മതിയായ കാരണമില്ലയോ? - സി.വി. കുഞ്ഞിരാമൻ
2. പൊതിച്ചോറ് - കാരൂർ
3. കടൽത്തീരത്ത് - ഒ. വി. വിജയൻ
4. പത്രം - സക്കറിയ
5. ഹിഗ്ഗിറ്റ് - എൻ. എസ്. മാധവൻ
6. വീഡിയോ ചിത്രങ്ങൾ - അഷ്ടമൂർത്തി
7. കൃഷ്ണഗാഥ - കെ. ആർ മീര
8. തല്പം - സുഭാഷ് ചന്ദ്രൻ

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

നോവൽ

മലയാളസാഹിത്യത്തിന്റെ വികാസ പരിണാമങ്ങളെക്കുറിച്ചുള്ള സാമാന്യജ്ഞാനം ഉാകുന്നതരത്തിലുള്ള ബോധനസമ്പ്രദായം സ്വീകരിക്കുക. (സന്ദർഭവും സ്വാരസ്യവും വ്യക്തമാക്കുകയെന്നതരത്തിലുള്ള ചോദ്യത്തിനു നാലുകെട്ടിന്റെ ആദ്യനാലധ്യായം മാത്രമേ ഉപയോഗിക്കാവൂ)

വിശദപഠനം:

നാലുകെട്ട്: എം.ടി വാസുദേവൻ നായർ

റഫറൻസ് ഗ്രന്ഥങ്ങൾ

1. സമ്പൂർണ്ണ മലയാള സാഹിത്യ ചരിത്രം - എഡിറ്റർ പന്മന രാമചന്ദ്രൻ നായർ
2. കൈരളിയുടെ കഥ - എൻ. കൃഷ്ണപിള്ള
3. ആധുനിക സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ - ഡോ.കെ.എം. ജോർജ്ജ്
4. മലയാളനോവൽ സാഹിത്യ ചരിത്രം - ഡോ.കെ.എം.തരകൻ
5. മലയാള ചെറുകഥാ സാഹിത്യചരിത്രം - ഡോ.എം.എം.ബഷീർ
6. നോവൽ സാഹിത്യം - കെ.സുരേന്ദ്രൻ
7. നോവൽ സ്വരൂപം - കെ.സുരേന്ദ്രൻ
8. നോവൽ സിദ്ധിയും സാധനയും - പി.കെ.ബാലകൃഷ്ണൻ
9. നോവൽ സാഹിത്യപഠനങ്ങൾ - ഡോ. ഡി.ബഞ്ചമിൻ
10. ആധുനിക നോവൽ ദർശനങ്ങൾ - കെ.എം. തരകൻ
11. ചെറുകഥാ പ്രസ്ഥാനം - എം.പി. പോൾ
12. ചെറുകഥ ഇന്നലെ, ഇന്ന് - എം. അച്യുതൻ
13. ചെറുകഥ - വാക്കുംവഴിയും - കെ.എസ്.രവികുമാർ
14. നോവൽ പഠനങ്ങൾ - ഡോ.പന്മന രാമചന്ദ്രൻ നായർ
15. ചെറുകഥാ പഠനങ്ങൾ - ഡോ.പന്മന രാമചന്ദ്രൻ നായർ
16. കഥയും ഫാന്റസിയും - ഡോ.വത്സലൻ വാതുശ്ശേരി
17. കഥയിലെ ആത്മീയസഞ്ചാരങ്ങൾ - ഡോ.ഇ. രമാഭായി
18. കഥ അനുഭവവും ആഖ്യാനവും - ഡോ.കെ.പി.അപ്പൻ
19. കഥയും ഭാവുകത്വപരിണാമവും - ഡോ.കെ.എസ് രവികുമാർ
20. ഏകാന്തനഗരങ്ങൾ - ഡോ.പി.കെ രാജശേഖരൻ
21. ഭാരതപര്യടനം - കുട്ടികൃഷ്ണമാരാർ
22. മാധ്യമങ്ങളും മലയാളസാഹിത്യവും - കേരളഭാഷാ ഇൻസ്റ്റിറ്റ്യൂട്ട്
23. മാധ്യമങ്ങളും മലയാളസാഹിത്യവും - എം.വി. തോമസ്, കേരള സാംസ്കാരിക പ്രസിദ്ധീകരണവകുപ്പ്
24. തെറ്റില്ലാത്ത മലയാളം - പ്രൊഫ. പന്മന രാമചന്ദ്രൻ നായർ
25. തെറ്റുംശരിയും - പ്രൊഫ. പന്മന രാമചന്ദ്രൻ നായർ

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Second Semester BA/BSc Degree Examination

CBCSS

Language Course

19UML211.1: ഗദ്യസാഹിത്യം

Model Question Paper

Time: 3Hrs.

Max. Marks: 80

Section A

ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്കു വീതം.

1. മലയാളത്തിലെ ആദ്യ ചെറുകഥ ഏത്?
2. കാരൂരിന്റെ രണ്ട് കഥകളുടെ പേരെഴുതുക.
3. അധ്യാപക കഥകളെഴുതിയ ചെറുകഥാകാരൻ ആര്?
4. 'പത്രം' ആരുടെ ചെറുകഥയാണ്?
5. 'കുടല്പുരിന്റെ കഥാകാരൻ' എന്നറിയപ്പെടുന്നതാര്?
6. അസൂരവിത്ത് ആരുടെ നോവലാണ്?
7. 'വീഡിയോ ചിത്രങ്ങൾ' എന്ന കഥ എഴുതിയതാര്?
8. 'കുശ്ശിരി' ആരുടെ ചെറുകഥയാണ്?
9. 'മാധ്യമഭാഷ ഇന്ന്' എന്ന ലേഖനത്തിന്റെ കർത്താവ്?
10. 'വാക്കിന്റെ വരവ്' ആരുടെ ലേഖനമാണ്?

(10x1=10മാർക്ക്)

Section B

അരപ്പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും എട്ടെണ്ണത്തിന് ഉത്തരമെഴുതുക. 2 മാർക്ക് വീതം.

11. അധ്യാപക കഥ എന്ന നിലയിൽ പൊതിച്ചോറിന്റെ പ്രസക്തി വ്യക്തമാക്കുക.
12. പത്രം എന്ന ചെറുകഥയ്ക്ക് ഒരു ആസ്വാദനക്കുറിപ്പ് തയ്യാറാക്കുക.
13. മാധ്യമഭാഷയുടെ പ്രസക്തി വിശദമാക്കുക.
14. മലയാള സാഹിത്യത്തിൽ കാല്പനികതയ്ക്ക് എത്രത്തോളം പ്രാധാന്യമുണ്ട്? വിശദമാക്കുക.
15. 'ജീവിതമെന്ന അത്ഭുതം' എന്ന ലേഖനത്തിൽ ഡോ. വി. പി. ഗംഗാധരൻ വിശദമാക്കുന്ന അനുഭവങ്ങൾ എന്തെല്ലാം?

16. വാക്കിന്റെ ഉത്ഭവത്തെക്കുറിച്ച് എം. എൻ കാർശ്ശേരി കണ്ടെത്തുന്ന അഭിപ്രായങ്ങൾ എന്തെല്ലാം?
17. തെറ്റുണ്ടെങ്കിൽ തിരുത്തുക.
1. പീഡനം 2. പ്രക്രിതി 3. അർത്ഥം 4. രാജ്ഞി
18. തെറ്റു തിരുത്തുക.
അവിരാമമായി പെയ്തുകൊണ്ടിരുന്ന മഴയിലേക്ക് ഒടുവിൽ ഗത്യന്തരമില്ലാതെ അയാൾ സ്വയം ആത്മഹത്യ ചെയ്യുന്നതിനെക്കുറിച്ച് ആലോചിച്ചുകൊണ്ടിരുന്നു.
19. വീഡിയോചിത്രങ്ങൾ എന്ന കഥയിൽ ഉത്തരാധുനികതയുടെ അംശങ്ങൾ കണ്ടെത്താമോ? വിലയിരുത്തുക.
20. സി. വി. കുഞ്ഞിരാമന്റെ രചനാശൈലി വ്യക്തമാക്കുക.
21. നമ്മുടെ ലോകം എങ്ങനെയായിരിക്കണമെന്നാണ് കെ. പി. കേശവമേനോൻ അഭിപ്രായപ്പെടുന്നത്?
22. ആഗോളവൽക്കരണത്തെക്കുറിച്ച് ഡോ. ടി. അനിതാകുമാരിയുടെ അഭിപ്രായമെന്ത്?
(8x2=16മാർക്ക്)

Section C

ഏതെങ്കിലും 6 ചോദ്യങ്ങൾക്ക് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക. 4 മാർക്ക് വീതം.

23. എം. ടി. വാസുദേവൻനായരുടെ രചനാശൈലി 'നാലുകെട്ടി'നെ ആസ്പദമാക്കി പരിശോധിക്കുക.
24. മൂന്നിലൊന്നായി സംഗ്രഹിക്കുക.
എത്ര മഹത്തായ കവിതയെഴുതിയ കവിയാണെങ്കിലും പുതുതായി എഴുതുന്ന കവിതയെക്കുറിച്ച് വായനക്കാർ അതെങ്ങനെ സ്വീകരിക്കുമെന്നോർത്ത് ഉത്കണ്ഠപ്പെടുകയും വിറകൊള്ളുകയും ചെയ്യുന്ന കവിമനസ്സുകളെക്കുറിച്ച് കേട്ടിട്ടുണ്ട്. വലിയ എഴുത്തുകാരിലും ഇത്തരം ഉത്കണ്ഠകളുണ്ടാകാറുണ്ട്. എന്നാൽ നമ്മുടെ നാട്ടിലെ ചില കവികൾക്ക് തങ്ങളെഴുതുന്ന എല്ലാറ്റിനെക്കുറിച്ചും വലിയ മതിപ്പാണ്, അഭിമാനവുമാണ്. തങ്ങളുടെ കവിതകളുടെ മഹത്വം മനസ്സിലാക്കാത്ത നിരൂപകരോട് അവർക്ക് വിദ്വേഷമാണ്, പൂച്ഛുവുമാണ്.
25. ആശയ വിപുലനം ചെയ്യുക.
“കാരസ്കരത്തിൻ കുരു പാലിലിട്ടാൽ
കാലാന്തരേ കയ്പു ശമിപ്പതുണ്ടോ”?
26. ആധുനിക ചെറുകഥയുടെ സവിശേഷതകൾ വിശദമാക്കുക.
27. മലയാളകവിതയിലെ കാല്പനികതയുടെ കടന്നുവരവ് എപ്രകാരമായിരുന്നു?
28. 'എനിക്ക് ആത്മഹത്യ ചെയ്യാൻ മതിയായ കാരണമില്ലയോ' എന്ന ചെറുകഥയ്ക്ക് ഒരു ആസ്വാദനം തയ്യാറാക്കുക.
29. ആധുനിക ചെറുകഥകളിൽ സക്കറിയയുടെ കഥകൾക്കുള്ള സ്ഥാനം വ്യക്തമാക്കുക.
30. ഉത്തരാധുനികതയുടെ സവിശേഷതകൾ വിശദമാക്കുക.

31. മലയാളത്തിലേക്ക് വിവർത്തനം ചെയ്യുക.

Twinkle twinkle little star
How I wonder what you are
Up above the world so high
Like a diamond in the sky

(6x4=24മാർക്ക്)

Section D

മൂന്നു പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ടു ചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

- 32. പരിസ്ഥിതിക കേന്ദ്രീകൃത വികസനത്തെക്കുറിച്ച് ഉപന്യസിക്കുക.
- 33. ആദ്യകാല ചെറുകഥകളുടെ സവിശേഷതകൾ ക്രോഡീകരിക്കുക.
- 34. മലയാള നോവൽ സാഹിത്യത്തിൽ 'നാലുകെട്ടി' നുള്ള പ്രാധാന്യം വിലയിരുത്തുക.
- 35. 'നമ്മുടെ ലോകം നാം സൃഷ്ടിക്കുന്നു' എന്ന ലേഖനത്തിൽ കെ. പി. കേശവമേനോൻ കണ്ടെത്തുന്നത് എന്തെല്ലാം? വിവരിക്കുക.

(2x15=30മാർക്ക്)

Core Course II

19UPH241: HEAT AND THERMODYNAMICS

No. of credits: 2

No. of instructional hours per week: 2

Course Outcome

- Understand the fundamental thermodynamic properties and various laws of thermodynamics
- Solve problems using the properties and relationships of thermodynamic systems
- Analyze basic thermodynamic cycles
- Understand the various phenomena of transference of heat

Thermodynamics

Zeroth and First Law of Thermodynamics (10 Hrs)

Thermodynamic system, Extensive and intensive Thermodynamic Variables, Thermodynamic Equilibrium, Zeroth Law of Thermodynamics & Concept of Temperature, Concept of Work & Heat, First Law of Thermodynamics and its differential form, Internal Energy, First Law & isochoric-isobaric-adiabatic-cyclic-isothermal processes, Applications of First Law to specific heat: General Relation between C and C_v , Application of first law of thermodynamics to latent heat, Work Done during Isothermal and Adiabatic Processes, Slopes of adiabatic curve and isotherm, Relation between adiabatic and isothermal elasticities

Second Law of Thermodynamics (8 Hrs)

Reversible and Irreversible processes, Heat Engines, Carnot's Cycle, Carnot engine & efficiency. Refrigerator & coefficient of performance, 2nd Law of Thermodynamics: Kelvin-Planck and Clausius Statements. Carnot's Theorem. Applications of Second Law of Thermodynamics, Otto Engine and Diesel Engine – working and efficiency.

Entropy (12 Hrs)

Concept of Entropy, change of entropy in reversible and irreversible cycles,. Clausius Inequality, Second Law of Thermodynamics in terms of Entropy. Entropy of a perfect gas. Principle of Increase of Entropy, Entropy and disorder, Nernst theorem and Third Law of Thermodynamics, Unattainability of Absolute Zero. Unavailable energy and heat death of Universe, Change in entropy in a reversible isothermal process, Change in entropy in a reversible adiabatic process, Change in entropy in a reversible isobaric process, change in entropy during a reversible process at constant pressure and constant temperature, Calculation of entropy when ice is converted into steam, Change in entropy associated with the mixing of water (different masses) at different temperatures, Temperature–Entropy diagram for Carnot's Cycle, Thermodynamic functions, The Maxwell's relations, Applications of Maxwell's thermodynamic relations: Specific heat equation & Clausius-Clapeyron Equation.

Transference of heat (6 hrs)

Thermal conductivity - determination by Lee's Disc method for bad conductor radial flow of heat, cylindrical flow, thermal conductivity of rubber, Wiedmann-Franz law, Radiation of heat, Stefan's law, determination of Stefan's constant, solar constant, determination of solar temperature.

Books for study:

1. Heat and Thermodynamics- Brijlal &Subramaniam-S. Chand & Co
2. Thermal Physics: Kinetic Theory, Thermodynamics and Statistical Mechanics – Garg, Bansal & Ghosh – McGrawHill Education 2nd Edn.
3. Heat and Thermodynamics –D. S. Mathur -S. Chand &Co
4. Thermal and Statistical Mechanics- S.K. Roy - NewAge International
5. Thermal Physics, Statistical Physics and Solid State Physics – C. J. Babu-Calicut University Press
6. Engineering Thermodynamics –P. K. Nag- McGraw-Hill-5th edn.

Books for reference:

1. Heat and Thermodynamics-Zemansky-McGraw-Hill
2. Heat and Thermodynamics–Rose C McCarthy -The Rosen Publishing Group, Inc.NY- 2005
3. Thermodynamics,Kinetic Theory and Statistical Thermodynamics-F. W. Sears and G. L. Salinger-Addison-Wesley Publishing Company- 3rd edn.

MODEL QUESTION PAPER
19UPH241: HEAT AND THERMODYNAMICS

Time: 3 Hrs

Maximum Marks: 80

Part – A (Answer all questions each in a word or a sentence; 1 mark each)

1. What happens to the temperature of a body under steady state?
2. Define thermal conductivity.
3. What is the rate of energy emission per unit area when the absolute temperature of a black body is doubled?
4. What is the entropy change in reversible adiabatic process?
5. What is the magnitude of Stephan's constant?
6. What is the SI unit of thermal conductivity?
7. State Wien's law.
8. Write the expression for Stefan's law
9. Define solar constant.
10. State first law of thermodynamics.

(10x1=10 marks)

Part – B (Answer any eight questions; 2 marks each)

11. Define the term thermal diffusivity?
12. What is Wiedmann-Frenz Law?
13. What is meant by solar Constant?
14. What is Nernst Theorem?
15. Explain the concept of entropy and disorder.
16. State second law of thermodynamics in terms of entropy.
17. What are intensive and extensive thermodynamic variables.
18. State Zeroth law of thermodynamics.
19. Derive the expression for work done during adiabatic expansion of gas
20. Using first law of thermodynamics show that for an adiabatic process
21. What are the differences between petrol engine and Diesel engine?
22. What is a heat engine? Mention some of the features of a heat engine

(8x2=16marks)

Part – C (Answer any six questions; 4 marks each)

23. A bar of length 1m and uniform area of cross section 10 cm^2 is made of first 60% with copper and the remaining with iron. The free end of copper part is held at 300°C and the other end is kept at ice point. If the sides of the bar are thermally insulated, find the rate of flow of heat at steady state. Thermal conductivity of copper is 0.9 and that of iron is 0.2 cgs units.
24. Calculate the rate of energy emitted per unit area of a black body maintained at 1000 K. (Given $\sigma = 5.67 \times 10^{-8} \text{ J/s/m}^2$)
25. Obtain the change in entropy when 50 g of water is heated from 0°C to 100°C ?
26. Calculate the energy exchanged through radiation between two black bodies held at 200°C and 1000°C . (Given $\sigma = 5.67 \times 10^{-8} \text{ J/s/m}^2$)
27. Show that slope of an adiabatic curve is γ times that of an isothermal curve.
28. Obtain the efficiency of a Carnot engine using TS diagram.
29. One mole of a gas at 27°C at 3 atmospheric pressure is compressed to $1/10$ of its volume (a) Slowly, (b) suddenly. What is the resulting temperature?
30. What is the efficiency of a Carnot engine working between ice point and steam point?
31. A Carnot's engine with sink temperature 27°C has 50% efficiency. By how much should the source temperature be changed to increase its efficiency to 60% ?

(6x4=24marks)

Part – D (Answer any two, each carries 15 marks)

32. Explain how to obtain the temperature of sun based on the principles of black body radiation.
33. Derive the Maxwell's equations of thermodynamics.
34. Write an experiment to measure the thermal conductivity of bad conductor by Lee's Disc method.
35. Explain the working of an Otto engine. Derive an expression for its efficiency.

(2 x 15=30marks)

Complementary Course III

19UMM231.1: Calculus with applications in Physics - II

No. of Credits: 3

Instructional hours per week: 4

Aim:

To enable students to acquire sound knowledge of concepts related to complex numbers, hyperbolic functions, partial differentiations, multiple integrals and vector differentiation.

Course outcome:

Students will acquire the skills to use variables and functions and apply the knowledge of integration and partial differentiation in various fields.

Module 1 : Complex numbers and hyperbolic functions (18 hours)

Basic operations (Addition and subtraction; modulus and argument; multiplication; complex conjugate; division), Polar representation of complex numbers (Multiplication and division in polar form), de Moivre's theorem (trigonometric identities; finding the n^{th} roots of unity; solving polynomial equations), Complex logarithms and complex powers, Applications to differentiation and integration, Hyperbolic functions (Definitions; hyperbolic trigonometric analogies; identities of hyperbolic functions; solving hyperbolic equations; inverses of hyperbolic functions; calculus of hyperbolic functions)

Chapter 3, sections 3.1 to 3.7

More exercises related to the topics in this module can be found in chapter 6 of reference [1] and chapter 13 of reference [4],] which is not to be included in ESE.

Module 2 : Partial differentiation (18 Hours)

Basics, The total differential and total derivative, Exact and inexact differentials, theorems of partial differentiation, The chain rule, Change of variables, Taylors theorem for many-variable functions, Stationary values of many-variable functions, Stationary values under constraints.

Chapter 5, sections 5.1 to 5.9

More exercises related to the topics in this module can be found in chapter 13 of reference [1], which is not to be included in ESE.

Module 3 : Multiple integrals (18 Hours)

Double integrals, Triple integrals, Applications of multiple integrals (Areas and volumes), Change of variables in multiple integrals -Change of variables in double integrals; evaluation some special infinite integrals, change of variables in triple integrals; general properties of Jacobians

Chapter 6, sections 6.1 to 6.4

More exercises related to the topics in this module can be found in chapter 14 of reference [1], which is not to be included in ESE.

Module 4 : Vector differentiation (18 Hours)

Differentiation of vectors, Composite vector expressions; differential of a vector, Integration of vectors, Space curves, Vector functions of several arguments, Surfaces, Scalar and vector fields

Vector operators, Gradient of a scalar field; divergence of a vector field; curl of a vector field, Vector operator formulae, Vector operators acting on sums and products; combinations of grad, div and curl, Cylindrical and spherical polar coordinates

Chapter 10, sections 10.1 to 10.9

More exercises related to the topics in this module can be found in chapter 3 of reference [3], which is not to be included in ESE.

Note: In all modules, proofs of theorems are to be omitted

Text

K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

References

Ref. 1 : H Anton, I Bivens, S Davis. Calculus, 10th Edition, John Wiley & Sons

Ref. 2 : Mary L Boas. Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley

Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press

Ref. 4 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India

Second semester B.Sc Degree
Examination First Degree Programme
Under CBCSS Complementary Course for
Physics

MM1131.1 : Mathematics II-Calculus with applications in Physics

Time:3hrs

Max marks:80

Section – I

All questions are compulsory. Each question carries 1 mark

- 1 Find the modulus and argument of the complex number $z = 2-3i$
- 2 Define principal argument of a complex number.
- 3 Find the total differential of $f(x,y) = ye^{(x+y)}$
- 4 What is the condition for a differential $A(x,y)dx + B(x,y)dy$ to be exact?
- 5 What is the formula for the mean value of a function of 3 variables?
- 6 Find $\frac{\partial(u,v)}{\partial(x,y)}$ where $u=x+y, v=x-y$.
- 7 Find $\int_{x=0}^1 \int_{y=0}^1 \int_{z=0}^1 dzdydx$
- 8 Find the derivative of $\mathbf{r}(t) = 2t^2 \mathbf{i} + (3t - 2)\mathbf{j} + (3t^2 - 1)\mathbf{k}$.
- 9 Write down the formula for the gradient of a scalar field.
- 10 Find the divergence of $\mathbf{f} = x\mathbf{i} + y^2\mathbf{j} + z^3\mathbf{k}$.

Section – II

Answer any 8 questions from questions 11 to 22. Each question carries 2 marks

- 11 If $z = 3+4i$ and $w = 2 - i$ plot $z+w$ and $w - z$ in an argand diagram.
- 12 Write down the conditions to determine the maxima and minima of a function $z = f(x,y)$ which has continuous first and second partial derivatives.
- 13 A possible equation for a gas is $PV=RT e^{\left(\frac{-\alpha}{VRT}\right)}$. Find $\left(\frac{\partial P}{\partial V}\right)_T$ where α and R are constants.
- 14 Express $z = \frac{3-2i}{-1+4i}$ in the form $x+iy$.
- 15 Find the value of $e^{\frac{-i\pi}{2}}$ and use it once in the expression i^i to show that its value is $e^{\frac{-\pi}{2}}$.
- 16 Show that $f(x,y) = x^2 + y^2$ has a minima at $(0,0)$.
- 17 Write down the formula for Jacobian.
- 18 Write down the formula for the centre of mass of a solid or lamina

body.

- 19 Evaluate $\int_0^1 \int_0^1 xydydx$.
- 20 Find the curl of the vector field $\mathbf{a} = x^2y^2z^2\mathbf{i} + y^2z^2\mathbf{j} + x^2z^2\mathbf{k}$.
- 21 Find the Laplacian of $f = xy^2z^3$.
- 22 Find the divergence of $\mathbf{r} = x\mathbf{i} + y\mathbf{j} + z\mathbf{k}$.

Section – III

Answer any 6 questions out of questions 23 to 31. Each question carries 4 mark each

- 23 Using the identity $\log(a + ib) = \frac{1}{2}\log(a^2 + b^2) + itan^{-1}\frac{b}{a}$ or by using $a = e^{\log a}$ show that $2^i = \cos(\log 2) + i \sin(\log 2)$.
- 24 Show that $\sinh^{-1}x = \log(x + \sqrt{x^2 + 1})$ and $\cosh^{-1}x = \log(x \pm \sqrt{x^2 - 1})$.
- 25 By integrating $e^{(a+ib)x}$ and separating real and imaginary parts, find the integrals of $e^{ax}\cos bx$ and $e^{ax}\sin bx$.
- 26 Find the stationary values of $f(x,y) = 4x^2 + 4y^2 + x^4 - 6x^2y^2 + y^4$ and classify them as maxima, minima or saddle points.
- 27 If $x = e^u \cos \theta$, $y = e^u \sin \theta$ and if $f(x,y) = \phi(u, \theta)$, show that $\phi_u^2 + \phi_\theta^2 = (x^2 + y^2)(f_x^2 + f_y^2)$ where f_x denotes the partial derivative of f with respect to x .
- 28 Find the volume of the tetrahedron bounded by three coordinate planes and plane $\frac{x}{a} + \frac{y}{b} + \frac{z}{c} = 1$.
- 29 Calculate the Jacobian $\frac{\partial(x,y,z)}{\partial(r,\theta,\phi)}$ where $x = r\sin\theta\cos\phi$, $y = r\sin\theta\sin\phi$, $z = r\cos\theta$
- 30 Show that $\text{curl}(\text{grad } \phi) = 0$.
- 31 Find $\mathbf{r}_u \times \mathbf{r}_v$ where $\mathbf{r} = u \cos v \mathbf{i} + u \sin v \mathbf{j} + u \mathbf{k}$.

Section – IV

Answer any 2 questions out of questions 32 to 35

- 32 a) Prove $\cosh^2 x - \sinh^2 x = 1$.
- b) For the quantities $x' = x \cosh \phi - ct \sinh \phi$ and $ct' = -x \sinh \phi + ct \cosh \phi$ appearing in special theory of relativity, show that $x'^2 - (ct')^2 =$

$$x'^2 - (ct')^2.$$

(c) Express x and ct in terms of x' , ct' , φ .

33 (a) Find the points where the function $f(x,y) = x^3 e^{-(x^2+y^2)}$ has maximum or minimum.

(b) Write down the first 3 terms of the Taylor's series for $f(x,y) = \cos(xy)$.

34 a) Evaluate $\iint_R (a + \sqrt{x^2 + y^2}) dx dy$, where R is the region bounded by the circle $x^2 + y^2 = 1$.

(b) For a right circular solid cylinder of radius a , mass M , uniform density ρ and extending from $z = -b$ to $z = +b$, show that moment of inertia I about the origin is $M\left(\frac{a^2}{2}, \frac{b^2}{3}\right)$, using the formula $I = \int_V (x^2 + y^2 + z^2) \rho dv$ and the fact that $\rho = \frac{M}{\pi a^2 (2b)}$.

35 (a) Find the element of the area on the surface of a sphere of radius a and hence calculate the total surface of the sphere.

(b) Find the expressions of the infinitesimal vector displacement dr in cylindrical co-ordinates.

Complementary Course IV

19UCH231.1: Physical Chemistry-I

No. of credits: 2

No. of instructional hours per week: 4

Total hours: 36

Course outcome

CO1: To impart an idea of the laws of thermodynamics

CO2: To get an understanding of the basics of heat changes in chemical reaction

CO3: To inculcate an overview of the characteristics of chemical equilibria

CO4: To impart knowledge on the concept of acid and base

CO5: To calculate pH

Module I –Thermodynamics

9hrs

First law of thermodynamics, mathematical form, intrinsic energy, enthalpy, reversible, process and maximum work, work of expansion of an ideal gas in reversible isothermal process. Heat capacity of gases at constant volume and constant pressure, derivation of $C_p - C_v = R$. Second law of thermodynamics, entropy and free energies, significance of ΔG , ΔH and available work – criteria of equilibrium, and spontaneity on the basis of entropy and free energy – Gibbs-Helmholtz equation.

Module II Thermochemistry

9hrs

Enthalpies of formation, combustion, neutralization, solution and hydration. Relation between heat of reaction at constant volume and constant pressure, variation of heat of reaction with temperature. Kirchoff's equation, Hess's law and application – bond dissociation energies and bond energies of different types of bonds, their calculation and enthalpies of reaction.

Module III –Chemical Equilibrium

9 hrs

Reversible reactions – K_p , K_c and K_y and their inter relationships – Free energy change and chemical equilibrium (thermodynamic derivation) – van't Hoff reaction isotherm and isochore - influence of pressure and temperature on the following reactions.

$N_2 + 3H_2 \leftrightarrow 2NH_3$ (ii) $PCl_5 \leftrightarrow PCl_3 + Cl_2$ (iii) $2SO_2 + O_2 \leftrightarrow SO_3$ Le Chatelier's principle and the discussion of the above reactions on its basis.

Module IV–Ionic Equilibrium

9hrs

Concepts of Acids and Bases, ionization of weak electrolytes. Influence of solvent on acid strength – leveling effect - pH and its determination by potentiometric method. Buffer solutions and calculations of their pH. Henderson equation. Hydrolysis of salt – degree of hydrolysis and hydrolytic constant, derivation of relation between K_w and K_h for salts of strong acid – weak base, weak acid - strong base and weak acid – weak base.

References

1. Principles of physical chemistry-Puri, Sharma and Pathania, Vishal Publishing Co., 2007.
2. Advanced physical chemistry-Gurudeep Raj, Goel Publishing House, 200
3. Thermodynamics for chemists- S Glastone, D. Van Nostrand company 1947.
4. Elements of physical chemistry- Glastone and Lewis, Macmillan Publishers, 1960.
5. A text book of physical chemistry-K L Kapoor McGraw Hill, 2019.
6. Physical chemistry-P C Rakshit, Levant Books, 1969.

MODEL QUESTION PAPER
19UCH231.1: PHYSICAL CHEMISTRY- I

Time: Three Hours

Maximum Marks: 80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. What is a reversible process?
2. Write the first law of thermodynamics.
3. What is an isochoric process?
4. What is standard enthalpy of formation?
5. Write one example for an exothermic reaction.
6. What is enthalpy of hydration?
7. What is rate constant?
8. What is the significance of ΔG ?
9. What is common ion effect?
10. What is the pH of 0.01M HCl?

SECTION B

(Answer any eight questions. Each question carries 2 mark)

11. One mole of an ideal gas at 25 °C is allowed to expand isothermally and reversibly from a volume of 10 liters to 20 liters. Calculate the work done by the gas?
12. State the first law of thermodynamics. What are its limitations?
13. Write the relation between ΔG , ΔH and ΔS . What is the condition for spontaneity of a process?
14. Calculate the enthalpy of hydrogenation, $C_2H_4(g) + H_2(g) \rightarrow C_2H_6(g)$. Given that bond energy of H-H: 433kJ, C=C :615kJ and C-C: 347kJ and C-H :413kJ.
15. Define Enthalpy of formation.
16. What is bond dissociation energy?
17. State Le Chatlier principle.
18. What is isochoric process?
19. What are the characteristics of equilibrium constant?
20. Define Lewis acid and base.
21. What is meant by levelling effect?
22. What is ionic product of water?

SECTION C

(Answer any six questions. Each question carries 4 mark)

23. What do you understand by heat capacity of a system? Show from thermodynamic considerations that $C_p - C_v = R$.
24. Derive Gibb's Helmholtz equation.
25. In a certain process 675 J of heat is absorbed by a system while 290 J of work is done on the system. What is the change in internal energy for the system?
26. State and explain Hesse's law.
27. Derive relation between heat of reaction at constant volume and constant pressure.
28. Calculate the equilibrium constant for a reaction at 25 °C. $\Delta G^\circ = 20 \text{ kCal}$
29. Predict the effect of pressure on the dissociation of PCl_5 .
30. What is meant by Buffer solution? Give an example of acidic and basic buffer solution? Explain its mechanism?
31. Write Henderson equation. What is its significance?

SECTION D

(Answer any two questions. Each question carries 15 mark)

32. (i) Derive an expression for work done in the reversible isothermal expansion of an ideal gas.
(ii) Define
 - a. Work function
 - b. Gibbs free energy function
 - c. Entropy
 - d. Internal energy

33. (i) State Kirchoff's equation. Indicate how it can be used to evaluate ΔH of a reaction from heat capacity data of reactants and products.
(ii) Calculate the heat of formation of CO_2 . Given that $\text{CO (g)} + \text{H}_2\text{O (l)} \rightarrow \text{CO}_2\text{(g)} + \text{H}_2\text{(g)}$; $\Delta H = 0.7 \text{ kcal}$. Heat of formation of $\text{H}_2\text{O (l)}$ and CO (g) are -68.3 and $-26.4 \text{ kcal mol}^{-1}$ respectively.
34. (i) Derive van't Hoff equation.
(ii) Derive relation between K_p and K_c .
(iii) The equilibrium constant of a reaction doubles on raising the temperature from 25°C to 35°C . Calculate ΔH° of the reaction?
35. (i) Define pH of a solution. Calculate the pH of 0.2M acetic acid in 0.5M sodium acetate at 298K . Dissociation constant of acetic acid at 298 K is 1.8×10^{-5} ?
(ii) Write a note on salt hydrolysis?

Semester III
Language Course VI
19UEN311.1: READINGS IN LITERATURE I

No of Credits: 4

No of hours: 90 (5 per week)

COURSE OUTCOME

On completion of the course, the students should be able to:

1. Understand the various genres of English literature
2. Understand and appreciate Indian literary discourse.
3. Look at the best pieces of Indian writings in English critically.
4. Analyze Indian literature as a cultural and interactive phenomenon.
5. Learn the English language through literature
6. Develop an understanding of the aesthetic, cultural and social aspects of Indian literature.
7. Help them analyze and appreciate literary texts in the Indian context.
8. Learn structures of the English language through the text.

Module 1: Introduction to Literature

What is literature – genres – Poetry: lyric, ode, ballad, sonnet, dramatic monologue – Drama: tragedy, comedy, one-act plays – Fiction: Novel, short story – Non-Fiction: Impersonal essay, Personal essay, biography, autobiography

Module 2: Prose

M.K.Gandhi	: <i>The Need for Religion</i>
Nirad C. Chaudhuri	: <i>Money and the English Man</i>
Arundhati Roy	: <i>The End of Imagination</i>

Module 3: Poetry

Rabindranath Tagore	: <i>Silent Steps</i>
Sarojini Naidu	: <i>The Soul's Prayer</i>
Nissim Ezekiel	: <i>The Railway Clerk</i>
Jayanta Mahapatra	: <i>An October Morning</i>
A.K. Ramanujan	: <i>The Striders</i>
Arun Kolatkar	: <i>An Old Woman</i>
Kamala Das	: <i>Nani</i>
Meena Alexander	: <i>Her Garden</i>

Module 4: Short Stories

Rabindranath Tagore	: <i>The Homecoming</i>
Mahasweta Devi	: <i>Arjun</i>
Abburi Chaya Devi	: <i>The Woodrose</i>
Anita Desai	: <i>Circus Cat, Alley Cat</i>

Core Text

Haneefa, S. and N.P. Rajendran, *Our Country, Our Literature*. Foundation Books. 2015

Further Reading:

1. Abrams, M.H. *A Glossary of Literary Terms* (Rev. ed.)
2. Hobsbaum, Philip. *Metre, Rhythm and Verse Form: The New Critical Idiom*. Indian Reprint. Routledge, 2007.
3. Prasad, Birjadish. *A Background to the Study of English Literature*. Macmillan, 2012.
4. Wainwright, Jeffrey. *Poetry: The Basics*. Indian Reprint. Routledge, 2009.
5. Hudson, W.H. *An Introduction to the Study of English Literature*. Maple Press. 2012.

MODEL QUESTION PAPER
19UEN311.1: Readings in Literature 1

Time: 3 hours

Max. Marks: 80

Section A

Answer all the ten questions:

1. Where, according to Gandhi, does God reside?
2. What do the Indians rely upon, when their efforts are inadequate?
3. What is a cold war?
4. What does the expression 'silent steps' mean?
5. Death is the _____ of my face.
6. The poem 'The Railway Clerk' has been taken from _____.
7. The picture of the morning presented in the poem "An October Morning" is _____.
8. A.K. Ramanujan was not only a poet, but a _____ as well.
9. What does the poet compare the hill's crack to in 'An Old Woman'?
10. Who is the clumsy puppet in the poem 'Nani'?

(10 x 1 = 10 marks)

Section B

Answer any eight of the following questions in a sentence or two:

11. Why do we, according to Gandhi, live in a state of perpetual fear?
12. Why does Chandhuri say that spending is the positive urge of English people and saving the corrective one.
13. What does Roy call the theory of deterrence?
14. What are the various worldly sorrows according to the poem "Silent Steps".
15. What, according to God, is life and death in "The Soul's Prayer".
16. How does the speaker express his subordination in "The Railway Clerk".
17. What is the significance of the morning being compared to the jackal's snort.
18. What is the poet's say, "Not only prophets walk on water"
19. Can you distinguish between the speaker and the poet in the poem "An Old Women"?
20. Does the poet identify herself with Nani?
21. Why did Phatik's cousins jeer at him more than the other boys?
22. What really happened to Anna's child in 'Circus Cat, Alley Cat'?

(8 x 2 = 16 marks)

Section C

Answer any six of the following questions in about 100 words:

23. How can we be fearless in the world in Gandhi's opinion
24. Describe Chandhuri's experience with the BBC.
25. Comment on Roy's views on nuclear deterrence.
26. Explore the poet's concept of God as reflected in the poem "Silent Steps".
27. What are the poet's implorations to God in "The Soul's Prayer" ?
28. How does the use of Indianisms highlight the theme of the poem "The Railway Clerk"
29. Why do you think the morning is 'out of joint' in 'An October Morning'?
30. What is the significance of the title of the poem "The Striders" ?
31. Can you trace out the anguish of cultural rootlessness in the poem 'An Old Woman' ?

(6 x 4 = 24 marks)

Section D

Answer any two of the following essays in about 300 words:

32. How does Gandhi establish the need for religion in the essay.
33. How forcefully does Arundhati Roy argue against the dangers of nuclear weapons?
34. How far is Ketu representative of the dispossessed tribesmen of India?
35. Bring out the symbolism of the story 'Circus Cat, Alley Cat'.

(2 x 15 = 30 marks)

Language course VII (Additional Language III)

19UFR311.1: LITERATURE IN FRENCH

No of Credits: 4

No of hours: 5 Hrs/week

COURSE OBJECTIVES:

1. To enhance literary sensibility.
2. To introduce students to the world of French and Francophone literature.

COURSE OUTCOME:

The students would be acquainted with the French & Francophone literature and thereby they would be equipped to enrich their vocabulary.

SYLLABUS:

NAME OF TEXT : ECHO-A1 méthode de français

Authors: J. Girardet & J. Pecheur

Publisher: CLE INTERNATIONALE

- Leçon – 6 : Bon appetit ! (Pages : 54 – 61)
- Leçon – 7 : Quelle journée ! (Pages : 62 – 69)
- Leçon – 8 : Qu'on est bien ici ! (Pages : 70 – 81)

The following poems to be studied:

- | | |
|-----------------------------|-----------------------|
| 1. Le Pont Mirabeau - | Guillaume Apollinaire |
| 2. Déjeuner du Matin - | Jacques Prévert |
| 3. Noël - | Théophile Gautier |
| 4. Chanson d'Automne - | Paul Verlaine |
| 5. Soir d'hiver - | Émile Nelligan |
| 6. La cigale et la fourmi - | Jean de la Fontaine |

Reference books:

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet
4. A bouquet of French poems (Polyglot house) by Prof. T.P Thamby

MODEL QUESTION PAPER
19UFR311.1: LITERATURE IN FRENCH

TIME: 3HRS

MAX MARKS: 80

PART-A

Répondez à toutes questions suivantes:

1. A quelle heure dinez-vous ?
2. Quel logement préférez-vous?
3. Quel pays voulez-vous visiter ?
4. Quel temps fait-il ?
5. Nommez deux pièces qu'on trouve dans un appartement ?
6. Quelle est la plus grande bibliothèque de la France ?
7. Qui a écrit le poème « Soir d'Hiver » ?
8. Nommez un pont français.
9. Quel est votre jour préféré de la semaine?
10. Que prenez-vous pour le déjeuner ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Quelles sont les saisons de l'année ?
12. Exprimez leur état physique ou leur besoin :
Ex : il n'a rien mangé. → Il a faim.
 - a. Elle a fait 20km à pied.
 - b. Il a bu trop de whisky.
 - c. Il est au pôle Nord.
 - d. Il fait très chaud.
13. Complétez avec « aller » ou « venir » :
 - Aux vacances de février, je dans les Alpes faire du ski. Tu peuxavec moi ?
 - Je ne peux pas. Jeen Grèce avec Marie. Mais l'été prochain, je voudraischez toi, dans ta maison de campagne. Tu es d'accord ?
14. Complétez avec l'article qui convient :
 - Vous voulezverre de vin ou vous prenezeau ?
 - J'ai préparé rôti de bœuf. Vous n'êtes pas végétarien ? Vous mangezbœuf ?
15. Mettez les verbes entre parenthèses a la forme qui convient :
« Deux femmes parlent de leur emploi du temps »
 - a. Je suis employée dans un cinéma. Alors je (se coucher) tard.
 - b. Et bien sûr, vous (se lever) tôt.
 - c. Non, je na (se lever) pas avant 9 heures !
 - d. Et qui (s'occuper) des enfants ?
16. Complétez :
Après le repas
 - Tu veuxthe ?
 - Non, merci, je n'aime pas....the. Je préfèrecafé.
 - Alors....café ?
17. Complétez les réponses avec une forme « à + pronom » :
Ex : C'est ton portable ? Oui, il est à moi.
 - a. C'est le dictionnaire de Pierre ?
Oui,
 - b. Les enfants, ce sont vos jeux vidéo ?
Oui,
 - c. Ce sac est à Marie ?
Non, il Il est à Julie.
 - d. Ce stylo n'est pas à toi, Pierre ?
Si,
18. Transformez à l'impératif :
 - a. Tu dois te lever.
 - b. Tu dois te préparer.

- c. Nous devons être en forme.
 - d. Nous devons nous réveiller à 7h.
19. Complétez avec « quelque chose, ne.....rien, quelqu'un, ne.....personne » :
- J'ai à te dire. Mais ne raconte cette histoire à
 - D'accord.
 - Melissa n'est pas partie seule au stage de Bruxelles. Elle est partie avec
 - Son mari sait..... ?
20. Dites si les phrases suivantes sont vraies ou fausses :
- a. Avec le TGV, on peut traverser Paris très vite.
 - b. Il y a un aéroport à Nantes.
 - c. Les Français prennent le petit déjeuner en famille.
 - d. Beaucoup de restaurants n'acceptent plus de clients après 14h 30.
21. Complétez ce dialogue avec les questions :
- a. ? Oui, Je pars en vacances.
 - b. ? Dans les Alpes.
 - c. ? En aout.
 - d. ? Avec Marie, Vanessa et Luc.
22. Complétez avec un adjectif possessif ou la forme « à + moi, toi, lui etc » :
- Pierre montre une photo à un ami :*
- « Regarde cette photo, c'estmaison de campagne. Là, ce sontenfants et ici, c'estchien.
- Tu loues cette maison ou elle est ? »

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Répondez :
- a. Alexandre est venu ? Non, il
 - b. Tu as dansé avec François ? Non, je
 - c. Vous avez bien mangé ? Non, je
 - d. Luc et Marie ont joué de la guitare ? Non,
24. Mettez les verbes entre parenthèses a la forme qui convient :
- Tu (prendre) un croissant ?
 - Non, merci. Je (faire) un régime. Et Marie aussi. Nous ne (manger) plus de pâtisseries et nous ne (boire) plus de boissons sucrées.
25. Donner-leur des conseils. Utilisez les verbes indiqués :
- Demain, ils vont jouer un match de football.
 - Se coucher tôt – bien manager – ne pas se fatiguer – se détendre.
26. Quelle est la morale de « La Cigale et La fourmi » ?
27. Décrivez le poème « Noel » ?
28. Pourquoi le poète est triste dans le poème « Chanson d'autonome » ?
29. Que savez-vous du poème « Le Pont Mirabeau » ?
30. Quelle est l'humeur du poète dans le poème « Soir d' Hiver » ?
31. Qui signifie-t-il, le poème « Déjeuner du Matin » ?

(6x4=24)

PART-D

Répondez à 2 questions suivantes :

32. Présentez votre logement idéal.
33. Vous logez à l'hôtel Astérix, rue de Rivoli. Une amie doit venir vous voir. Envoyez un message à cette amie pour expliquer comment aller jusqu'à votre hôtel.
34. Vous avez changé de domicile. Envoyez un message à un(e) ami(e) et écrivez en quelque phrase :
- La ville ou le village
 - Le quartier et la rue
 - L'immeuble et les voisins
 - L'appartement.
35. Vous allez déjeuner au restaurant « L'Assiette » avec Un(e) ami(e). Rédigez ce dialogue.

(2x15=30)

Language course VII (Additional Language III)

19UHN311.1: POETRY AND GRAMMAR

No of Credits: 4

No of hours: 5 Hrs/week

Aims of the Course / Objectives

To sensitize the student to the aesthetic aspects of literary appreciation and to introduce Hindi poetry. To understand the grammar of Hindi.

Course Outcome

Understanding the role played by the poets of Bhakti cult in Literature and Society. Developing philosophy of life inspiring by the vision of eminent modern Hindi poets. Develop approach of Hindi Grammar

Module I

Poetry Collection (Detailed) – Kavya Sudha

Edited by Dr. V. Bhaskar

Jawahar Pusthakaalaya, Mathura

Poems to be studied

1. Kabeer Doha 1 to 5
Pada 1
2. Thulsidas Pada 3 & 5
3. Soordas Pada 1,3 & 4
4. Nirjar - Maidhilisharan Gupt
5. Prathibimb - Sumithranandan Panth
6. Kahde mem kya ab Dekkoom - Mahadevi Varma
7. Oh Megh - Mukthibodh
8. Kavitha ki bath - Agyeya
9. Machali - Sarveswar Dayal Saxena
10. Dhabba - Kedarnath Singh
11. Proxy – 4 - Venugopal
12. Machiz - Sunitha Jain

Module 2

Long Poems (Non-Detailed)

Prescribed Text book – ‘Panchrang’ Edited by Dr. V.V. Viswam

Hindi Vidyapeth, Kerala

Poems to be studied

1. Vah phir jee Udhi - Nagarjun
2. Ek yathra ke Dauran - Kumvar Narayan

Module 3

Grammar- Vyavaharik Hindi Vyakaran: Anuvad tatha Rachana

By Dr H Parameswaran

Published by Radhakrishna Prakashan, Delhi

Topics to be studied

Varna, Ling, Vachan, Karak, Sangya, Sarvanam, Visheshan, Kriya, Kal

Book for General Reading

1. Hindi Kavya Ka Ithihas - Ramswaroop Chaturvedi
Lokbharati Prakashan
2. Kabir, Soor, Thulsi - Yogendra Pratap Singh
Lokbharati Prakashan
3. Adhunik Hindi Kavitha - Viswanath Prasad Tivari
Lokbharati Prakashan
4. Lambi Kavithayen
Vaicharik Sarokar - Dr. Bal dev Vanshi
Vani Prakashan

5. Nayi Kavitha - Dr. Jugadish Gupt
Rajkamal Prakashan
6. Samakaleen Hindi Kavitha - Viswanath Prasad Tivari
Lokbharati Prakashan
7. Hindi Vyakaran - Kamatha Prasad Guru
Vani Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM
Third Semester B.A/B.Sc Degree Examination
Language Course (Additional Language III) - HINDI
19UHN 311.1 Poetry and Grammar
(2019 Admission onwards)

Time : 3 Hrs.

Max.Marks : 80

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. 'रामचरितमानस' के रचनाकार कौन है?
2. कबीरदास की प्रामाणिक रचना का नाम क्या है?
3. वचन किसे कहते हैं?
4. द्विवेदी युग के प्रतिनिधि कवि का नाम लिखिए?
5. 'लोकायतन' किसका महाकाव्य है?
6. 'घर' शब्द का बहुवचन क्या है?
7. 'यामा' काव्यकृति के लिए किसको ज्ञानपीठ पुरस्कार मिला था?
8. कवि वेणुगोपाल का जन्म कहाँ हुआ?
9. 'आत्मजयी' किसका प्रबन्धकाव्य है?
10. 'क्रिया' किसे कहते हैं?

(10×1=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. पुरुषवाचक सर्वनाम किसे कहते हैं? उसके भेदों को समझाइए?
12. 'वह फिर जी उठी' कविता का प्रतिपाद्य क्या है?
13. 'माचिस' कविता में नारी जीवन की किस त्रासदी का वर्णन किया है?
14. संज्ञा किसे कहते हैं? उसके कितने भेद हैं?
15. कबीरदास के अनुसार सच्चे गुरु का लक्षण क्या है?
16. तुलसीदास की नवधा भक्ति का स्वरूप समझाइए?
17. स्त्रीलिंग शब्दों के बहुवचन कैसे बनाये जाते हैं?
18. 'ओ मेघ' कविता का सन्देश क्या है?
19. 'कह दें मैं क्या अब देखूँ' कविता में अभिव्यक्त कवयित्री की विचारधारा का परिचय दीजिए?
20. अज्ञेय द्वारा प्रतिपादित 'कविता की बात' क्या है?
21. हर बार प्लेट में मछली को देखने पर कवि को क्या लगता है?
22. संख्या वाचक विशेषण और परिमाणवाचक विशेषण में क्या अन्तर है?

(8×2=16 marks)

III. किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

23. 'निर्झर' कविता का सारांश लिखिए?
24. 'प्रतिबिंब' कविता का भाव समझाइए?
25. कारक किसे कहते हैं? कारक के भेदों को सोदाहरण समझाइए?
26. सूरदास की 'बाललीला वर्णन' पर प्रकाश डालिए?
27. प्राक्सी-4 कविता में चित्रित मध्यवर्गीय मानसिकता पर प्रकाश डालिए?
28. लिंग परिवर्तन के नियम लिखिए?
29. सूरदास की भक्ति पद्धति का परिचय दीजिए।
30. कवि नागार्जुन के कृतित्व पर प्रकाश डालिए?
31. भावार्थ लिखिए।

जाके मुंह माथा नाही, नाहिं रूप कुरूप।

पुहुप वास ते पातरा, ऐसा तत अनूप।।

(6×4=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. 'धब्बा' कविता का मूल्यांकन कीजिए?
33. 'एक यात्रा के दौरान' कविता का सारांश लिखकर उसकी विशेषताओं पर प्रकाश डालिए?
34. सर्वनाम किसे कहते हैं? उसके भेदों को सोदाहरण समझाइए?
35. काल किसे कहते हैं? काल के भेदों को सोदाहरण समझाइए?

(2×15=30 marks)

- സെമസ്റ്റർ : III
- കോഴ്സ് കോഡ് : 19 UML 311.1
- ലാംഗ്വേജ് കോഴ്സ് : VII (അഡീഷണൽ ലാംഗ്വേജ് : III)
- സമയക്രമം : ആഴ്ചയിൽ 5 മണിക്കൂർ (18x5=90 മണിക്കൂർ)
- ക്രെഡിറ്റ് : 4

ദ്വ്യശ്യകലാസാഹിത്യം

പഠനലക്ഷ്യങ്ങൾ, ഫലങ്ങൾ:

1) ദ്വ്യശ്യകലാ സംസ്കാരത്തിന്റെ സമ്പന്നതയെക്കുറിച്ചുള്ള അറിവ് നേടുക. കഥകളി, തുള്ളൽ, നാടകം, സിനിമ എന്നീ ദ്വ്യശ്യകലകളെയും അവയ്ക്ക് ആധാരമായ സാഹിത്യപാഠങ്ങളെയും പരിചയപ്പെടുത്തുക.

പാഠ്യപദ്ധതി

മൊഡ്യൂൾ ഒന്ന് (36 മണിക്കൂർ)

ആട്ടക്കഥ, തുള്ളൽ, സാഹിത്യം

കഥകളിയുടെ ഉത്ഭവവികാസ പരിണാമങ്ങൾ, പ്രധാന ആട്ടക്കഥാകൃത്തുക്കൾ

1. നളചരിതം ആട്ടക്കഥ (നാലാംദിവസം) - ഉണ്ണായിവാര്യർ
(നളദമയന്തീ സംവാദം വരെ)
2. കാർത്തവീര്യാർജ്ജുനവിജയം തുള്ളൽ - കുഞ്ചൻ നമ്പ്യാർ

മൊഡ്യൂൾ രണ്ട് (36 മണിക്കൂർ)

നാടക സാഹിത്യം

സംസ്കൃത നാടക പ്രസ്ഥാനം - മലയാള വിവർത്തന നാടകങ്ങൾ

1. മലയാള ശാകുന്തളം(വിവ:) - എ.ആർ.രാജരാജവർമ്മ (നാലാം അങ്കം
വിശദപഠനം. മറ്റ് അംഗങ്ങൾ സാമാന്യപഠനം)
2. ആ മനുഷ്യൻ നീതന്നെ - സി. ജെ. തോമസ്
3. രാവുണ്ണി - പി. എം. താജ്

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

തിരക്കഥാപഠനം

ഒഴിമുറി - **ജയകാന്തൻ**

റഫറൻസ് ഗ്രന്ഥങ്ങൾ

1. കേരള സാഹിത്യ ചരിത്രം - ഉള്ളൂർ
2. സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ - ഡോ.കെ.എം.ജോർജ്ജ്
3. കൈരളിയുടെ കഥ - എൻ.കൃഷ്ണപിള്ള
4. നാട്യശാസ്ത്രം - ഭരതമുനി
5. കഥകളി - ജി.കൃഷ്ണപിള്ള
6. കഥകളിരംഗം - കെ.പി.എസ്. മേനോൻ

- | | |
|---------------------------------------|---------------------------------|
| 7. കഥകളിയും സാഹിത്യവും | - മാടശ്ശേരി |
| 8. കഥകളി വിജ്ഞാന കോശം | - അയ്മനം കൃഷ്ണകൈമൾ |
| 9. നളചരിതം വ്യാഖ്യാനം | - എം.എച്ച്. ശാസ്ത്രികൾ |
| 10. കഥകളി മഞ്ജരി | - ഡോ.എസ്.കെ നായർ |
| 11. ആത്മകഥ | - പി.കൃഷ്ണൻ നായർ |
| 12. ദി ആർട്ട് & ലിറ്ററേച്ചർ ഓഫ് കഥകളി | - ഡോ.എസ്.കെ. നായർ |
| 13. നാടകദർപ്പണം | - എൻ.എൻ. പിള്ള |
| 14. നാടകം ഒരു പഠനം | - സി.ജെ.തോമസ് |
| 15. ഉയരുന്ന യവനിക | - സി.ജെ.തോമസ് |
| 16. നാടക പഠനങ്ങൾ | - എഡിറ്റർ പന്മന രാമചന്ദ്രൻ നായർ |
| 17. കഥയും തിരക്കഥയും | - എ.ജി. രാജ്കുമാർ |
| 18. സിനിമയും മലയാളസാഹിത്യവും | - മധു ഇറവങ്കര |
| 19. മലയാള സിനിമ | - സിനിക് |
| 20. ചലച്ചിത്രത്തിന്റെ പൊരുൾ | - വിജയകൃഷ്ണൻ |
| 21. ചലച്ചിത്ര സമീക്ഷ | - വിജയകൃഷ്ണൻ |
| 22. സിനിമയുടെ രാഷ്ട്രീയം | - രവീന്ദ്രൻ |

കാർകൊണ്ടെഴും വാസരമെന്നപോലെ” - ആശയം വ്യക്തമാക്കുക.

- 18. “ഇഷ്ടപ്രവാസമതിനാലുളവാമവസ്ഥ കഷ്ടം!തുലോമബലമാർക്കൊരുതർക്കമില്ല” ഈ വരികളുടെ സാംഗത്യമെന്ത്?
- 19. “ഏറ്റവസ്തു തിരികെകൊടുത്ത പോ- ലേറ്റവും തെളിമപുണ്ടിതെൻ മനം” - ആരുടെ വാക്കുകൾ? കാരണമെന്ത്?
- 20. “വിരഹം മേ മർമ്മദാരണം; അതിലേറെനല്ലുമാരണം” ഇങ്ങനെ ചിന്തിക്കാൻ കാരണമെന്ത്?
- 21. “മുറ്റുമതിനായി സംഗതി വന്നു മറ്റൊരു കാര്യവുമേതുമില്ല” - സന്ദർഭം വിശദമാക്കുക.
- 22. “ക്ലേശവിനാശത്തിനുമുന്നം കൗശലമേതത്” - സന്ദർഭമേത്? (8×2=16)

Section C

III. ഒന്നര പുറത്തിൽ കവിയാതെ ഏതെങ്കിലും ആറ് ചോദ്യത്തിന് ഉത്തരമെഴുതുക. 4 മാർക്ക് വീതം

- 23. കാശ്യപൻ ദുഷ്യന്തനു നൽകുന്ന സന്ദേശത്തിന്റെ അർത്ഥതലങ്ങൾ എന്തൊക്കെ? വിശദമാക്കുക.
- 24. കാളിദാസ സൃഷ്ടികളായ അനസൂയാ പ്രിയംവദമാർക്ക് ശാകുന്തളം നാടകത്തിലുള്ള സ്ഥാനമെന്ത്?
- 25. ശകുന്തള ആശ്രമത്തിൽ നിന്ന് യാത്രയാകുമ്പോൾ പ്രകൃതിയ്ക്കുണ്ടാകുന്ന ഭാവമാറ്റങ്ങൾ എന്തെല്ലാം? വിശദമാക്കുക.
- 26. ഋതുപർണ്ണൻ - കഥാപാത്ര നിരൂപണം ചെയ്യുക.
- 27. നളനോടു ദമയന്തി തന്റെ നിരപരാധിത്വം വെളിപ്പെടുത്തുന്നതെങ്ങനെ?
- 28. ശാകുന്തളം രണ്ടാമങ്കത്തിൽ പ്രണയസുരഭിലയായ ശകുന്തളയുടെ മനോവ്യാപാരം വർണ്ണിച്ചിരിക്കുന്നത് എപ്രകാരമാണ്?
- 29. “വിരഹമോ കഠോരം, കടലിതുവീതഗാധപാരം” - ഈ പരിഭവനത്തിനു പിന്നിലുള്ള മാനസികവ്യഥ അനാവരണം ചെയ്യുക.
- 30. ‘നളചരിതം ആട്ടക്കഥയും’ ‘അഭിജ്ഞാനശാകുന്തളം’ നാടകവും നാടകീയതയിൽ സമരസപ്പെടുപോകുന്നതെങ്ങനെ?
- 31. ദുഷ്യന്തന്റെ രാജകൊട്ടാരത്തിൽ എത്തിയ ശാർങ്ഗരവ - ശാരദതന്മാർക്ക് പട്ടണം കണ്ടപ്പോഴുണ്ടായ അനുഭവം കാളിദാസൻ എങ്ങനെ വർണ്ണിക്കുന്നു? (6×4=24)

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ ഏതെങ്കിലും രണ്ട് ചോദ്യത്തിന് ഉത്തരമെഴുതുക 15 മാർക്ക് വീതം

- 32. “നളചരിതം അരങ്ങിലും പാഠത്തിലും വിസ്മയങ്ങൾ തീർത്തത് കാവ്യശൈലികൊണ്ടാണ്.” ഈ പ്രസ്താവനയോട് ഉദാഹരണസഹിതം പ്രതികരിക്കുക.
- 33. ‘അഭിജ്ഞാനശാകുന്തളം’ കാലാതീതമായി വായിക്കപ്പെടുന്നതും അനുഭവവേദ്യമാകുന്നതും രചനാ സൗന്ദര്യം കൊണ്ടാണോ? വിശദമാക്കുക.
- 34. ചരാചരങ്ങളെ ഏകോദര സഹോദരങ്ങളായി കാണുന്ന കാഴ്ചപ്പാട് ശാകുന്തളം നാലാം അങ്കത്തെ ആസ്പദമാക്കി വിലയിരുത്തുക.
- 35. “നളചരിതത്തിലെ ഭാഷ സംസ്കൃതമാകുന്ന ചെമ്പും മലയാളമാകുന്ന വെളുത്തീയവും ചേർത്തുരുക്കിയ ഒരു വെങ്കലഭാഷയാണ്.” എന്ന കേരളപാണിനിയുടെ അഭിപ്രായം പാഠഭാഗത്തെ മുൻനിർത്തി ചർച്ചചെയ്യുക. (2×15=30)

Core Course III

19UPH341: ELECTRODYNAMICS

No. of credits: 3

No. of instructional hours per week: 3

Course Outcome

- Understand the concepts and properties of electric and magnetic fields in vacuum and matter
- Understand the theory of electrostatics and magnetostatics
- Understand the classical electrodynamics based on Maxwell's equations, concepts and properties of electromagnetic wave propagation and emission
- Apply Maxwell's equations to a variety of problems and solve problems involving the propagation and scattering of electromagnetic waves in a variety of media, calculation of fields, the motion of charged particles etc
- Demonstrate an understanding of the characteristics of electromagnetic radiation.
- Evaluate various circuits including L, C, R and to analyze their complete response
- Apply various network theorems to determine the circuit response / behaviour

Unit 1-Electrostatic Field (10hrs)

Introduction*, Coulomb's Law*, Electric field*, continuous charge distribution* Divergence and curl of electrostatic fields; Field lines, flux and Gauss' law, the divergence of E, applications of Gauss's law, the Curl of E- Electric potential: Introduction to potential, Comments on potential, Poisson's and Laplace's equations, Potential of a localized charge distribution, electrostatic boundary.

Work and energy in Electrostatics: The work done to move a charge, the energy of a point charge distribution, The energy of a continuous charge distribution.

Unit 2-Electrostatic fields in matter (10 hrs)

Polarization: Dielectrics, induced dipoles, Polarization, The field of a polarized object: Bound charges, Physical interpretation of bound charges, and the field inside a dielectric, Electric displacement: Gauss's law in the presence of dielectrics, Boundary conditions

Unit 3-Magnetostatics (8hrs)

Introduction*, The Biot-Savart law*, Ampere's force law*, Magnetic torque, Magnetic flux and Gauss's law for magnetic fields, Magnetic vector potential, Magnetic intensity and Ampere's circuital law, Magnetic materials.

Unit 4-Electromagnetic Induction (8hrs)

Electromotive force: Ohm's law; Electromagnetic induction: Faraday's law, the induced electric field; Maxwell's Equations: Electrodynamics before Maxwell, How Maxwell fixed Ampere's law, Maxwell's equations, Magnetic charge, Maxwell's equations in matter, Boundary conditions.

Unit 5-Electromagnetic waves (6hrs)

Waves in one dimension: The wave equation, Electromagnetic waves in vacuum: The wave equation for E and B, Monochromatic plane waves, Energy and momentum in electromagnetic waves.

Unit 6-Transient currents(4hrs)

Growth and decay of current in LR and CR circuits-Measurement of high resistance by leakage. Charging and discharging of a capacitor through LCR circuit.

Unit 7-Alternating current (4 hrs)

AC through series LCR (acceptor circuit) and parallel LCR circuit (rejecter circuit)- Q- factor, Power in AC- power factor - AC bridges Maxwell's L/C bridge and Owens's bridge.

Unit 8-Circuit Theory (4 hrs)

Ideal voltage and current sources- Thevenin's and Norton's theorems, Maximum power transfer theorem

* Revision topics

Books for study

1. Electrodynamics - David J Griffith (PHI 3rd edition)
2. Electricity and Magnetism-Murugesan (S.Chand & Co.)
3. Electricity and Magnetism - K.K.Tiwari (S.Chand & Co.)

Reference Books

1. Electromagnetic theory fundamentals- Bhag Guru and HuseyinHizirogulu (Cambridge University Press 2nd edition)
2. Electricity and Magnetism – E.M. Purcell, Berkley Physics course, Vol.2 (MGH)
3. Electricity and Magnetism – J.H. Fewkes& John Yarwood (University t u t o r i a l press)
4. Electricity and Magnetism- D.C.Tayal (Himalaya Publishing Co)
5. Electricity and Magnetism_ - Muneer H. Nayfeh& Norton K. Bressel (John Wiley & Sons)
6. Classical Electrodynamics- Walter Greiner (Springer International Edition)
7. Electromagnetic waves and radiating systems-Jordan &Balmain (PHI)
8. Electromagnetics, B.B.Laud (Wiley Eastern Ltd.2nd edition)
9. Introduction to electrodynamics-Reitz &Milford (Addison Wesley)

MODEL QUESTION PAPER
19UPH341: ELECTRODYNAMICS

Time : 3hr

Total mark :80

Section A (Answer all questions; one mark each)

1. R.M.S value of house hold ac is 220V. What is the peak value?
2. State the unit of entropy.
3. Define thermal conductivity.
4. What is Wien's law?
5. What is Clausius inequality?
6. Why a series LCR circuit is called an acceptor circuit?
7. State Thevenin's network theorem
8. What is Poynting's vector?
9. What is an ideal current source?
10. What is meant by dielectric constant?

(1x 10 = 10 Marks)

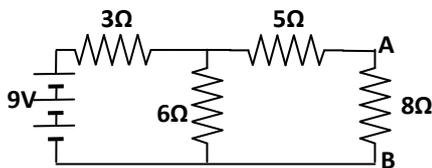
Section B (answer any eight. Two mark each)

11. Derive the expression for average power in a series LCR circuit. What is power factor?
12. Define sharpness of resonance and quality factor of an LCR circuit
13. Write the expression for energy and momentum in electromagnetic waves.
14. State and explain maximum power transfer theorem.
15. Obtain Poisson's relation for electric field.
16. Distinguish between emf and pd.
17. What is meant by electrostatic shielding?
18. What is meant by atomic polarizability?
19. What is meant by induced dipole?
20. What are bound charges?
21. What is meant by linear dielectrics?
22. What is the concept of 'magnetic charge'?

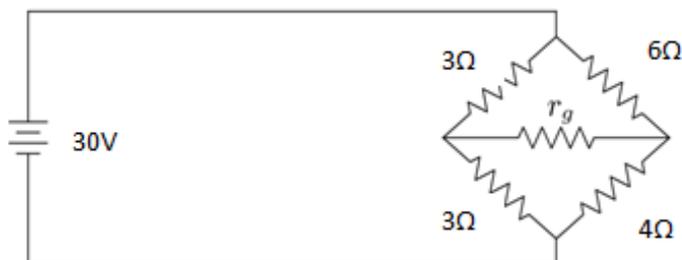
(2x 8 = 16 Marks)

Section C (Answer any six. Four mark each)

23. A resistance of 10Ω , an inductance of 0.2 H and a capacitance of $100\mu\text{F}$ are connected in series across a 200V, 50 Hz supply main. Find the impedance and current in the circuit.
24. Find the capacitive reactance of a $15\mu\text{F}$ capacitor at 2000Hz. Calculate the inductance required to produce series resonance with the capacitor at this frequency.
25. Find the current in 8Ω resistor using Norton's theorem. Assume that the battery has no internal resistance.



26. Determine the current through 2Ω resistance galvanometer in the Wheatstone's bridge using Thevenin's theorem. Assume that the battery has no internal resistance



27. Calculate the electric field intensity due to a line charge of density 5mc/m at distance of 6 cm in free space.
28. Calculate the electric potential at a far away point from an electric dipole of charge q and length 'd'.

29. A system of two charges was found have 5N force between them in free space. What would be the force if the system is placed in a medium of dielectric constant 20?
30. Find the electric field produced by a uniformly polarized sphere of radius R.
31. A metal sphere of radius 'r' carried a charge Q surrounded by a dielectric of permittivity ' ϵ ' by a thickness 'd'. Find the potential at the centre of the saphere?

(6x 4 = 24 Marks)

Section D (Answer any two. 15 marks each)

32. Explain the following methods to find the self inductance of a coil. (a) Maxwell's Bridge and (b) Owen's Bridge
33. Derive the expression for current and impedance in (a) series LCR circuit and (b) parallel LCR circuit. Draw the phasor diagram showing voltages and current
34. Explain the Lorentz Drude theory of electrical conductivity
35. Briefly explain the electrostatic boundary conditions

(2x 15 = 30 Marks)

Complementary Course V

19UMM331.1: Calculus and Linear Algebra

No. of Credits: 4

Instructional hours per week: 5

Aim:

To familiarize students with ordinary differential equations, vector integration, Fourier series and basic linear algebra.

Course outcome:

Students will acquire necessary skills for applying differential equations in real life situations and analyzing wave motion etc. by Fourier series.

Module 1 : Ordinary Differential Equations

(30 Hours)

First order ordinary differential equations : General form of solution, First-degree first order equations (Separable-variable equations; exact equations; inexact equations, integrating factors; linear equations; homogeneous equations; isobaric equations; Bernoulli's equation; miscellaneous equations) Higher-degree first-order equations (Equations solvable for p ; for x ; for y ; Clairaut's equation)

Higher-order ordinary differential equations : Linear equations with constant coefficients, (Finding the complementary function $y_c(x)$; finding the particular integral $y_p(x)$; constructing the general solution $y_c(x) + y_p(x)$; linear recurrence relations). Linear equations with variable coefficients (The Legendre and Euler linear equations; exact equations; partially known complementary function; variation of parameters; Green's functions; canonical form for second-order equations)

General ordinary differential equations - Dependent variable absent; independent variable absent; non-linear exact equations; isobaric or homogeneous equations; equations homogeneous in x or y alone; equations having $y = Ae^x$ as a solution

Chapter 14 and chapter 15(exclude 15.1.5) of text [1].

More exercises related to the topics in this module can be found in chapter 1, 2 and 3 of reference [3], which is not to be included in ESE.

Module 2 : Vector Integration - Line, surface and volume integrals

(18 hours)

Evaluating line integrals; physical examples; line integrals with respect to a scalar Connectivity of regions, Green's theorem in a plane, Conservative fields and potentials, Surface integrals, Evaluating surface integrals; vector areas of surfaces; physical examples, Volume integrals, Volumes of three-dimensional regions, Integral forms for grad, div and curl, Green's theorems; other related integral theorems; physical applications, Stokes theorem and related theorems, Related integral theorems; physical applications

Chapter 11 of text [1].

More exercises related to the topics in this module can be found in chapter 3 of reference [2], which is not to be included in ESE.

Module 3 : Fourier series

(18 Hours)

Basic definition, Simple Harmonic Motion and Wave Motion; Periodic Functions, Applications of Fourier Series, Average Value of a Function, Fourier Coefficients, Dirichlet Conditions, Complex Form of Fourier Series, Other Intervals, Even and Odd Functions, Fourier Transforms

Chapter 7 (excluding sections 10 and 11) of text [2].

More exercises related to the topics in this module can be found in chapter 11 of reference [3], which is not to be included in ESE.

Module 4 : Basic Linear Algebra

(24 Hours)

Matrices and row reduction, Determinants, Cramer's rule for solving system of equations, vectors, lines and planes, linear combinations, linear functions, linear operators, linear dependence and independence, special matrices like Hermitian matrices and formulas, linear vector spaces, eigen values and eigen vectors, diagonalizing matrices.

Chapter 3 (sections 1 to 11) of text [2]

More exercises related to the topics in this module can be found in chapter 7 and 8 of reference [3], which is not to be included in ESE.

Note: In all modules, proofs of theorems are to be omitted

Texts

Text 1 : K F Riley, M P Hobson, S J Bence. *Mathematical Methods for Physics and Engineering*, 3rd Edition, Cambridge University Press

Text 2 : Mary L Boas. *Mathematics Methods in the Physical Sciences*, 3rd Edition, Wiley

References

Ref. 1 : H Anton, I Bivens, S Davis. *Calculus*, 10th Edition, John Wiley & Sons

Ref. 2: George B Arfken, Hans J Weber, Frank E Harris. *Mathematical Methods for Physicists*, 7th Edition, Academic Press

Ref. 3 : Erwin Kreyszig. *Advanced Engineering Mathematics*, 10th Edition, Wiley-India

Model Question Paper
19UMM331.1: Calculus and Linear Algebra

Time 3 hours

Max marks :80

Section -1

(All the 10 questions are compulsory. They carry 1 mark each)

1. Check the exactness of the equation $(3x+y)dx+xdy=0$
2. Write the general form of isobaric equation.
3. Write the canonical form of a second order equation.
4. Prove that $\text{div } \vec{r} = 3$.
5. Check whether $F(x,y)=(6xy-y^3)i+(4y+3x^2-3x^2y)j$ is solenoidal.
6. Find the average value of $\sin^2 nx$ on $(-\pi,\pi)$
7. What are the Fourier coefficients of an odd function $f(x)$ in the interval $(-l,l)$
8. Define unitary and Hermitian matrices.
9. Find the rank of the matrix $\begin{bmatrix} 1 & 1 & 2 \\ 2 & 4 & 6 \\ 3 & 2 & 5 \end{bmatrix}$
10. Show that the product of any matrix with its transpose (ie, AA^T) IS A SYMMETRIC MATRIX.
(10X1=10)

Section II

Answer any 8 questions from among the questions 11 to 22 .These questions carry 2 marks each.

11. Solve $y=px+p^2$
12. Find the complementary function of $\frac{d^2f}{dt^2} + 2\frac{df}{dt} + 5t = t^2 + 1$
13. Solve $\frac{dy}{dx} + 2xy = 4x$
14. Find the particular integral of $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^x$
15. Evaluate $\int_C \vec{F} \cdot d\vec{r}$, where $\vec{F}=yi+xj$ and C is the curve $y=x^2$ from $(0,0)$ to $(1,1)$.
16. Evaluate $\int_C (1 + xy^2)ds$ from $(0,0)$ to $(1,1)$ along the line segment C represented by the parametric equations $x=t, y=2t$ $0 \leq t \leq 1$.
17. Show that $\text{curl curl curl curl}(F)=-\nabla^2 f$ if F is solenoidal.
18. Find the amplitude and velocity amplitude for the motion of a particle whose distance S from the origin is $S=2\sin 3t \cos 3t$.
19. What are the Dirichlet Conditions for the existence of the Fourier Series of a Periodic function.
20. Check whether the functions $1,x,\sin x$ are linearly independent or not.
21. Show that the product of two unitary matrices is unitary.
22. Find the eigen values and eigen vectors of $M=\begin{bmatrix} 1 & 3 \\ 2 & 2 \end{bmatrix}$ **(8X2=16)**

Section 3

Answer any 6 questions from among the following questions 23 to 31. These questions carry 4 marks each.

23. Solve $xp^2 - 2xp - y = 0$
24. Solve $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} - 4y = 0$
25. Solve $4x^2 \frac{d^2y}{dx^2} + 4x \frac{dy}{dx} + (x^2 - 1)y = 0$
26. Show that the area of a region R enclosed by a simple closed curve C is $\frac{1}{2} \int_C xdy - ydx$
27. If u and v are scalar point functions and \vec{F} is a vector point function such that $u\vec{F}=\nabla v$, prove that $\vec{F} \cdot \text{curl } \vec{F}=0$.
28. Expand $f(x)=\begin{cases} 0 & 0 < x < l \\ 1 & l < x < 2l \end{cases}$ as a Fourier series of Period 2l.
29. Find the fourier series of $f(x)=|x|$ $-\frac{\pi}{2} < x < \frac{\pi}{2}$.
30. Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 2 & 0 & 2 \\ 0 & 2 & 0 \\ 2 & 0 & -1 \end{pmatrix}$

31. Solve the system of equations by row reducing the matrix $x-2y+3z=0$, $2x+2y-3z=0$, $x+4y-6z=0$.
(6X4=24)

Section IV

Answer any two questions from among the questions 32 to 35. These questions carry 15 marks each.

32. Use Gauss function to solve the differential equation $\frac{dy}{dx} + y = \operatorname{cosec} x$ subject to the boundary condition $y(0)=y(1)=0$.

33.a) Show that $\nabla^2 f(r) = f''(r) + \frac{2}{r} f'(r)$ where $r=|\vec{r}|$ and $\vec{r}=xi+yj+z\hat{k}$

b) Show that $\nabla \times \nabla \cdot \vec{F} = \nabla(\nabla \cdot \vec{F}) - \nabla \times (\nabla \times \vec{F})$, ϕ is a solenoid function and \vec{F} is a vector valued function.

34. Given $f(x) = \begin{cases} x & 0 \leq x \leq 1 \\ 2-x & 1 < x < 2 \\ 0 & \text{if } x \geq 2 \end{cases}$

a) Find cosine transform of $f(x)$ and use it to write $f(x)$ as an integral. Also using it evaluate

$$\int_0^\infty \frac{\cos^2 \alpha \sin^2 \frac{\alpha}{2}}{\alpha^2} d\alpha$$

b) Let $f(t) = e^{i\omega t}$ on $(-\pi, \pi)$. Expand $f(t)$ as a complex exponential Fourier series of period 2π (assume $\omega \neq \text{integer}$)

35. Diagonalize the matrix $M = \begin{pmatrix} 1 & -4 & 2 \\ -4 & 1 & -2 \\ 2 & -2 & -2 \end{pmatrix}$

(15X2=30)

Complementary Course VI

19UCH331.1: PHYSICAL CHEMISTRY- II

No. of credits: 3

No. of instructional hours per week: 5

Total hours: 54

Course outcome

CO1: To impart an idea about gaseous and crystalline state

CO2: To get an understanding of the basics of conductometric titration and electrochemistry

CO3: To inculcate an overview of photochemical reactions and rate of chemical reactions

CO4: To impart knowledge on fuel cells

CO5: To learn the basics of group theory

Module I- Gaseous State

9hrs

Maxwell's distribution of molecular velocities (No derivation) average, most probable and rms velocities, collision number and collision frequency, mean free path, deviation of gases from ideal behaviour – Boyle temperature, derivation of vander waals constants and critical constants – Law of corresponding states – reduced equation of state, Joule Thomson effect, liquefaction of gases – Linde's and Claude's processes

Module II – Crystalline State

9hrs

Isotropy and anisotropy – symmetry elements in crystals – the seven crystal systems. Miller indices, Bravais lattices, primitive, bcc and fcc of cubic crystals – Representation of lattice planes of simple cubic crystal - Density from cubic lattice dimension – calculation of Avogadro number - Bragg equation, diffraction of X rays by crystals – single crystal and powder method. Detailed study of structures of NaCl and KCl crystals.

Module III - Electro Chemistry

9hrs

Transport number – definition, determination by Hittorf's method and moving boundary method, application of conductance measurements. Conductometric titrations involving strong acid – strong base, strong acid – weak base, weak acid – strong base and weak acid – weak base.

EMF – Galvanic cells, measurement of emf, cell and electrode potential, IUPAC sign convention, Reference electrodes, SHE and calomel electrode, standard electrode potential, Nernst equation, anion and cation reversible electrodes, redox electrode with examples, quinhydrone electrode, glass electrode concentration cell without transference, potentiometric titration, Fuel cells: $H_2 - O_2$ and hydrocarbon – O_2 type.

Module IV – Catalysis and Photochemistry

9hrs

General Characteristics of catalytic reactions. Different types of catalysis – examples – theories of catalysis (Outline of intermediate compound formation theory and adsorption theory). Enzyme catalysis – Michaelis-Menten mechanism. Photochemistry:- Laws of Photochemistry, Grothus – Draper law, Beer Lambert's law, Einstein's laws, quantum yield, $H_2 - Cl_2$ reaction, $H_2 - Br_2$ reaction – Fluorescence and phosphorescence, chemiluminescence and photosensitization.

Module – V: Chemical Kinetics

9 Hrs

Rates of reaction, various factors influencing rates of reactions – order and molecularity – Zero, first, second and third order reaction, derivation of integrated rate equation, fractional life time, units of rate constants, influence of temperature on reaction rates. Arrhenius equation, calculation of Arrhenius parameters – collision theory of reaction rates.

Module VI-Group theory

9 Hrs

Group theory- elements of symmetry- proper and improper axis of symmetry- plane of symmetry-center of symmetry- identity elements, combination of symmetry elements-point group- C_{2v} , C_{3v} and D_{3h} - group multiplication table of C_{2v} - determination of point group of simple molecules like water, NH_3 , BF_3

References

1. Principles of physical chemistry-Puri, Sharma and Pathania, Vishal Publishing Co., 2007
2. Advanced physical chemistry-Gurudeep Raj, Goel Publishing House, 2009.
3. Physical chemistry- PW Atkins,Oxford University Press, 2014.
4. Physical chemistry-F Daniel and R A Alberty, Wiley, 1955.
5. Physical chemistry-E A Moelwyn, Franklin Book, 1964.
6. Introduction to solids- L V Azaroff, McGraw Hill, 1960.
7. Solid state chemistry- N B Hannay, Prentice Hall, 1967.
8. Group theory in chemistry-V Ramakrishnan and M S Gopinathan, Vishal, 2013.
9. Group theory and its applications in chemistry- A Salahuddin kunju and G krishnan, PHI Learning, 2015.

MODEL QUESTION PAPER
19UCH331.1: PHYSICAL CHEMISTRY- II

Time: Three Hours

Maximum Marks: 80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. What is the ratio of observed molar volume to ideal molar volume ?
2. Define Boyle temperature?
3. How many unit cell are possible in cubic crystal?
4. Why amorphous solids are said to be isotropic?
5. In a Galvanic cell electron flows from to
6. What is the potential of SHE?
7. What is the quantum yield of H_2-Cl_2 reaction?
8. Define chemiluminescence
9. What is the order of the reaction with rate constant $2 \times 10^{-2} \text{ molL}^{-1}\text{s}^{-1}$
10. NH_3 belongs to which point group?

SECTION B

(Answer any eight questions. Each question carries 2 mark)

11. Define critical temperature and explain its significance?
12. What is virial equation of states?
13. Explain the term Space lattice and Unit cell.
14. Both NaCl and KCl have fcc structures but KCl behaves towards X-rays like simple cubic lattice. Why?
15. What is liquid junction potential? How can it be eliminated?
16. What are reference electrodes? Give their significance?
17. State Einstein's law of photochemical equivalence?
18. Give a brief account of IUPAC sign convention.
19. What is meant by autocatalysis?
20. Define order and molecularity of a reaction?
21. A substance decomposes following first order kinetics. The half life period of a reaction is 35 minutes. What is the rate constant of the reaction?
22. What is meant by point group?

SECTION C

(Answer any six questions. Each question carries 4 mark)

23. What is the law of corresponding states? How is it derived from the vander waal's equation?
24. Calculate the constants a and b, if $T_c=31^\circ\text{C}$, $P_c=72.8 \text{ atm}$ and $R=0.082 \text{ lit atm/K}$?
25. What are the Miller indices? How are they determined?
26. EMF of a standard Daniel Cell is 1.01832 V at 298 K. Temperature coefficient of the cell is $5 \times 10^{-5} \text{ V/K}$. Calculate ΔG , ΔH , and ΔS of the cell reaction?
27. Write a brief note on Calomel electrode?
28. State and explain Beer-Lambert's law? What are its limitations?
29. Explain pseudo order reactions with suitable examples?
30. Give the group multiplication table for C_{2v}
31. Explain the different symmetry elements?

SECTION D

(Answer any two questions. Each question carries 15 mark)

32. (i) Explain Linde's and Claude's method of liquefaction of gases?
(ii) Do all gases obey gas laws? Discuss some experimental results to explain the deviation and point out the causes which account for this behavior?
(iii) Explain the terms: collision frequency and collision diameter.
33. (i) Derive Bragg's equation for the diffraction of X-rays by crystal lattice? How is this equation used in elucidating the crystal structure?
(ii) In fcc lattice of NaCl the distance between Na^+ and Cl^- ions is 281 pm and the density of NaCl is 2.165 g/cm^3 . Compute Avogadro's no. from the given data. The molar mass of NaCl is 58.5 g/mol .
(iii) Assign the point groups of the molecule BF_3 and H_2O
34. (i) Write a brief note on fuel cells? (ii) State and explain Nernst equation (iii) Explain the principle of potentiometric titrations?
35. (i) What is catalysis? What are the general characteristics of catalyst? (ii) Derive an expression for rate constant of a first order reaction? (iii) Explain the influence of temperature on reaction rates?

Semester IV
Language Course VIII
19UEN411.1: READINGS IN LITERATURE II

No of Credits:4

No of hours: 90 (5 per week)

COURSE OUTCOME

On completion of the course, the students should be able to:

1. Understand and appreciate literary discourse.
2. Look at the best pieces of writings in English critically.
3. Analyze literature as a cultural and interactive phenomenon.
4. Learn the English language through literature
5. Understand the aesthetic, cultural and social aspects of global literature.
6. Analyze and appreciate literary texts in the global context.
7. Learn structures of the English language through the text.

Module 1: Poetry

Module 2: One-Act Play

Module 3: Prose

Module 4: Fiction

COURSE MATERIAL

Module 1: Poetry

1. William Shakespeare : *Sonnet 30*
2. John Keats : *Ode to a Nightingale*
3. Robert Frost : *Mending Wall*
4. David Malouf : *The Bicycle*
5. Maya Angelou : *Poor Girl*
6. Gabriel Okara : *Once Upon a Time*

Module 2: One-Act Play

1. Anton Chekhov : *The Marriage Proposal*

Module 3: Prose

1. E. V. Lucas : *Bores*
2. Jawaharlal Nehru : *A Glory has Departed*
3. Bertrand Russell : *How to Escape from Intellectual Rubbish*

Module 4: Fiction – Short stories

1. Charles Lamb and Mary Lamb : *Tales from Shakespeare - King Lear*
2. Charles Lamb and Mary Lamb : *Tales from Shakespeare – Merchant of Venice*
3. O. Henry : *Retrieved Information*
4. A.J. Cronin : *Two Gentlemen of Verona*

Core Text:

Sadasivan, Leela. *Perspectives in Literature*. Foundation Books 2015

Further Reading

1. Abrams, M.H. *A Glossary of Literary Terms* (Rev. ed.)
2. Hobsbaum, Philip. *Metre, Rhythm and Verse Form: The New Critical Idiom*. Indian Reprint. Routledge, 2007.
3. Prasad, Birjadish. *A Background to the Study of English Literature*. Macmillan, 2012.
4. Wainwright, Jeffrey. *Poetry: The Basics*. Indian Reprint. Routledge, 2009.
5. Hudson, W.H. *An Introduction to the Study of English Literature*. Maple Press. 2012.

MODEL QUESTION PAPER
19UEN411.1: Readings in Literature II

Time: Three hours

Maximum Marks: 80

Section-A

Answer **all the questions**, each in a word or a sentence. Each question carries 1 mark.

1. Who is Lancelot Gobbo?
2. Who is the illegitimate son of the Earl of Gloucester?
3. Who does Nehru refer to in “We have failed to protect”?
4. Why does Keats wish for a “draught of vintage”?
5. A foundation stone of a bore is _____.
6. What is the attitude of the poet towards the bicycle?
7. What was the reason for the tourist’s interest in the two boys?
8. Why was Jimmy Valentine imprisoned?
9. What happens after Natalia accepts the marriage proposal?
10. What does the poet mean by the terms “unlearn” and “relearn”?

(10 x 1 = 10 marks)

Section-B

Answer **any eight questions**, each in a short paragraph not exceeding 50 words. Each question carries 2 marks.

11. What was the contract that Shylock made Antonio sign before giving him the loan?
12. Write a brief note on the storm scene in ‘King Lear’.
13. What is the greatest asset of a Bore?
14. How did the brothers help to defeat the German army in ‘Two Gentlemen of Verona’?
15. What is the “gap” that the poet refers to in ‘Mending Wall’?
16. What is Ivan’s outlook towards lottery and luck?
17. What is the mistake that Aristotle made according to Russell?
18. Why does the poet say that his “grievances” are foregone?
19. Do you think nostalgia is the predominant theme in the poem, “Once Upon a Time”?
20. Who is Mid-May’s eldest child?
21. What is the divine quality that Gandhi possessed?
22. Why did Lomov visit his neighbour?

(8 x 2 = 16 marks)

Section-C

Answer **any six questions** in about 100 words. Each question carries 4 marks.

23. Describe the first meeting between Lomov and Natalia?
24. Comment on the role of the Fool in ‘King Lear’.
25. How does the story of ‘The Two Gentlemen of Verona’ give promise of greater hope for human society?
26. Nehru feels Gandhi does not need any monument in bronze. Why?
27. What are the two ways of avoiding fear in ‘How to Escape from Intellectual Rubbish’?
28. What are the two opposing ideas of the two neighbours?
29. Comment on the phrase ‘Once Upon a Time’ as the title and the opening line of the poem.
30. Do you think money exercises power and has an adverse effect on personal relationships in ‘The Lottery Ticket’?
31. Trace the elements of a farce in ‘The Marriage Proposal’?

(6 x 4 = 24 marks)

Section-D

Answer **any two** of the following, each in about three hundred words. Each question carries 15 marks.

32. How does Maya Angelou treat the themes of love and deception in ‘Poor Girl’?
33. Discuss how the theme of ingratitude is treated in the play, ‘King Lear’.
34. What are the ways suggested by Russell to escape from “intellectual rubbish”.
35. In ‘The Proposal’ by Anton Chekhov, what idea does each of the characters represent?

(15 x 2 = 30 marks)

Language course IX (Additional Language IV)

19UFR411.1: CULTURE & CIVILIZATION

No of Credits: 4

No of hours: 5 Hrs/week

COURSE OBJECTIVES:

1. To acquaint the students with French culture and civilization.
2. To comprehend, compare and understand better the civilization of one's native place.

COURSE OUTCOMES:

The students would be able to comprehend French culture and civilization and thereby be able to compare and grasp better the civilization of one's native place.

SYLLABUS:

NAME OF TEXT : ECHO-A1 méthode de français

Authors: J. Girardet & J. Pecheur

Publisher: CLE INTERNATIONALE

- Leçon- 9 : Souvenez-vous ! (Pages : 86 -93)
- Leçon – 10 : On s'appelle ? (Pages : 94 – 101)
- Leçon – 11 : Un bon conseil ! (Pages : 102 – 109)
- **The following topics on Kerala culture with special emphasis on festivals, tourist centres, cuisine and cities are to be asked as short essays and long essays.**
 - » L'Onam – la fête unique du Kerala
 - » Le Vishou,
 - » Une ville touristique favori du Kerala
 - » Le Kerala – Le Pays du Dieu
 - » L'importance touristique du Kerala
 - » Un écrivain célèbre du Kerala
 - » Un plat traditionnel du Kerala

Reference books :

1. Connexions – Niveau 1 By Régine Mérieux and Yves Loiseau
2. Le Nouveau Sans Frontières Vol I by Philippe Dominique
3. Panorama Vol I by Jacky Girardet

MODEL QUESTION PAPER
19UFR411.1: CULTURE & CIVILIZATION

TIME: 3HRS

MAX MARKS: 80

PART-A

Répondez à toutes questions suivantes:

1. Qui est le fils de votre père ?
2. Vous avez un ordinateur ?
3. Qu'est-ce que vous faites pour rester en contact avec vos amis ?
4. Nommez deux parties du corps ?
5. Quel numéro fait-on pour appeler les pompiers en France ?
6. Que faites-vous si vous avez perdu votre carte bancaire en France ?
7. Nommez un film français que vous avez regardé ?
8. Pourquoi utilisez-vous l'internet ?
9. Jusqu'à quand peut-on dire « Bonjour » en France ?
10. En France, qu'est-ce que vous devez faire quand on vous fait un cadeau ?

(10x1=10)

PART-B

Répondez à 8 questions suivantes :

11. Complétez en utilisant un pronom complément direct :
Leo : J'ai rencontré une fille sympa. Je aime bien.
Marco : Tuvois souvent ?
Leo : Oui, Jeappelle.
12. Remplacez les mots soulignés par un pronom complément direct ou indirect :
 - Tu connais la nouvelle ? Clémentine a quitté Antoine !
 - Elle a quitté Antoine quand ?
 - Il y a un mois. Elle a écrit une lettre à Antoine. Elle a dit à Antoine qu'elle allait vivre à Toulouse.
 - Et les enfants ?
 - Elle a emmené les enfants.
13. Mettez les verbes entre parenthèses à l'imparfait :
« A Paris. J'(avoir) une chambre dans le Quartier Latin. J'(étudier) à l'Ecole de médecine. C'(être) une belle époque. Le soir, nous (danser) à la Huchette.
14. Mettez les verbes suivants à l'imparfait :
 - a. Connaitre : Elle
 - b. Lire : Je
 - c. C. habiter : Nous
 - d. Regarder : Vous
15. Répondez :
 - a. Vous jouez encore au football ?
 - b. Vous lisez encore des bandes dessinées ?
16. Vous êtes en vacances en France. Que faites-vous dans les situations suivantes :
 - a. Dans la rue, une voiture brule.
 - b. Vous avez perdu votre carte bancaire.
17. Faites des phrases avec « *Souvent* » et « *Quelquefois* » :
18. Transformez les mots ci-dessous aux mots de la répétition :
 - a. Faire
 - b. Lire
 - c. Prendre
 - d. Dire
19. Donnez deux raisons pour lesquels vous utilisez l'ordinateur.
20. Rédigez un court message pour votre répondeur.
21. Peut-on vivre sans le téléphone portable ? Exprimez votre avis.
22. Ecrivez deux phrases pour présenter des actions que vous avez déjà faites :
Ex : J'ai déjà mangé des escargots !

(8x2=16)

PART-C

Répondez à 6 questions suivantes :

23. Mettez le récit suivant au passé. Utilisez le passé composé et l'imparfait :
« Nous allons au bord de la mer pour le week-end. Il fait chaud. Il y a beaucoup de monde. Je prends un bain. Puis, avec mon frère, nous faisons du surf. Le soir, nous sommes fatigués. »
24. Répondez en utilisant un pronom :
Ex : Vous apprenez bien le vocabulaire ? → Oui, je l'apprends.
a. Vous faites les exercices ? → Oui, Je
b. Vous regardez la chaîne française TV5 ? → Oui, Je
c. Vous regardez les films ? → Oui, Je
d. Vous comprenez les acteurs ? → Non, Je
25. Rapportez le dialogue :
Ex : Lisa dit à Paul qu'elle a envie de sortir...
Lisa : J'ai envie de sortir.
Paul : Ou tu veux aller ?
Lisa : Je voudrais aller danser. Tu veux venir ?
Paul : Je suis fatigué.
Lisa : Je ne veux pas sortir seule.
Paul : Appelle Marie.
26. Dites ce qu'ils sont en train de faire, ce qu'ils viennent de faire, ce qu'ils vont faire :
a. Paul part en vacances (arriver à la gare, monter dans le train, chercher sa place).
b. Marie va faire une course (sortir, acheter du pain, rentrer dans cinq minutes).
27. Présentez votre voisin.
28. Rédigez en quatre phrases les souvenirs de votre premier livre.
29. Présentez un écrivain du Kerala que vous connaissez.
30. Présentez le film dernier que vous avez regardé.
31. Une amie vous a prêté un livre il y a six mois. Elle vous le demande. Vous lui renvoyez ce livre avec un petit mot. Exprimez vos excuses, vos remerciements, votre plaisir d'avoir lu ce livre.

(6x4=24)

PART-D

Répondez à 2 questions suivantes :

32. Faites un arbre généalogique de votre famille. Alors, présentez votre famille.
33. Pourquoi le Kerala est appelé comme « Le Pays du Dieu » ?
34. Décrivez une fête unique du Kerala.
35. Vous décidez de quitter votre travail ou d'arrêter vos études. Vous avez d'autres projets. Vous rencontrez un(e) ami(e) et vous parlez de ces projets.

(2x15=30)

Language course IX (Additional Language IV)

19UHN411.1: DRAMA, TRANSLATION & COMMUNICATIVE HINDI

No of Credits: 4

No of hours: 5 Hrs/week

Aims of the Course / Objectives

To appreciate and analyze the dramatic elements in literature. To understand the distinct features of Hindi Drama. To understand the process of translation and the qualities of a translator. To familiarize official correspondence in Hindi. Learn Hindi for effective communication. To familiarize the technical terms used in offices.

Course Outcome

Understanding the Drama 'Nepatya Rag' written by Mira Kaanth in context of struggle for independence of women in patriarchal society. Students got scope to gain knowledge about the forms of exploitation faced by women in feudalistic system. To develop communication skills in Hindi. Get jobs for their livelihood.

Module 1

Drama

Prescribed textbook – 'Nepathya Rag' by Mira Kaanth
Published by Bharatheey Gyanpeeth, New Delhi

Module 2

Translation

Textbook – 'Anuvad evam Vyavaharik patra vyavahar'
By Prof. Vanaja K. V
Published by Govind Prakashan Mathura
(Passages 1 to 8 should be studied.)

Module 3

Communicative Hindi

Patravvyavahar

Text: 'Anuvad evam Vyavaharik patra vyavahar' By Prof. Vanaja K. V
Published by – Govind Prakashan, Mathura
(Invitation letter, Leave letter, Letter to (Father, Son, Friend), Application letter for employment, Letters regarding orders, Letters of enquiry and Letters of complaint).

Technical Terminology

Prescribed Textbook – Anuvad Evam Vyavaharik Patra Vyavahar
Prof, Vanaja K V
Published by – Govind Prakashan, Mathura

Varthalap

Text: 'Bolchal ki Hindi'
By Dr Susheela Gupt
Published by Lok Bharati Prakashan
(Chapters 2 to 16 should be studied)

Books to General Reading

1. Samakaleen Hindi Natak aur Rangmanch
Dr. Narendra Mohan
Vani Prakashan
2. Hindi Natak - Dr. Bachan Singh
Radhakrishna Prakashan
3. Sattothar Hindi Natak - Dr. K.V. Naryana Kurup
Lokbharati Prakashan
4. Anuvad Sidhanth aur Prayog – Dr. G. Gopinathan
Lokbharati Prakashan
5. Patravvyavahar Nirdeshika - Bholanath Thivari
Vani Prakashan

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM
Fourth Semester B.A/B.Sc Degree Examination
Language Course (Additional Language IV) - HINDI
19UHN 411.1 Drama, Translation and Communicative Hindi
(2019 Admission onwards)

Time : 3 Hrs.

Max.Marks : 80

I. एक शब्द या वाक्य में उत्तर लिखिए?

1. मीरा कान्त का जन्म कहाँ हुआ?
2. मालवगणनायक विक्रमादित्य के नवरत्नों में आयुर्वेद के विद्वान कौन थे?
3. वराह मिहिर किस गाँव के निवासी है?
4. सुबन्धु भट्ट को खना प्यार से क्या पुकारती थी?
5. किसने 'कुमार सम्भवम्' की रचना की?
6. 'बृहत-जातक' ग्रंथ के रचयिता कौन है?
7. इतिहास की पहली महिला ज्योतिषी कौन थी?
8. 'ततः किम' किसका उपन्यास है?
9. 'Casual Leave' का हिन्दी अनुवाद क्या है?
10. 'संघ लोक सेवा आयोग' का अंग्रेज़ी अनुवाद क्या है? (10×1=10 marks)

II. किन्हीं आठ प्रश्नों के उत्तर पचास शब्दों में लिखिए?

11. मीरा कान्त के चार नाटकों के नाम लिखिए?
12. मेधा अपने कार्यालय में क्यों दुःखी है? उसके ऑफिस में चल रही 'पोस्ट मॉडर्न प्रॉब्लम' क्या है?
13. स्वास्थ्य के बारे में धन्वन्तरि की राय क्या है?
14. 'निर्धन पुरुष' के वेष में वराह मिहिर से मिलने कौन आया था? क्यों?
15. महादेवी ज्योतिष्मती खना से क्या जानना चाहती है?
16. महाराज भर्तृहरि ने संन्यास क्यों स्वीकार किया था?
17. विक्रमादित्य खनादेवी को क्यों सभासद बनाना चाहते हैं?
18. वररुचि के स्त्री विषयक दृष्टिकोण का परिचय दीजिए?
19. वराह मिहिर ने अनुवाद के लिए कौन-सी व्याख्या दी है?
20. नाटककार मीराकान्त का परिचय दीजिए?
21. अंग्रेज़ी पारिभाषिक शब्द लिखिए?
 1. Accountant
 2. Administration
 3. Code
 4. Notification
22. हिन्दी पारिभाषिक शब्द लिखिए?
 1. अवर सचिव
 2. कार्यक्रम
 3. प्रमाण-पत्र
 4. सचिवालय

(8×2=16 marks)

III. निम्नलिखित खंडों से किन्हीं छह प्रश्नों के उत्तर 120 शब्दों में लिखिए?

खण्ड 'ख' से एक प्रश्न का उत्तर अनिवार्य है।

खण्ड क

23. पत्र-लेखन के महत्व पर प्रकाश डालिए?
24. आचार्य वराह मिहिर की चरित्रगत विशेषताओं पर प्रकाश डालिए?
25. आवश्यक पुस्तकों की माँग करते हुए वाणी प्रकाशन, दिल्ली के प्रकाशक के नाम पत्र लिखिए?
26. खनादेवी को सभासद् बनाने के प्रस्ताव पर नवरत्नों की प्रतिक्रिया क्या थी?
27. रसोई घर में माँ के साथ बातचीत का नमूना लिखिए?
28. 'परन्तू... यह निर्धन पुरुष था कौन.... साम्राज्य की चिन्ता में डूबा। घुटनों से नीचे तक पहुँचते वे हाथ क्या किसी निर्धन के थे?' सप्रसंग व्याख्या कीजिए?
29. अनुवाद किसे कहते हैं? अनुवाद करते समय किन किन बातों पर ध्यान रखना चाहिए?

खण्ड 'ख'

निर्देश: हिन्दी में अनुवाद कीजिए

30. The government, however, cannot do everything by itself. So it looks to the people for help. Infact, the most wonderful thing about our plans is the way in which the people have come forward to improve their lives by working together. By far, the best example of this is the community development programme. This is the right step in the right direction. It will lead us to progress and prosperity. On it depends the future of India to a large extend.
31. I am extremely glad to note the progress of Hindi in South India. A common language for the whole of India is a necessity. There are many advantages in making Hindi the national language. There is no possibility of Hindi endangering the provincial languages. Hindi is a fine rope with which we can bind the whole of India together. Some people complain that it is difficult to learn other languages. But there is really no difficulty in that. You can find many people in Europe knowing four or five languages, besides their mother tongue.
(6×4=24 marks)

IV. किन्हीं दो प्रश्नों के उत्तर 250 शब्दों में लिखिए?

32. खना का चरित्र-चित्रण कीजिए?
33. केरल हिन्दी प्रचार सभा, तिरुवनन्तपुरम के हिन्दी विभाग में एक अतिथि अध्यापक का पद खाली है। उक्त पद में आपकी नियुक्ति के लिए सचिव के नाम एक पत्र लिखिए?
34. कॉलज में विभिन्न व्यक्तियों के साथ बातचीत का नमूना तैयार कीजिए।
35. 'नेपथ्य राग' नाटक के नामकरण की सार्थकता पर विचार कीजिए? (2×15=30 marks)

സെമസ്റ്റർ	:	IV
കോഴ്സ് കോഡ്	:	19UML 411.1
ലാംഗ്വേജ് കോഴ്സ്	:	IX (Add lang:IV)
സമയക്രമം	:	ആഴ്ചയിൽ 5 മണിക്കൂർ (18×5= 90 മണിക്കൂർ)
ക്രെഡിറ്റ്	:	4

ഭാഷാപ്രായോഗിക പഠനം

പഠനോദ്ദേശ്യം

1. വിദ്യാർത്ഥികളുടെ ആശയവിനിമയശേഷി വർദ്ധിപ്പിക്കുക.
2. ഔദ്യോഗിക/ഭരണകാര്യങ്ങളും ശാസ്ത്രവിഷയങ്ങളും മലയാളഭാഷയിലൂടെ അവതരിപ്പിക്കാനുള്ള കഴി വ്യാകൃതം.
3. മലയാള ഭാഷ കൈകാര്യം ചെയ്യുമ്പോൾ ഉപയോഗിക്കുന്ന പാഠകൃതികൾ സ്വയം തിരഞ്ഞാൻ പ്രാപ്തരാക്കുക.
4. പദം, വാക്യം, ചിഹ്നം എന്നിവ തിരിച്ചറിയുന്നതിലൂടെ പ്രായോഗികപരമായ ഭാഷാശുദ്ധി നിലനിർത്തുക.
5. മലയാള ഭാഷ അനായാസം കൈകാര്യം ചെയ്യാനുള്ള കഴിവ് നേടിക്കൊടുക്കുക.
6. വിവർത്തനത്തിൽ പ്രായോഗിക പരിശീലനം നൽകുക.

പാഠ്യപദ്ധതി :

മൊഡ്യൂൾ - ഒന്ന് (18 മണിക്കൂർ)

പദശുദ്ധി - വാക്യശുദ്ധി, വാക്യ രചനയിൽ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ, ഭാഷാ പ്രയോഗത്തിലെ ശരി തെറ്റുകൾ - നല്ല മലയാള ശൈലി - ശൈലീ ഭംഗം - വാക്യങ്ങളും വാക്യങ്ങളും തിരിച്ചറിയുന്നതിലൂടെ ശുഭൃതവാനുള്ള പ്രായോഗിക പരിശീലനം.

മൊഡ്യൂൾ - രണ്ട് (18 മണിക്കൂർ)

ശബ്ദ കോശജ്ഞാനം, വാക്യങ്ങളുടെ അർത്ഥം വിപരീത ശബ്ദങ്ങൾ സമാന ശബ്ദങ്ങൾ നാനാർത്ഥങ്ങൾ, പദച്ഛേദം, ചേർത്തെഴുത്ത്, എതിർ ലിംഗം, അർത്ഥ വ്യത്യാസം. മുതലായവയിലൂടെ വിദ്യാർത്ഥികളുടെ ഭാഷാ ഗ്രഹണ ക്ഷമത വർദ്ധിപ്പിക്കുന്നു.

വിശദപഠനം:

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

1. ആശയ വിപുലനം പ്രകൃഷ്ട കാവ്യ മാതൃകകളിലെ ഉദ്ധരണികൾ നൽകി, ആശയം വിപുലീകരിച്ച് എഴുതാനുള്ള ശേഷി വർദ്ധിപ്പിക്കും വിധം അഭ്യാസ പ്രവർത്തനങ്ങൾ നടത്തുക.
2. പരാവർത്തനം: തന്നിരിക്കുന്ന പാഠ്യഭാഗം എറ്റക്കുറച്ചിലുകൾ വരാതെ ഗദ്യരൂപത്തിലാക്കുവാനുള്ള പരിശീലനം
3. മൂന്നിലൊന്നായി സംഗ്രഹിക്കൽ: ആശയ ചോരണം വരാതെ സുദീർഘങ്ങളായ മാതൃകകൾ സംഗ്രഹിക്കാനുള്ള ശേഷി.
4. ഉത്തരം കത്തെൽ: ഗദ്യ-പദ്യ മാതൃകകളിൽ നിന്ന് ഉത്തരം കത്തിയെഴുതാനുള്ള ശേഷി വളർത്തുന്നു.

മൊഡ്യൂൾ നാല് (36 മണിക്കൂർ)

1. ഉപന്യാസം : നിർവ്വചനം., വിവിധ ഉപന്യാസ മാതൃകകൾ, ഒരു ഉപന്യാസം തയ്യാറാക്കുമ്പോൾ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ, പ്രായോഗിക ഒരു ഉപന്യാസം തയ്യാറാക്കുമ്പോൾ ശ്രദ്ധിക്കേണ്ട കാര്യങ്ങൾ, പ്രായോഗിക മാതൃകകളിലൂടെ ഏതൊരു വിഷയത്തെക്കുറിച്ചും ഉപന്യാസം തയ്യാറാക്കുവാനുള്ള പരിശീലനം.

വിശദീകരണം

- 1. ആ മനുഷ്യൻ നീതന്നെ : സി.ജെ. തോമസ്
- 2. രാവുണ്ണി : പി.എം. താജ്

മൊഡ്യൂൾ മൂന്ന് (18 മണിക്കൂർ)

തിരക്കഥാപഠനം

ചലച്ചിത്രനിർമ്മിതിയിൽ തിരക്കഥയ്ക്കുള്ള പ്രാധാന്യത്തെക്കുറിച്ചുള്ള അന്വേഷണ നേടണം

വിശദീകരണം

- 1) ഒഴിമുറി : ജയകാന്തൻ
- 1. കേരള സാഹിത്യ ചരിത്രം - ഉള്ളൂർ
- 2. സാഹിത്യ ചരിത്രം പ്രസ്ഥാനങ്ങളിലൂടെ - ഡോ.കെ.എം.ജോർജ്ജ്
- 3. കൈരളിയുടെ കഥ - എൻ.കൃഷ്ണപിള്ള
- 4. കുഞ്ചൻ നമ്പ്യാർ വാക്കും സമൂഹവും - കെ.എൻ.ഗണേഷ്
- 5. കഥയും തിരക്കഥയും - എ.ജി.രാജ്കുമാർ
- 6. സിനിമയുടെ ലോകം - അടൂർ ഗോപാലകൃഷ്ണൻ
- 7. ആധുനിക മലയാള സിനിമ - കെ.പി. രാമൻ കുട്ടി
- 8. സിനിമയുടെ വഴിയിൽ - ഐ.ഷൺമുഖദാസ്
- 9. സഞ്ചാരിയുടെ വീട് - ഐ.ഷൺമുഖദാസ്
- 10. കഥയും തിരക്കഥയും - എ.ജി. രാജ്കുമാർ
- 11. സിനിമയും മലയാളസാഹിത്യവും - മധു ഇറവങ്കര
- 12. മലയാള സിനിമ - സിനിക്
- 13. ചലച്ചിത്രത്തിന്റെ പൊരുൾ - വിജയകൃഷ്ണൻ
- 14. ചലച്ചിത്ര സമീക്ഷ - വിജയകൃഷ്ണൻ
- 15. സിനിമയുടെ രാഷ്ട്രീയം - രവീന്ദ്രൻ
- 16. കാഴ്ചയുടെ അശാന്തി - രവീന്ദ്രൻ
- 17. സിനിമയെ കണ്ടെത്തൽ - എം.എഫ്.തോമസ്
- 18. മലയാള സിനിമ അരനൂറ്റ് - (എഡി) കെ.ജയകുമാർ
- 19. എം.ടി, കല, കാലം, വൃത്തി - (എഡി) കെ.ജയകുമാർ
- 20. എം.ടി. കഥയും പൊരുളും - (എഡി) എം.എം. ബഷീർ
- 21. എം.ടി.യുടെ സർഗ്ഗപ്രപഞ്ചം - കേരളഭാഷാഇൻസ്റ്റിറ്റ്യൂട്ട്
- 22. എം.ടി.കല,കാലം,സ്വത്വം - ഡോ.എ.എസ്. പ്രതീഷ്

FATIMA MATA NATIONAL COLLEGE (AUTONOMOUS), KOLLAM

Fourth Semester B.A Degree Examination May 2019

CBCSS

19UML 411.1: ഭാഷാപ്രായോഗിക പഠനം

Time : 3 Hrs.

Max.Marks : 80

Section A

- I. ഒറ്റവാക്കിലോ പരമാവധി രണ്ടു വാക്യത്തിലോ ഉത്തരമെഴുതുക. 1 മാർക്ക് വീതം**
1. 'തലപ്പാവ്' എന്ന സിനിമയുടെ സംവിധായകൻ ആര്?
 2. 'റൂഥ്' ആരുടെ നാടകം ആണ്?
 3. പി.എം. താജിന്റെ ഏതെങ്കിലും രണ്ട് നാടകങ്ങളുടെ പേര് എഴുതുക.
 4. തുള്ളൽ വിഭാഗങ്ങൾ ഏതെല്ലാം?
 5. സ്യമന്തകം ഓട്ടൻതുള്ളൽ ആരുടെ കൃതി?
 6. അമ്പലപ്പുഴ ശ്രീകൃഷ്ണസ്വാമി ക്ഷേത്രം മലയാളത്തിലെ ഏത് കവിതയുമായി ബന്ധപ്പെട്ടിരിക്കുന്നു?
 7. 'ഇനി വായന ഇനി വായന' ആരുടെ കൃതി?
 8. 'മധുരം നിന്റെ ജീവിതം' ആരെക്കുറിച്ചുള്ള കൃതിയാണ്?
 9. മലയാളത്തിലെ ഇബ്സൺ എന്നറിയപ്പെടുന്ന നാടക്യത്താര്?
 10. മലയാളത്തിൽ ആദ്യമായി പ്രഹസനങ്ങൾ രചിച്ചത് ആര്? (1×10=10)

Section B

- II. ഏതെങ്കിലും 8 ചോദ്യത്തിന് അരപ്പുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 2 മാർക്ക് വീതം.**
11. ജോർദ്ദാൻ എങ്ങോട്ടാണ് ഒഴുകുന്നത് - സന്ദർഭം വ്യക്തമാക്കുക.
 12. ഇ-വായന എന്നാൽ എന്ത്?
 13. കണ്ണുള്ളത് തുറക്കാൻ മാത്രമല്ല അടയ്ക്കാൻ കൂടിയാണ് - സന്ദർഭം വ്യക്തമാക്കുക.
 14. ഇതര നാടകങ്ങളിൽ നിന്നും തനത് നാടകം എങ്ങനെ വ്യത്യാസപ്പെട്ടിരിക്കുന്നു?
 15. ബ്ലോഗെഴുത്തിന്റെ സവിശേഷതകൾ വ്യക്തമാക്കുക.
 16. രാവണൻ കാർത്തവീര്യാർജ്ജുനന്റെ അഹങ്കാരം ശമിപ്പിച്ചതെങ്ങനെ?
 17. കാർത്തവീരാർജ്ജുനം തുള്ളൽ ഏത് വിഭാഗത്തിൽപ്പെടുന്ന വിശദമാക്കുക.
 18. രാവുണ്ണി എന്ന നാടകത്തിന്റെ കേന്ദ്രഭാവം എന്ത്?
 19. കാർത്തവീര്യാർജ്ജുന വിജയത്തിൽ കാർത്തവീര്യന്റെ അഹങ്കാരം ശമിപ്പിക്കുന്നതെങ്ങനെ?
 20. ഓട്ടൻ തുള്ളലിലെ വേഷവിധാനത്തെ കുറിച്ച് വിവരിക്കുക.

Section C

II. ഏതെങ്കിലും 6 ചോദ്യത്തിന് ഒന്നരപുറത്തിൽ കവിയാതെ ഉത്തരമെഴുതുക 4 മാർക്ക് വീതം.

- 21. 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന ശീർഷകത്തിന്റെ സാങ്കല്പം പരിശോധിക്കുക.
- 22. തിരുവിതാകൂർ ഭാഷയിലെ മനോഹാരിത 'ഒഴിമുറിയിൽ' എങ്ങനെ ആവിഷ്കരിച്ചിരിക്കുന്നു?
- 23. ഒഴിമുറി ചർച്ചചെയ്യുന്ന ജീവിതസംഘർഷം വിവരിക്കുക.
- 24. കാർത്തവീരാർജ്ജുന വിജയം തുള്ളലിൽ പ്രകടമാകുന്ന സാമൂഹിക ആക്ഷേപഹാസ്യം വ്യക്തമാക്കുക.
- 25. രാവുണ്ണി എന്ന നാടകപ്രമേയ സവിശേഷത വിശദമാക്കുക.
- 26. 'ബൽഗേബ' എന്ന കഥാപാത്ര നിരൂപണം ചെയ്യുക.
- 27. നാഥൻ എന്ന പ്രവാചകന്റെ കടന്നുവരവ് 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന നാടകത്തെ എത്രമാത്രം സംഘർഷാത്മകമാക്കുന്നു? വ്യക്തമാക്കുക.
- 28. ബൈബിൾ രചനകളുടെ മേന്മയും പരിമിതിയും വ്യക്തമാക്കുക.
- 29. പാപബോധം ആ മനുഷ്യൻ നീ തന്നെ എന്ന നാടകത്തിൽ എങ്ങനെ കടന്നു വരുന്നു?
- 30. മലയാള നിരൂപണത്തിലെ വേറിട്ട മുഖമാണ് കെ.പി. അപ്പന്റേത് - വിശദമാക്കുക.
- 31. സി. ജെ. യുടെ ദാർശനികമായ വിചാരധാരകൾ 'ആ മനുഷ്യൻ നീ തന്നെ'യിൽ എത്രത്തോളം പ്രതിഫലിക്കുന്നു.

Section D

IV. മൂന്നുപുറത്തിൽ കവിയാതെ രണ്ടുചോദ്യത്തിന് ഉത്തരമെഴുതുക. 15 മാർക്ക് വീതം.

- 32. തനത് നാടകത്തിന്റെ പൊതു സവിശേഷതകൾ വിശദമാക്കുക.
- 33. ബൈബിൾ കഥയെ നാടകീയമായി ചിത്രീകരിക്കുന്നതിനുള്ള സി.ജെ.യുടെ കഴിവ് 'ആ മനുഷ്യൻ നീ തന്നെ' എന്ന നാടകത്തെ ആസ്പദമാക്കി ചർച്ച ചെയ്യുക.
- 34. കടക്കണിയിൽ അകപ്പെട്ടുപോയ ഒരാളുടെ മാനസിക വ്യഥകളെ രാവുണ്ണി എന്ന നാടകത്തിൽ എപ്രകാരം ചിത്രീകരിച്ചിരിക്കുന്നു?
- 35. നമ്പ്യാരുടെ കൃതികൾ ഉത്തമമായ സാമൂഹിക പരിഹാസങ്ങൾ ആണ്. കാർത്തവീരാർജ്ജുന വിജയത്തെ ആധാരമാക്കി വിലയിരുത്തുക.

Core Course IV

19UPH441: CLASSICAL AND RELATIVISTIC MECHANICS

No. of credits: 3

No. of instructional hours per week: 3

Course Outcome

- Knowledge and understanding of the classical laws of motion.
- Competency in using the essential mathematical skills needed for describing mechanics and special relativity
- Problem solving skills- Lagrangian and Hamiltonian mechanics applied to basic systems.
- Understand the influence of classical mechanics and relativity on modern scientific development.
- Understand the role of mechanics and relativity in the everyday world
- Demonstrate an understanding of the basic principles of special theory of relativity and perform basic calculations in relativistic kinematics and dynamics

Unit 1 - Particle Dynamics (5 hrs)

Mechanics of a particle – equation of motion of a particle – Motion of a charged particle in electromagnetic field – mechanics of a system of particles

Unit 2-Conservation laws (6 hrs)

linear uniformities of space and conservation of linear momentum – rotational invariance of space and law of conservation of angular momentum – homogeneity of flow of time and conservation of energy.

Unit 3- Motion in central force field (10 hrs)

Equivalent one body problem – motion in central force field – general features of motion – motion in an inverse square law force field – equation of the orbit – Kepler's laws of planetary motion and their deduction.

Unit 4 - Collisions (6 hrs)

Conservation laws- Conservation of momentum- laboratory and centre of mass systems- kinetic energies in the lab and CM systems-Cross-section of elastic scattering

Unit 5. Lagrangian Dynamics(9hrs)

Constraints-generalized coordinates- principle of virtual work-D'Alembert's principle, Lagrange's equation from D'Alembert's principle-applications of Lagrange's equation in simple pendulum, Atwood's machine and compound pendulum, Comparison of Lagrangian approach with Newtonian approach

Unit 6. Hamiltonian Dynamics(5hrs) Generalized momentum and cyclic coordinates- Hamiltonian function H- conservation of energy- Hamilton's equation - examples of Hamiltonian dynamics- one dimensional harmonic oscillator

Unit 7. Frames of Reference, Galilean transformation and Special theory of relativity(13hrs)

Inertial frames of reference- Galilean transformation- non- inertial frames

Origin and significance of special theory of relativity-search for universal frame of reference-Michelson-Morley experiment- postulates of special theory of relativity- consequences-Lorentz transformation equations- kinematical consequences of Lorentz transformations-length contraction-time dilation-twin paradox-transformation of velocity- variation of mass with velocity- mass energy equivalence

Books for Study:

1. Classical Mechanics: J. C. Upadhyaya, Himalaya Publishing
2. Mechanics: H.S.Hans and S.P.Puri, Tata-McGraw Hill
3. Classical Mechanics: G. Aruldas, PHI Learning Pvt Ltd., 2008
4. Introduction to classical mechanics: R.G.Thakwale and P.S.Puranik, Tata-McGraw Hill.
5. Classical Mechanics: Vimal Kumar Jain, Ane Books Pvt. Ltd., 2009

Books for Reference: 1.Classical Mechanics: Goldstein.

1. Modern Physics:Ronald Gautreau, Shaum's outlines series,1999
2. Classical Mechanics-Systems of Particles & Hamiltonian Dynamics:Walter Greiner, Springer,2ndEdn.
3. Classical Mechanics: N.C Rana and P.S.Joag, TMH Education Pvt. Ltd., 2015

MODEL QUESTION PAPER
19UPH441: CLASSICAL & RELATIVISTIC MECHANICS

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. What are inertial frames of references?
2. Write the equation of motion of a freely falling body which is experiencing a resistive force proportional to its velocity?
3. Write the expression for complete Lorentz force?
4. State Kepler's second law of planetary motion?
5. Define elastic scattering cross section?
6. State the principle of virtual work.
7. What are cyclic coordinates?
8. Write down the Hamilton's equations of motion.
9. Give an example for non inertial frame of reference.
10. State the postulates of special theory of relativity.

Section B (Answer any eight questions; Two mark each)

11. State Newton's second law of motion and explain its significance?
12. What is a central force? Give two examples of it.
13. What does the term 'rotational invariance' imply?
14. Define reduced mass of a two body system? Discuss its applicability in central force motion?
15. Show that the motion of centre of mass of a system of particles is unaffected by the internal forces?
16. Show that a target resting in laboratory frame appears to move in centre of mass frame.
17. Obtain the expression for generalized momentum in terms of Lagrangian function.
18. Obtain the Hamilton's equations for a one dimensional harmonic oscillator.
19. Interpret the negative result of Michelson Morley experiment.
20. Write a note on twin paradox.
21. Differentiate inertial and non-inertial frames of references.
22. What is the physical significance of the Hamiltonian function?

Section C (Answer any six questions; Four mark each)

23. A body of mass 1 kg is falling vertically towards the equator of earth. Calculate the Coriolis force experienced by it when its instantaneous velocity is 40 m/s?
24. Show that linear uniformity of space leads to the conservation of linear momentum?
25. In a collision analysis, a target is observed to have an initial velocity of 100 m/s towards the origin of the centre of mass frame. If the target is at rest in laboratory frame, find the velocity of the projectile and that of the centre of mass in the laboratory frame if the projectile and target are of equal mass?
26. Find the total energy of earth in its orbit around the sun assuming that mass of the sun is 2×10^{30} kg and that of earth is 6×10^{24} kg. The average radius of earth's orbit is 1.5×10^8 km.
27. Show that the law of conservation of energy is invariant under Galilean transformation.
28. Calculate the rest energy of an electron in Joules and in electron volts.
29. Obtain the Einstein's mass energy relation.
30. Obtain the equations for transformation of velocity under Lorentz transformation.
31. Show that the length or distance between two points is invariant under Galilean transformation.

Section D (Answer any two question; 15 marks each)

32. Obtain the equation of orbit under central force motion. Discuss the nature of orbits with total energy of motion.
33. Obtain the expression for fictitious force generated in a uniformly rotating frame and comment on the two types of forces generated?
34. Obtain the Lagrange's equations for the following systems (a) Simple pendulum, (b) Atwood's machine and (c) Compound pendulum.
35. Derive the Lorentz transformation equations and discuss the consequences of Lorentz transformation equations.

Core Course V

19UPH442: MECHANICS , PROPERTIES OF MATTER, HEAT AND ACCOUSTICS

Course Outcome

- Understand the appropriate concepts to analyze qualitatively problems or situations involving the fundamental principles of mechanics, properties of matter, heat and accoustics.
- Understand the mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
- Demonstrate basic experimental skills by the practice of setting up and conducting an experiment with due regards to minimizing measurement error.
- Demonstrate basic communication skills by working in groups on laboratory experiments and the thoughtful discussion and interpretation of data.

Basic Physics Lab 1 (minimum 18 experiments to be done)

1. Fly Wheel - Moment of Inertia
2. Compound Bar Pendulum – Symmetric
3. Compound Bar Pendulum – Asymmetric
4. Uniform Bending---Y---Pin and Microscope
5. Uniform bending—Y- optic lever method
6. Non-uniform bending-Y-Optic lever& telescope
7. Rigidity modulus –Static torsion
8. Torsion pendulum I- By Torsional oscillations
9. Torsion pendulum II- By Equal masses
10. Kater's pendulum-Acceleration due to gravity
11. Melde's string-----Frequency of fork
12. Phase transition-determination of M.P of wax.
13. Determination of thermal conductivity of rubber
14. Lee's disc-determination of thermal conductivity of a bad conductor
15. Viscosity-Continuous flow method using constant pressure head.
16. Viscosity-Variable pressure head arrangement
17. Surface tension-Capillary rise
18. Sonometer-frequency of A.C
19. Kundt's tube-determination of velocity of sound.
20. Determination of m and B_h using deflection and vibration magnetometers.
21. Potentiometer-Resistivity.
22. Comparison of least counts of measuring instruments.
23. Evaluation of errors in simple experiments.

References

1. Yarwood and Wittle; Experimental Physics for Students, Chapman &Hall Publishers.
2. An advanced course in practical physics, Chathopadhyaya, Rakshit and Saha, New central agency, Kolkata.
3. A text book of practical physics, S.Viswanathan & Co., Chennai.
4. Advanced Practical Physics, B.L.Worsnop and H.T.Flint, Khosla Publishers, Delhi.

Complementary Course VII

19UMM431.1: Complex Analysis, Special Functions, and Probability Theory

No. of Credits: 4

Instructional hours per week: 5

Aim:

To create an interest among students towards advanced complex analysis, special functions and probability theory.

Course outcome:

Students will be able to use probabilistic reasoning to describe experiments in terms of sample spaces.

Module 1 : Advanced Complex Analysis

(36 Hours)

Functions of a complex variable, Analytic functions, the Cauchy-Riemann relations, Contour integrals, Cauchy's theorem, Cauchy's integral formula, Laurent series, the residue theorem, methods of finding residues, evaluation of definite integrals using residue theorem, residues at infinity, conformal mapping and some of its applications.

Chapter 14

More exercises related to the topics in this module can be found in chapter 14, 15, 16 and 17 of reference [4], which is not to be included in ESE.

Module 2 : Special functions

(18 Hours)

The Factorial Function, Definition of the Gamma Function; Recursion Relation, The Gamma Function of Negative Numbers, Some Important Formula Involving Gamma Functions, Beta Functions, Beta Functions in Terms of Gamma Functions

Chapter 11(sections1-7)

More exercises related to the topics in this module can be found in chapter 13 of reference [3], which is not to be included in ESE.

Module 3 : Probability and Statistics

(36 Hours)

Basics, Sample Space, Probability Theorems, Methods of Counting Random Variables, Continuous Distributions, Binomial Distribution, The Poisson Distribution

Chapter 15, sections 15.1 to 15.7 ,15.9

More exercises related to the topics in this module can be found in chapter 23 of reference [3], which is not to be included in ESE.

Note: In all modules, proofs of theorems are to be omitted

Text

Mary L Boas Mathematics Methods in the Physical Sciences, 3rd Edition, Wiley

References

Ref. 1 : K F Riley, M P Hobson, S J Bence. Mathematical Methods for Physics and Engineering, 3rd Edition, Cambridge University Press

Ref. 2 : H Anton, I Bivens, S Davis Calculus, 10th Edition, John Wiley & Sons

Ref. 3 : George B Arfken, Hans J Weber, Frank E Harris. Mathematical Methods for Physicists, 7th Edition, Academic Press

Ref. 4 : Erwin Kreyszig. Advanced Engineering Mathematics, 10th Edition, Wiley-India

UNIVERSITY OF KERALA

Model Question Paper

First Degree Programm Semester IV Complementary Course

M.M 1431.1 Complex Analysis, Special Functions and Probability Theory

Time: 3 Hours

Maximum marks : 80

Section I

(Answer all questions. 1 mark for each)

1. Find the real part of $\frac{1}{z}$
2. Show that $U(x, y) = e^x \cos y$ is a harmonic function.
3. Find the residue of $e^{1/z}$ at $z = 0$
4. State recurrence relation for Gamma function.
5. Define $\beta(p, q)$.
6. Show that $\int_C \frac{\sin z}{z - \pi} dz = 0$ where C is the circle $|z| = 1$.
7. A ball is drawn from a box containing 2 white and 4 red balls . Find the probability of getting
a red ball.
8. If the mean and variance of a binomial distribution are 50 and 5 respectively , find the
number of trials.
9. A club consists of 50 members. In how many ways can a president and secretary can be chosen.
10. A card is drawn from a well shuffled deck . What is the probability of getting a king
or a club

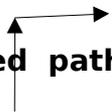
Section II

(Answer any 8 questions. Each carries 2 marks)

11. Define an analytic function.

12. Use Cauchy- Reiman equations to find out whether $\frac{x-iy}{x^2+y^2}$ is analytic .

13. Evaluate $\int_0^{1+2i} z \sqrt{z} dz$ along the indicated path



2i 1+ 2i

O

14. Verify Cauchy's theorem for $f(z) = z$ and C is $|z| = 1$

15. Find $R(0)$ for $f(z) = \frac{\cos z}{z}$

16. Prove that $\sqrt[1/4]{9/4} \div 9/4 = 16/5$

17. Prove that $\int_0^{\infty} x^n e^{-x} dx = n!$

18. Express $\int_0^{\infty} x^{-2/5} e^{-x} dx$ as Γ function.

19. When two dice are thrown , find the probability that the product of numbers on the two dice is 12.

20. Two students are working separately on the same problem. If the first student has the

probability $1/2$ of solving it and the second has the probability $3/4$ of solving it; what

is the probability that at least one of them solves it.

21. Differentiate between discrete and continuous probability function.

22. Let $f(x) = \begin{cases} \frac{1}{\sqrt{h-y}} & , 0 \leq y \leq h \\ 0 & , \text{otherwise} \end{cases}$ be a probability density function of a random variable x . Find mean.

Section III

(Answer any 6 questions. Each carries 4 marks)

23. Derive Cauchy - Reiman equations.

24. Prove that $\frac{d}{dz} \left(\frac{f(z)}{g(z)} \right) = \frac{gf' - fg'}{g^2}, g(z) \neq 0$,

25. Expand $\frac{2-z}{1-z^2}$ as a laurent's series \in the region $|z| > 1$

26. Evaluate $\Gamma^{1/2}$

27. Prove that $\Gamma P \Gamma (1-P) = \frac{\pi}{\sin \pi P}$

28. Find the mean and variance of a random variable x which takes the values 0 , 1, 2,3 with

respective probabilities $\frac{5}{12}$, $\frac{1}{3}$, $\frac{1}{12}$, $\frac{1}{6}$

29. Two people are taking turn tossing a pair of coins , the first person to toss two alike wins.

What are the probabilities of winning for the first player and for the second player ?

30. Suppose that boxes of a certain kind of cereal have an average weight of 16 ounces and it

is known that 70% of the boxes weigh within 1 ounce of the average. What is the

probability that the box you buy weigh less than 14 ounces.

31. Suppose two dice are thrown . If x denote the sum of the numbers on the dice , find the

Probability density function of x

Section IV

(Answer any two questions. Each carries 15 marks)

32. (a). Evaluate $\int_0^{2\pi} \frac{d\theta}{13+5\sin\theta}$

(b). Discuss the conformality of the transformation $W = e^z$ and show that it transforms a

vertical line in to a circle.

33.(a). Prove that $\beta(p, q) = \frac{\Gamma p \Gamma q}{\Gamma p+q}$

(b). Evaluate $I = \int_0^{\infty} \frac{x^3}{(1+x)^5} dx$

34. (a).Using binomial distribution and the corresponding normal approximation , find the

probability of getting exactly 195 tails in 400 tosses of a die

(b). Find the probability $P(45, 55)$ of between 45 and 55 heads in 100 tosses of a coin , ie, $45 < x < 55$

35.(a). Derive the Poisson Probability density funcyion $P_n = \frac{\mu^n}{n!} e^{-\mu}$

(b). In an alpha particle counting experiment , the number of alpha particle is recorded each

minute for 50 hours . The total number of particles is 6000. In how many 1 - minute intervals would you expect no particles ?

Complementary Course VIII

19UCH431.1: Spectroscopy and Material Chemistry

No. of credits: 3

No. of instructional hours per week: 3

Total hours: 54

Course outcome

CO1: To impart an idea of electromagnetic radiation

CO2: To get an understanding of different spectroscopic techniques

CO3: To inculcate an overview of the theories of co-ordination chemistry

CO4: To impart knowledge on the extraction of metals from ores

CO5: To learn nano science, advanced materials such as conducting polymers and applications

Module I - Spectroscopy-I

9hrs

Regions of electromagnetic spectrum – different units to represent energy such as erg, joule, calorie, cm^{-1} , Hz and eV, their interconversions – interaction of radiation with matter, different types of energy levels of molecules – rotation, vibration and electronic levels. Rotation spectroscopy Microwave spectrum of diatomic molecules – expressions for rotational energy, selection rule – frequency separation and determination of bond length. vibrational spectrum – harmonic oscillator, equation for frequency of vibration, expression for vibrational energy, selection rule, frequency separation, calculations of force constant, Electronic spectroscopy – types of transition and regions where they absorb.

Module II- Spectroscopy - II

9 hrs

Raman spectroscopy – stokes and anti stokes lines, quantum theory of Raman spectrum – advantages and disadvantages of Raman spectrum, rotational Raman spectrum, selection rules and frequency separation. Vibrational Raman spectrum – Complementary with IR spectrum, mutual exclusion principle. NMR spectroscopy- principle of NMR spectroscopy, nuclear spin, interaction with external magnet, energy spacing, transition between nuclear energy levels in hydrogen nucleus, low resolution spectrum, chemical shift, spin – spin coupling – fine structure spectrum, application to simple molecules.

Module III -Coordination Chemistry

9 Hrs

Types of ligands, Werner's coordination theory, Valence bond theory of bonding in octahedral and tetrahedral complexes, Drawbacks of valence bond theory, crystal field theory of octahedral and tetrahedral complexes, examples – high and low spin complexes, magnetic properties, applications in qualitative and quantitative analysis.

Module IV – Metallurgy

9 Hrs

General principles of occurrence and extraction of metals – purification, roasting, calcination and smelting, reduction to metal, different methods with examples, refining of metals- electrolytic and zone refining. Van – Arkel method. Metallurgy of titanium, cobalt, nickel, thorium and uranium.

Module V -Chemistry of Nano Materials

9hrs

Evolution of Nano science – Historical aspects – preparations containing nano gold in traditional medicine, Lycurgus cup – Faraday's divided metal etc.

Nanosystems in nature.

Preparation of Nano particles – Top – down approach and bottom – top approach, sol – gel synthesis, colloidal precipitations, Co- precipitation, combustion technique. Properties of nano particles: optical, magnetic and mechanical properties.

Tools for measuring nano structure – XRD, Atomic force Microscopy (AFM), Scanning Tunneling Microscopy (STM), and Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM). Applications of nano materials in electronics, robotics, computers, sensors, mobile electronic devices, Medical applications (use Au, Ag, ZnO and ZnO_2 as examples)

Module VI- Advanced Materials

9hrs

Magnetic materials-classification-applications- conducting polymers- polyacetylene- ployanilines- synthesis-applications- photoconducting polymers-examples-super conducting materials - Liquid crystals – mesomorphic state, types of liquid crystals applications and examples. .

References

1. Fundamental of molecular spectroscopy- C N Banwell, McGraw Hill, 2017.
2. Atomic structure and chemical bonding in molecular spectroscopy- Manas Chanda, TMH, 1991
3. Physical chemistry-R Stephen Berry, Sturt A Rice and John Rose, Oxford University Press, 2000.
4. Inorganic chemistry-J E Huhee, Pearson, 2014.
5. Coordination chemistry- S F A Kettle,
6. Inorganic chemistry- Puri, Sharma and Kalia, Vishal, 2017.
7. NANO: the essentials –T Pradeep, McGraw Hill, 2007.
8. Introduction to Solid State Physics- Charles Kittel, Wiley India, 2019.

MODEL QUESTION PAPER
19UCH431.1: Spectroscopy and Material Chemistry

Time: Three Hours

Maximum Marks: 80

SECTION A

(Answer all questions. Each question carries 1 mark)

1. Which of the following give pure rotational spectrum: H_2 , N_2 , CO_2 , HCl ?
2. What is Rayleigh scattering?
3. What is the selection rule for vibrational transition?
4. What is the condition for a molecule to be NMR active?
5. What is Wilkinson's catalyst?
6. What is nano shells?
7. Write an example for a chelate.
8. What are the ores of titanium?
9. Name the nano materials used in semiconductors?
10. What are ferromagnetic materials?

SECTION B

(Answer any eight questions. Each question carries 2 mark)

11. What is Born Oppenheimer approximation?
12. The force constant of HF molecule is 970 Nm^{-1} . Calculate the fundamental vibrational frequency as well as the zero-point energy?
13. What is Raman Effect? What is the cause of Raman effect?
14. Explain the terms shielding and deshielding with regard to NMR spectroscopy.
15. What is chemical shift?
16. Explain the effect of solvent in UV spectroscopy.
17. What is the difference between a double salt and a complex compound?
18. $[Fe(CN)_6]^{3-}$ paramagnetic. Why?
19. Explain Van Arkel method of refining of metals.
20. What is froth flotation?
21. What is STM and its basic principle?
22. Explain the synthesis of polyaniline from aniline.

SECTION C

(Answer any Six questions. Each question carries 4 mark)

23. Why are anti-stokes lines intense than the stokes lines in the Raman spectrum?
24. Taking the example of HCl show how rotation of the molecule causes dipole moment fluctuations?
25. State and illustrate the Frank-Condon principle.
26. Define the terms: Bathochromic shift, Hypsochromic shift, hyperchromic shift, hypochromic shift.
27. Discuss Werner's theory of coordination compounds.
28. Explain the formation of low spin and high spin complexes with the help of crystal field theory.
29. Outline the principles involving electrolytic refining.
30. Explain the properties of nano particles.
31. Give a short note on superconducting materials.

SECTION D

(Answer any two questions. Each question carries 15 mark)

32. (i) Derive an expression for allowed energies of rotational levels in a diatomic molecule.
(ii) Show that for a rigid diatomic rotor the moment of inertia is given by $I = \mu r^2$.
(iii) Discuss the quantum theory of Raman spectroscopy
33. (i) Explain the underlying principle in an NMR spectrum.
(ii) What are the different kinds of protons indicated in an NMR spectrum. How do they produce their characteristic signals?
(iii) How can the NMR method be used to distinguish between the structures of 1-propanol and 2-propanol?
34. (i) Give an account of crystal field theory?
(ii) What are applications of coordination compounds in qualitative analysis? (iii) Give an account of hydrometallurgy.
35. (i) Explain the applications of nanomaterials in electronic and robotics.
(ii) Explain working principle of SEM and TEM. (iii) Give a note on types of liquid crystals.

Complementary Course IX
SYLLABUS FOR LABORATORY COURSES

19UCH432.1

No. of credits: 4

No. of instructional hours per week: 2

Course outcome

CO1: To impart an idea of the reactions of cations

CO2: To obtain skill in identifying cations in solution

CO3: To acquire confidence in handling glasswares in the laboratory

CO4: To impart knowledge in volumetric analysis

CO5: To determine the concentration of solution accurately and precisely

Reactions and identification of cations: Hg^+ , Pb^{2+} , Ag^+ , Hg^{2+} , Bi^{3+} , Cd^{2+} , As^{3+} , Sb^{3+} , Sn^{2+} , Sn^{4+} , Fe^{3+} , Al^{3+} , Cr^{3+} , Mn^{2+} , Zn^{2+} , Ni^{2+} , Cd^{2+} , Ba^{2+} , Sr^{2+} , Ca^{2+} , Mg^{2+} and NH_4^+

The cations must be provided in solutions. A student must analyse at least ten mixtures containing two cations each.

Volumetric analysis- one burette method only

A. Acidimetry and Alkalimetry

- a. Preparation and standardization of decinormal HCl using sodium carbonate as primary standard
- b. (Estimation of a strong base and a weak base using standardized HCl)
Estimation of sodium hydroxide using (i) Std. oxalic acid and (ii) Std. HCl
- c. Determination of sodium hydroxide, and sodium hydroxide and sodium carbonate in a mixture (indicator method)
- d. Preparation and standardization of decinormal NaOH using oxalic acid as primary standard.
- e. Estimation of a strong acid using standardized NaOH.

B. Permanganometry

- a. Standardisation of KMnO_4 by oxalic acid sodium oxalate and Mohr's salt
- b. Estimation of oxalic acid / sodium oxalate.
- c. Estimation of Mohr's Salt.
- d. Estimation of calcium.

C. Dichrometry

- a. Preparation of Std. $\text{K}_2\text{Cr}_2\text{O}_7$ and estimation of ferrous iron by external and internal indicators.
- b. Estimation of ferric iron by reduction with stannous chloride (internal indicator).

D. Iodometry and Iodimetry

- a. Standardization of sodium thiosulphate using std. potassium dichromate.
- b. Estimation of copper in a solution
- c. Estimation of iodine

E. Complexometric titrations

- a. Standardisation of EDTA using std Mg^{2+} or Zn^{2+} ion solution
- b. Estimation of any one metallic ion from Ca^+ , Mg^{2+} , Zn^{2+} or Ni^{2+}

A student has to carry out at least twelve experiments in this class.

Physical Chemistry Experiments

- a. Conductometric titrations- HCl Vs NaOH
- b. Potentiometric titrations- Ferrous iron Vs Dichromate

This laboratory based course reinforces the qualitative and quantitative chemical analysis that the student has learned in the 1st, 2nd, 3rd and 4th semesters

Semester V
Core Course VI
19UPH541: QUANTUM MECHANICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Understand the emergence of quantum mechanics, wave properties of matter, general formalism on wave mechanics
- Understand how a wave function is interpreted in terms of probability, and appreciate its physical significance
- Understand how a wave function is interpreted in terms of probability, and appreciate its physical significance
- Apply Schrodinger equation to Hydrogen atom
- Apply principles of quantum mechanics to calculate observables on known wave functions
- Understand the fundamental quantum mechanical processes in nature

Unit 1 : The Emergence of Quantum Mechanics (12 Hrs)

Blackbody radiation –Wien’s energy density distribution & its limitation (derivation not needed) – Rayleigh-Jeans formula and its limitation – Planck’s hypothesis and radiation formula – Photoelectric effect – Einstein’s photoelectric equation – The Compton effect – Stability of an atom – Rutherford and Bohr atom models and their limitations.

Unit 2 : Wave properties of matter (14 Hrs)

Wave-particle duality – de Broglie hypothesis – Experimental Confirmation of de Broglie’s hypothesis – Davisson-Germer experiment – Thomson’s experiment– Phase and group velocities – wave packet – Physical interpretation and conditions on wave function - Conservation of probability- Normalized and orthogonal wave functions – Operators associated with different observables–Expectation values of dynamical quantities – Ehrenfest’s theorem

Unit 3 : General formalism of wave mechanics (16 Hrs)

General formalism – fundamental postulates of wave mechanics – Adjoint of an operator and self-adjointness – eigenvalues and eigen functions of self adjoint operators – Dirac delta function – completeness and normalization of eigen functions - closure – Generalized uncertainty principle –commuting observables – constants of motion

Unit 4 : Schrodinger’s wave equation (20 Hrs)

One dimensional time dependent wave equation – one dimensional time independent wave equation – Particle in one dimensional box – Particle in rectangular three dimensional box – Simple harmonic oscillator – Transmission across a potential barrier: the tunnel effect – the finite square well potential

Unit 5 : The hydrogen atom (10 Hrs)

Wave equation for the hydrogen atom – solution of the azimuthal wave equation – solution of the polar wave equation –solution of the radial wave equation

Books for Study

1. Modern Physics – R. Murugesan – S.Chand (15th Edition)
2. Concepts of modern physics – Arthur Beiser – Tata McGraw-Hill Edition (6th Edition)
3. A text book of quantum mechanics – PM Mathews & K Venkatesan – McGrawHill (2nd Edition)
4. Elements of quantum mechanics – Kamal Singh & SR Singh – S. Chand
5. Quantum Mechanics : Concepts and Applications – NouredineZettili – Wiley (2nd Edition)
6. Quantum Mechanics – Sathyaprakash& Swati Saluja – KedarnathRamnath
7. Quantum Mechanics : 500 problems with solutions – G Aruldas –PHI

MODEL QUESTION PAPER
19UPH541: QUANTUM MECHANICS

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. What is Zero point energy of harmonic oscillator?
2. Inside the potential well what is the value of potential.
3. Write down the operator form of Hamiltonian
4. According to Bohr's principle, what is the relation between principle quantum number n and radius of the orbit?
5. State Plank's law of radiation.
6. State de Broglie hypothesis.
7. Write down Einstein's photoelectric equation and explain the terms.
8. Write down Schrodinger equation in one dimension.
9. What is meant by the dual nature of a particle?
10. Name the principle in quantum mechanics, which explains the finite width of spectral lines.

(10x 1=10marks)

Section B (answer any eight questions; Two mark each)

11. What are de Broglie waves?
12. What is Bohr's correspondence principle?
13. What are the inadequacies of quantum theory?
14. State and explain uncertainty principle.
15. What are operators? Give examples.
16. What are degenerate states?
17. Define photoelectric work function and stopping potential.
18. Explain delta function well.
19. What is meant by normalization?
20. Distinguish between phase velocity and group velocity.
21. What are the properties of ?
22. State the postulates of Bohr atom model.

(8x 2=16marks)

Section C (Answer any six questions; Four mark each)

23. Find the change in wave length of an X-ray photon when it is scattered through an angle of 90° by a free electron.
24. Show that the energy eigen values are real.
25. If the operator A is hermitian, show that the expectation value $\langle A^2 \rangle \geq 0$.
26. Explain the orthogonality properties of wave function.
27. If A and B are hermitian operators, show that $(AB + BA)$ is hermitian and $(AB-BA)$ is not hermitian.
28. The life time of an excited state of an atom is 1×10^{-8} s. Find the uncertainty in frequency of the photon emitted.
29. Determine the wavelength of an electron that has been accelerated through a potential difference of (1) 100 V and (2) 200 V.
30. A particle is in motion along a line between $x = 0$ and $x = a$ with zero potential energy and at points for which $x < 0$ and $x > a$, the potential energy is infinity. Find the wave function for the particle in the n^{th} state.
31. The stopping potential for copper surface illuminated by radiation of 253.7 nm from mercury arc is 0.24 V. What is the threshold wavelength of copper. Calculate the work done in just taking an electron out of the surface of copper.

(6x 4=24marks)

Section D (Answer any two question; 15 marks each)

32. Describe the experiment to prove the existence of dual nature of particles.
33. With necessary theory explain Compton effect and hence derive the equation of Compton shift.
34. Write a note on uncertainty principle. How will you determine the uncertainty in position and momentum accurately.
35. Discuss the harmonic oscillator problem in quantum mechanics. Derive expression for ground state and first excited level energy eigen functions.

(15x 2=30marks)

Core Course VII

19UPH542: STATISTICAL PHYSICS, RESEARCH METHODOLOGY AND DISASTER MANAGEMENT

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Explain statistical physics as logical consequences of the postulates of statistical mechanics
- Understand and use the methods of statistical mechanics to develop the statistics for Maxwell Boltzmann, Bose-Einstein, Fermi-Dirac distributions
- understand the statistics of particles
- understand some basic concepts of research and its methodologies , identify appropriate research topics , select and define appropriate research problem and parameters , prepare a project proposal ,organize and conduct research in a more appropriate manner ,write a research report and thesis
- acquire a knowledge on Global natural disasters and communicate factors about health emergencies and diseases etc
- analyze and communicate the processes of disaster management including disaster risk reduction, response, recovery etc and also to design and perform research on the different aspects of the emergencies and disaster events

Unit 1- Statistical Physics (18 hrs)

Statistical probability, Macro and Micro states, Phase space, Statistical ensemble, Postulate of equal probability, Maxwell Boltzmann distribution, Velocity distribution, Indistinguishability of identical particles, Bose Einstein and Fermi Dirac distribution function, comparison of three statistics .

Unit 2 Research Methodology (18 hrs)

Research - Objectives and motivation in research – different types of research- research approaches- Significance of research- Research methods and methodology – Research and scientific method- Various steps in a research process- importance of literature survey- criteria of good research.

Thesis/ Report writing - preliminary section (Title page, declaration of author, certificate of supervisor, table of contents, list of tables and figures, preface acknowledgement), Main Text (abstract, introduction, experimental section, results and discussion), Conclusions, references, scope for future study.

Unit 3 Error Analysis (8 hrs)

Significant figures, basic ideas of error measurement, uncertainties of measurement, random errors, systematic errors, absolute and relative errors, percentage error (topics up to this is for revision).

Importance of estimating errors, dominant errors, rejection of spurious measurements, estimating and reporting of errors, errors with reading scales, standard deviation, variance in measurements, error bars and graphical representation of errors.

Unit 4 – Disaster Management (28 hrs)

Global natural disasters: Natural hazards and natural disasters, Recent major disasters and their relief efforts, Impact of global climate change and major natural disasters, Human adaptability of natural disasters, Fragile natural eco-environment, Disaster reduction activity, achievements, challenges and future development Earth quake disaster and their and their effects, Advancement in research of earthquake disaster, earthquake and tsunami warnings, earthquake disaster prevention, earthquake disaster mitigation.

Health emergencies and diseases: environmental health and diseases, disasters and emergencies, steps in disaster management, pre-disaster activity, role of water supply, need for protecting large scale water supply schemes, assessment of damaged and available water resources, water quality testing- Personal hygiene, control of communicable diseases and prevention of epidemics, measures for controlling communicable diseases and epidemics.

Radiation emergencies, health consequence of radiation, measures to prevent sudden health emergencies due to radiation.

Books for Study:

1. Thermal and Statistical Mechanics: S.K. Roy –New Age International-2001
2. Elements of Statistical Mechanics: Kamal Singh and S. P. Singh- S. Chand & Co,1999
3. Thermal Physics, Statistical Physics and Solid State Physics: C. J. Babu, Calicut University Press
4. Introduction to Statistical Mechanics: S. K. Sinha, Alpha Science International Ltd. 2005
5. Statistical Mechanics: B. K. Agarwal- New Age International 2007
6. Research Methodology: C. R. Kothari, New Age International Publishers.
7. 7. Natural disaster mitigation – a scientific and practical approach: Science Press, Beijing, 2009 8. Environmental health in emergencies and disasters: A practical guide, B.Wisner & J.Adams (Eds.), WHO, Geneva, 2002 ISBN 92-4 154541-0.
8. Introduction to Disaster Management: SatishModh, Macmillan, 2010.

Books for Reference:

1. Statistical Mechanics: S. Rajagopal
2. Introduction to Statistical Physics: Kerson Huang -CRC Press, 2001
3. Statistical Mechanics: Norman Davison, Courier Corporation, 2013
4. Disaster Management: Harsh K Gupta, Universities Press, 2003

MODEL QUESTION PAPER
19UPH542: STATISTICAL PHYSICS, RESEARCH METHODOLOGY &
DISASTER MANAGEMENT

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. Define probability of an event?
2. What is the total number of macrostates in arranging “n” particles into two compartments?
3. Define microstate?
4. What is a hypothesis?
5. Define absolute error?
6. What is Fermi-Dirac statistics ?
7. What is the volume of a cell in phase space according to quantum statistics?
8. Name the ensemble that allows the exchange of particles between its systems?
9. What is radiation emergency?
10. Name the national agency undertaking disaster relief activities?

Section B (Answer any eight questions; Two mark each)

11. Distinguish microstates and macrostates?
12. Write a note on phase space?
13. Compare micro-canonical and canonical ensembles?
14. Distinguish bosons and fermions?
15. List out any four criteria of a good research?
16. What is the importance of literature survey in research?
17. Write a note on graphical representation of errors?
18. Explain the difference between distinguishable and indistinguishable particles?
19. Describe briefly health hazards due to disasters.
20. What is disaster? What is the difference between natural and manmade disasters?
21. What do you mean by early warning system? Explain about the existing Hazard Forecasting and early Warning Network in India for Tsunami.
22. Enlist various pre-disaster activities to reduce human and property losses.

Section C (Answer any six questions; Four mark each)

23. Find the most probable, average and root mean square speeds of nitrogen molecule at 27°C. Given the molecular mass of N₂ molecule is 2.8 x 10⁻³ kg/mol, the gas constant R = 8.31 J/mol K.
24. Show that BES and FDS approach MBS at high temperatures.
25. Find out the number of possible arrangements of 3 particles in 2 cells, assuming the particles obey (i) M-B statistics and (ii) B-E statistics.
26. Write a short note on the significance of literature survey in research.
27. Calculate the standard deviation of the marks of ten students given: 10,12,11,15,13,14,19,18,16,15. Take deviation from mean.
28. Calculate the mean absolute error and percentage error of the given data: 2.56, 2.57, 2.51, 2.50, 2.49, 2.53, 2.59.
29. Discuss the prevention and mitigation of disasters?
30. Explain the various measures to prevent sudden health emergencies due to radiation.
31. Explain the various measures for controlling communicable diseases and epidemics.

Section D (Answer any two question; 15 marks each)

32. Obtain the Bose-Einstein distribution law. What do you mean by Bose-Einstein condensation?
33. What do you mean by research methodology? Describe briefly the important research methods?
34. Define error? What is the importance of estimating errors? Discuss error bars and graphical representation of errors?
35. Enlist and define various phases of disaster management cycle? Explain the various steps in planning for an earthquake disaster mitigation? Discuss about one mega disaster of India and lessons learnt from that?

Core Course VIII
19UPH543: ELECTRONICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Analyze simple electronic circuits based on diodes and transistors with special focus on designing amplifiers with discrete components
- Design and analyze bias circuits for BJTs and amplifiers for the basic categories (CB,CE and CC)
- Analyze oscillator circuits, feedback amplifiers, operation amplifiers etc

Unit 1. Diode Circuits (14 hours)

PN junction under forward and reverse biased conditions- r_m value and peak inverse voltage- diode characteristics-ac and dc resistances- half wave and full wave rectifiers- (average dc value of current, ripple factor and efficiency)- different types of filters(shunt capacitor, LC and RC)- break down mechanism in diodes-Zener diode- voltage regulator

Unit 2. Transistors(16 hours)

Theory of BJT operation- CB,CE and CC characteristics- α , β and γ – relation between transistor currents- biasing circuits(CE configuration)- stability factors-selection of operating point-ac and dc load lines-Q point-collector feedback; base resistor and potential divider methods- BJT amplifiers- input and output impedances-graphical analysis of CE amplifier(frequency response, band width and gain in dB)- emitter follower.

Unit 3. Power amplifiers: (6 hours)

Amplifier classes and efficiency - class A operation - transformer coupled class A amplifier - class B amplifier - push pull amplifier.

Unit 4. Feedback & Oscillator circuits (12 hours)

Feedback principles – negative feedback - advantages of negative feedback – feedback amplifier topologies- positive feedback - principle of sinusoidal feedback- oscillation - Barkhausen criterion for oscillations - RC phase shift, Hartley Oscillator, Colpitts Oscillator (derivations not required).

Unit 5. Modulation (6 hours)

Fundamentals of modulation - AM, FM - frequency spectrum of AM - power in AM - demodulation of AM signal - frequency spectrum for FM

Unit 6. Special devices: (6 hours)

JFET- Basic construction - Theory of operation - Static characteristics - Drain characteristics- Advantages – basic idea of MOSFET – Depletion enhancement MOSFET – Construction – Static characteristics.

Unit 7. Operational amplifiers (IC741)(12 hours)

Introduction – Schematic symbol and pin configuration - circuit configuration and block diagram representation – differential amplifier-ideal OP amp. - CMRR – differential mode and common mode – virtual ground principle – parameters of OP amp. - inverting amplifier – non-inverting amplifier –summing- differentiator-integrator amplifiers.

Books for Study:

1. Basic electronics: Devices, circuits and IT fundamentals: Santiram Kal, PHI, 2009
2. Basic Electronics-Solid State: B. L. Theraja, S. Chand Ltd., 2005
3. Principles of Electronics: V. K. Mehta, S. Chand Ltd.,2005
4. A first course in Electronics: Anwar A. Khan, Kanchan K. Dey,PHI, 2006
5. Communication Electronics:Jose Robin and Ubald Raj, Indira Publications, 2002

Books for Reference:

1. Electronic Devices and Circuits: Theodore F. Bogart Jr., Universal book stall
2. Electronic devices and Circuit theory: Robert Boylestad & Louis Nashelski,PHI,5th Edn.
3. Electronic fundamentals & applications: John D Ryder, PHI, 4thEdn.
4. Electronic Communications: Dennis Roddy, John Coolen,Pearson, 4thEdn.

Topics for assignments/discussion in the tutorial session (sample)

1. Electronic projects using flip flops.
2. Electronic projects using logic gates.
3. Electronic projects using IC 741 OP amp.
4. Electronic projects using timer 555.
5. Electronic projects using IC 311.
6. Constant voltage power supplies.
7. Constant current sources.
8. Oscillators of different frequencies.
9. Low range frequency generators.
10. High range frequency generators.
11. Voltage regulated dc power supplies with variable output.
12. Voltage regulated dual power supplies with variable output.
13. Instrument for the measurement of capacitance.
14. Instrument for the measurement of dielectric constant of a liquid/ solid.
15. Effect of temperature on electronic components.

MODEL QUESTION PAPER
19UPH543: ELECTRONICS

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. What is peak inverse voltage?
2. What is ripple factor
3. Distinguish between Zener breakdown and Avalanche breakdown.
4. Why we use filters in a rectifier circuit?
5. What do you mean by operating point of an amplifier?
6. What is modulation?
7. What are Barkhausen criteria for oscillation?
8. What is CMRR in an Op-Amp?
9. What is virtual ground concept?
10. Why common emitter configuration is most widely used in amplifier circuits?

Section B (Answer any eight questions; Two mark each)

11. Explain forward and reverse characteristics of a p-n junction diode
12. Describe the working of a Zener diode as a voltage regulator
13. Which are the different transistor configurations?
14. Distinguish between amplitude modulation and frequency modulation.
15. Explain the need of modulation
16. Explain the working of a phase shift oscillator
17. Obtain the expression for generalized momentum in terms of Lagrangian function.
18. Obtain the Hamilton's equations for a one dimensional harmonic oscillator.
19. Interpret the negative result of Michelson Morley experiment.
20. Write a note on twin paradox.
21. Differentiate inertial and non-inertial frames of references.
22. What is the physical significance of the Hamiltonian function?

Section C (Answer any six questions; Four mark each)

23. What are filters ? Describe the action of the following filter circuit (i) capacitor filter, (ii) choke input filter (iii) CLS filter
24. A full wave rectifier used two diodes the internal resistance of each diode may be assumed to be 20Ω . The transistor rms secondary voltage from center tap to each end of secondary is 50 V and load resistor is 980Ω . Find (i) the mean load current, (ii) the rms value of load current, (iii) peak inverse voltage (iv) rectifier efficiency
25. Find the operating frequency of a transistor Colpitts oscillator if $C_1=0.005\mu\text{F}$ $C_2=0.01\mu\text{F}$ and $L=10\mu\text{H}$
26. An amplifier has a maximum gain 2×10^4 , lower cutoff frequency 30Hz and upper cutoff frequency 30KHz. If 0.01% negative feedback is introduced in the amplifier, calculate the change in maximum gain, lower and upper cutoff frequencies
27. When negative voltage feedback is applied to an amplifier of gain 100 the overall gain falls to 50. (i) Calculate the fraction of the output voltage feedback (ii) if this fraction is maintained calculate the value of amplifier gain required if the overall stage gain is to be 75
28. In an RC coupled amplifier the mid frequency gain is 2000. What will be its value at upper and lower cutoff frequencies?
29. The maximum peak to peak voltage of an AM wave is 16 mV while the minimum peak to peak voltage is 8 mV. Find the percentage modulation.
30. A 50kW carrier is to be modulated to a level of 85%. What is the carrier power after modulation?
31. The VGS of a JFET changes from -3.1 V to -3V, the drain current changes from 1mA to 1.3 mA. What is the value of transconductance?

Section D (Answer any two question; 15 marks each)

32. Explain centre tap full wave rectifier. Derive the expression for rectifier efficiency and ripple factor
33. Explain CE amplifier. Describe frequency response and band width. Explain the different biasing modes
34. What are the parameters of an ideal Op-Amp? Explain Op-Amp inverting and non inverting amplifier.
35. Explain the different feedback topologies in an amplifier?

Core Course IX

19UPH544: ATOMIC AND MOLECULAR PHYSICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Understand the vector atom model
- Understand the change in behavior of atoms in external applied electric and magnetic field.
- Understand the rotational, vibrational, electronic and Raman spectra of molecules.
- Understand the electron spin and nuclear magnetic resonance spectroscopy and their applications.

Unit 1- Vector Atom Model: (10hrs)

Generalization of atomic models and their limitations. Vector atom model- Various quantum numbers associated with vector atom model-, L.S and j.j couplings –application of spatial quantization- Pauli's exclusion principle – periodic classification of elements –some examples of electronic configuration with modern symbolic representations - magnetic dipole moment of electron due to orbital and spin motion - Stern and Gerlach experiment - Spin-Orbit coupling.

Unit 2- Atomic Spectra (14hrs)

Optical spectra-Spectral terms and notations - selection rules - intensity rule and interval rule fine structure of sodium D lines – hyperfine structure-alkali spectra - Zeeman effect - Larmor's theorem – quantum mechanical explanation of normal Zeeman effect. Anomalous Zeeman Effect –Paschen-Back effect-Stark effect.

Unit 3- X-ray Spectra (8 hrs)

X-ray –Discovery-properties-scattering-measurement of X-ray wavelength by ruled gratings –X-ray spectra -continuous and characteristics X- ray spectrum-Origin of continuous and characteristic X-rays-X-ray energy level diagram-Moseley's law and its importance--absorption of X-rays-Application of X-rays

Unit 4- Molecular spectra (2 8 hrs)

Origin of molecular spectra- electromagnetic spectra-molecular energies-classification of molecules-rotational spectra of diatomic molecules-rotational energy levels-selection rules-rotational spectrum-isotope effect- bond length and atomic mass.

Diatomic Vibrational spectra-Vibrational energy levels-selection rule - Vibrational transitions-Rotation-Vibration transitions-I.R spectrometer-
electronic spectra-sequences and progressions-Frank-Condon principle
- Raman scattering- Vibrational Raman spectra-diatomic molecules - polyatomic molecules- rotational Raman spectra-Raman spectrometer.

Unit 5- Resonance Spectroscopy (12 hrs)

NMR principle-Resonance condition-NMR spectrometer-chemical shift-indirect spin- spin interaction applications of NMR spectroscopy.

ESR principle- Resonance condition – ESR spectrometer-hyperfine interaction-applications of ESR spectroscopy
Moss Bauer spectroscopy principle -isomer shift.

Books for Reference:

1. Modern Physics- G.Aruldas and P.Rajagopal, PHI, New Delhi, 2005.
2. Modern Physics by R.Murugesan, S.Chand& Co., Reprint, 2008.
3. Atomic and Nuclear Physics- N.Subramaniam&Brijlal, S.Chand& Co.
4. Atomic Physics - J.B.Rajam, S.Chand&Co.edition.
5. Concepts of Modern Physics by A. Beiser, Tata McGraw-Hill, New Delhi, 6th edition
6. Fundamentals of Molecular Spectroscopy - Banwell (TMH)
7. Spectroscopy- Walker & Straw, Chapman & Hill.
8. Molecular Spectroscopy- G.Aruldas.

Topics for assignments/discussion in the tutorial session (sample)

1. History of atom model
2. Rutherford experiment leading to atom model
3. Bohr model of atom and correspondence principle.
4. Molecular bond and electron sharing.
5. Width of spectral lines.
6. Spectroscopic techniques.
7. X-ray diffraction for identification of samples

MODEL QUESTION PAPER
19UPH544:Atomic and Molecular Physics

Time: 3Hrs

Maximum Marks: 80

Part A

Answer all questions each in a word or a sentence .Each question carries 1 mark.

1. What is the selection rule for rotational spectra?
2. Name the region of vibrational spectra.
3. Write the equation for rotational constant.
4. What is meant by hyper fine structure
5. Find the lande g factor for $2D_{5/2}$
6. Why is Tungsten used as target in gas filled X-ray tube?
7. What is mass absorption coefficient?
8. What is Spectroscopy ?
9. State Pauli's exclusion principle
10. Give the number of permitted orbits of L with respect to magnetic field.

(10 x 1 =10marks)

Part B

Answer any 8 questions. Each question carries 2 marks.

11. Write any four properties of X-rays.
12. State Moseley's law. Briefly describe the importance of Moseley's law.
13. Differentiate prolate and oblate Symmetric tops with one example.
14. Explain any four applications of X-rays.
15. Explain Paschen series.
16. State correspondence principle
17. Give the difference between L-S Coupling and j-j coupling.
18. Write a note on magnetic orbital quantum number.
19. Explain Larmor's theorem
20. What is Zeeman effect?
21. Explain the NMR spectrum
22. Why are anti stokes lines are less intense than stokes lines?

(8 x 2 =16marks)

Part C

Answer any 6 questions .Each question carries 4 marks.

23. A Raman line is observed at 476.8 nm when the substance was excited by 435.83 nm radiations. Calculate the vibrational frequency in cm^{-1} that causes this Raman shift?
24. The fundamental and first overtone frequencies of NO molecules are centered at 187600.6 cm^{-1} and 372402 cm^{-1} respectively. Evaluate the equilibrium vibration frequency, the anharmonicity constant and zero point energy of the molecule?
25. Calculate the lande's g factor for 3S_1 and 3P_1 levels. Show the anomalous Zeeman splitting of spectral lines due to transition between these levels?
26. The red line of Cd splits into three components separated by 120MHz when source is placed in a magnetic field 8.6 mT , the light being examined in a direction perpendicular to magnetic field. Calculate the ratio of charge to mass ratio of electron.
27. Compare the magnetic potential energy of electron and a proton in a magnetic field of 0.1T
28. Calculate the wave number ,the wavelength, and frequency of $H\alpha$ line of hydrogen atom. Also find the wavelength of the Balmer series limit.
29. Show that velocity of the electron in the first Bohr orbit is $(1/137)c$, where c is the velocity of light.
30. The average spacing between adjacent rotational lines of CO molecule is 3.8626 cm^{-1} . Calculate the length of the CO bond.
31. The fundamental and first overtone frequencies of NO molecule are centered at 1876.06 cm^{-1} and 3724.2 cm^{-1} respectively. Evaluate the equilibrium vibration frequency, the anharmonicity constant, and the zero point energy of the molecule.

(6x 4 =24 marks)

Part D

Answer any 2 questions. Each question carries 15 marks.

32. a) Explain the quantum and classical theory of Raman scattering
b) Describe the Raman spectrometer with block diagram?
33. Discuss the necessary theory for the principle of NMR spectroscopy. Mention two applications of NMR spectroscopy?
34. Explain in detail the production of X-Rays using (a) Gas filled X-Ray tube (b) Coolidge tube.
35. a) Write the experimental arrangement and procedure for normal Zeeman effect.
b) Explain quantum mechanical explanation of normal Zeeman effect

(2x 15 =30marks)

Open Course

19UPH551.1: BIO PHYSICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Develop a deep knowledge on biophysics, its application on Cellular-Molecular biophysics,
- Gain a knowledge on bio instrumentation, informatics etc, impacts of Radiation and practical idea about various experiments etc.

Unit 1 (18 hrs)

Bio mechanics-biophysics and fluid flow-Gas transport-physics of audition Physics of vision (chapter 1 to 5 of Reference 3)

Unit 2 Cellular-Molecular biophysics (18 hrs)

Cell-components-proteins-nucleic acids-physics of bio-membranes- Thermodynamics of bio systems (Chapter 6 to 9 of reference 3)

Unit 3 Radiation biophysics (18 hrs) (chapter 18 of reference 1)

Bio-electronics and Bio Instrumentation (chapter 17 of reference 1) Bio-informatics (chapter 6 of reference 1)-Demonstration of biophysics experiments (reference 3)

Reference books

1. Essentials of Biophysics, P.Narayanan, 2nd edn. New Age publishers
2. A text book of biophysics, R.N.Roy, New central book agency Kolkata.
3. Elementary bio physics,P.K.Srivastava,Narosa publishing house ,New Delhi
4. Introduction to Biophysics ,Pranabkumarbanerjee,S.Chand& co ,New Delhi
5. Biological science ,Green,Stout,&Taylor, Cambridge university press

Open Course

19UPH551.2: ASTRONOMY AND ASTROPHYSICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the birth of universe , various methods of astronomy
- Understand the features of objects in the Solar System (i.e. Sun, planets, asteroids, comets, asteroids, meteorites etc.).
- Understand and analyze the various seasons depending on the motion of the earth.
- Understand the concepts of stellar evolution, including red giants, supernovas, neutron stars, pulsars, white dwarfs and black holes, using evidence and presently accepted theories

Unit 1-Introduction 4 hrs (Book 2, Chapter 1, P 1 – 6)

Astronomy and Astrophysics-Importance of Astronomy-Methods of Astronomy and Astrophysics-The Scientific Methods-Scope of Astronomy

Unit 2 - Astronomy 15 hrs (Book 1, Chapter 4, 5, P 65-70, 78-101)

Birth of the Universe-Ancient astronomy-Medieval Astronomy-Renaissance Astronomy-Modern Astronomy

Unit 3-The Objects in the Sky 15 hrs ((Book 1, Chapter 6, P 102 -127)

The Microwave background radiation-The Sun-The Stars-Neutron Stars and Black holes-Supernovae-Galaxies

Unit 4 -The Solar System15 hrs (Book 1, Chapter 7, P 128-154)

Sun and Planets-Formation of the Planets-Comets-Planets and Satellites-Asteroids-Meteorites

Unit 5 -Earth in Space 5hrs (Book 1, Chapter 8 , P 155 -162)

Motion of the Earth-The Calendar-The Seasons

Books for Study

1. Planet Earth, Cesare Emiliani , (Cambridge University Press, 1995)
2. Astrophysics - K. D. Abhayankar (University Press,2001)

Books for reference

1. Fundamentals of Geophysics William Lowrie(Cambridge University Press,1997)
2. Modern Physics- R. Murugesan, Kiruthika Sivaprasath (2007), S.Chand&Company Ltd.
3. Introduction to Astrophysics – Baidyanadh Basu
4. Modern Trends in Physics VolII , C. J. Babu
5. Space Science –Louise K. Harra& Keith O.Mason(Imperial College Press,London, 2004) 80

Open Course

19UPH551.3: APPLIED PHYSICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the principle of working behind various electric and electronic equipments used in day to day life
- Demonstrate the theories and working principle behind various analyzing techniques used in current research scenario like TEM, SEM etc and may lead themselves to a research life.
- Understand the working principle, applications, advantages etc of various medical, optical and common mechanical devices etc

Unit-1. Electric and Electronic Equipments (12 hrs)

Electric motor-principles of working-Microwave oven-principle-technical specifications-applications-advantages-Public address system-Block diagram representation-function of each unit-CD player and drives-DVD player and drives-Telephonic communication (Cable and cellular)-Principles (qualitative using block diagrams)-Cell phone-SIM card-technical specifications-Radio-History of radio revolution- different types of radios- Television-working (qualitative)-Touch screens & ATM (Automatic Telling machine)

Unit 2. Scientific Instruments (12 hrs)

Tunneling Electron Microscope (TEM)-What is it?-working principle-schematic representation- applications-technical specifications-Scanning Electron Microscope (SEM)-What is it?-working principle- schematic representation-applications-technical specifications-Atomic Force Microscope (AFM)-What is it?-working principle-schematic representation-applications-technical specifications XRD-Principle and applications-Spectrophotometer-working and applications-Scanning Tunneling Microscope

Unit 3. Medical Instruments (10 hrs)

CT Scan-basic principle-applications & advantages-MRI Scan-principle and applications & advantages-X ray-applications & advantages-Echo Cardio Gram (ECG)-Ultra sound scan

Unit 4. Optical Instruments (10 hrs)

Microscope-Electron microscope-Camera-History of evolution of camera- Digital camera-Holography-Optical communication network-building blocks-Over head Projector (OHP)-LCD Projector-OMR reader-radar

Unit 5. Common Mechanical devices (10 hrs)

Pumps-what is it?-working-different types of pumps-Refrigerator-working principle-technical specifications-Heat engines-Automobile engines-working (Qualitative description only)-Different types- Brakes-Different types of brakes

References

1. Audio and video Systems. R.G.Gupta, Technical Education Series.
2. Mobile Satellite Communication Network (Ch 1 & 2), Ray E Sherrif&Y.Funtu, Wiley India Edn.
3. Television Engineering & Video System, R.G.Gupta, TMH.
4. Electrical Technology (Vol I & II), B.L.Theraja.
5. A Text book of elements of Mech. Engg (page 105-114), S.TrynbakaMoorthy,I.K International Publishing house.
6. Physical principles of electron microscopy- An introduction to TEM, SEM, AFM, Springer, 2005.

Open Course

19UPH551.4: ENVIRONMENTAL PHYSICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Acquire basic knowledge within selected environmental topics (ionizing radiation, radioactivity, UV-radiation, atmospheric ozone, greenhouse effect and climate, and biological effects related to these)
- Understand the origins of global effects on the environment caused by human activities, the physical basis for the exploitation of various energy sources, and make assessments on different energy technologies (potential, pros and cons)

Unit 1 Essentials of Environmental physics (18 hrs)

Structure and thermodynamics of the atmosphere-composition of air-Green house effect-Transport of matter-energy and momentum in nature-Stratification and stability of the atmosphere-Laws of motion- Hydrostatic equilibrium-General circulation of the tropics-Elements of weather and climate in India

Unit 2 Environmental pollution and Degradation (18 hrs)

Factors governing air-water and noise pollution-Air and water quality standards-Waste disposal-Heat island effect-Land and sea breeze-Puffs and Plumes-Gaseous and particulate matter-Wet and dry deposition- Dispersal mechanism of air and water pollutants-Mixing height and turbulence-Gaussian plume models-Dispersion models-Environmental degradation-Thermal and radioactive pollution-Nuclear radiation-Health hazards and safety

Unit 3 Environmental Changes and remote sensing (18 hrs)

Energy sources and combustion processes-Renewable sources of energy-Solar energy-Wind energy-Bio energy-hydro power-fuel cells-nuclear energy-Forestry and bio-energy-Deforestation-Degradation of soils-Agriculture and land use changes-Changing composition of local and global environment-Remote sensing techniques

Books for Study

1. The Physics of Monsoon:R.N. Kesavamoorthy and N SankarRao (Allied Pbl)
2. The Physics of Atmosphere :J.T.Houghton(Cambridge Uty)
3. Renewal Energy Resources:J.Twidell and J Weir (ELBS 1988)
4. Numerical Weather Prediction:G.J.Haltiner and R.T.Williams (John Wiley)

Open Course

19UPH551.5: ENERGY PHYSICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

This course is designed to give the students a scientific understanding of various energy systems, transform the world's energy systems, and discover new ways of generating and storing energy.

- Understand the various forms of conventional and non conventional energy forms
- Understand how energy can be obtained from sun ,wind, biomass, oceans, chemical resources etc
- Understand the various challenges facing in the availability of natural energy resources
- Understand the patterns of energy crisis and possible solutions ,energy options for the developing countries

Unit I (7 hrs)

Various forms of energy - renewable and conventional energy systems -comparison - coal, oil and natural gas - availability - applications - merits and demerits.

Unit 2 (10 hrs)

Solar energy - Solar constant, Solar radiation measurements, Pyrheliometers - the Angstrom, the Abbot silver disc, Eppley pyrheliometer- Pyranometers- Eppley pyranometer, Yellot Solarimeter, solar energy collector, principle of the conversion of solar radiation in to heat, Solar energy storage, solar heaters, space cooling, solar ponds, solar cookers, solar distillation, solar furnaces, solar green houses, photovoltaic generation basics, merits and demerits of solar energy.

Unit 3 (10 hrs)

Wind energy, Basic principle of wind energy conversion, basic components of wind energy conversion system (WECS), wind energy collectors, wind energy storage, applications of wind energy.

Unit 4 (9 hrs)

Biomass energy, classification, photosynthesis, biomass conversion process, Gobar gas plants-Types of gobar gas plants(Elementary ideas), wood gasification, ethanol from wood, merits and demerits of biomass as energy source.

Unit 5 (9 hrs)

Energy from Oceans and Chemical energy resources, fuel cell, Ocean thermal energy conversion, energy from waves and tides - basic ideas, nature, applications, merits and demerits.

Unit 6 (9 hrs)

Patterns of energy consumption in domestic, industrial, transportation and agricultural sectors -energy crisis and possible solutions - energy options for the developing countries - energy storage and hydrogen as a fuel (basics) - impact due to non-conventional energy sources - global warming.

Books for Study:

1. Non - Conventional Energy Resources by G. D. Rai, Khanna Publishers,2008.
2. Solar energy by G.D. Rai, 5th edition, 1995.
3. Solar Energy Fundamentals and application by H.P. Garg and J. Prakash, Tata McGraw - Hill Publishing company Ltd., 1997.
4. Solar energy by S. P. Sukhatme, Tata McGraw- Hill Publishing company Ltd.,1997.

References:

1. Energy Technology by S. Rao and Dr. B.B. Parulekar, 1997, 2ndEdn.
2. Power Plant Technology by A. K. Wahil. 1993.

MODEL QUESTION PAPER
19UPH551.5 : ENERGY PHYSICS

Time: 3 Hrs

Max.Marks:80

Section A
(Answer all questions)

1. Define solar constant.
2. Define tidal range.
3. What is a non-conventional energy source?
4. What is a solar pond?
5. Name two methods of solar refrigeration techniques.
6. What is a solar energy collector?
7. What is the basic principle of OTEC systems?
8. Give two merits of wind energy.
9. Define Air mass.
10. What is a fuel cell?

(10×1=10 marks)

Section B
(Answer any eight questions not exceeding a paragraph)

11. Write about global warming
12. What is meant by anaerobic digestion?
13. What are the advantages and disadvantages of fuel cell energy?
14. List the materials used for biogas generation.
15. How energy is stored in wind mill?
16. Explain briefly different methods of production of Hydrogen.
17. What are the basic elements of solar water heater?
18. How can we get electricity from sun?
19. List the characteristics of the solar spectrum
20. Explain the merits and demerits of tidal power generation.
21. How thermal energy is got from ocean?
22. Explain the environmental impact of fossil fuels.

(8×2=16 marks)

Section C
(Answer any six questions)

23. Describe the principle of Angstrom compensation pyrheliometer.
24. Explain green house effect
25. Explain solar energy storage system.
26. Explain the principles of the conversion of solar radiation into heat.
27. Write short notes on tidal energy
28. Explain the importance of Hydrogen energy as alternate source of energy.
29. Describe a non convective solar pond for solar energy collection and storage.
30. Write short notes on chemical energy
31. Explain a flat plate thermal energy collector.

(6×4=24 marks)

Section D
(Answer any two questions)

32. Explain briefly with principle the solar photovoltaic power generation. What are its advantages and disadvantages?
33. Explain with a schematic diagram the structure and working of a biogas plant. What are the advantages and disadvantages of floating drum plant?
34. Briefly explain different non conventional energy sources and the production. Briefly explain the merits and demerits of conventional sources of energy.
35. Describe with neat sketch the working of a WECS with main components.

(15×2=30 marks)

Semester VI

Core Course X

19UPH641: SOLID STATE PHYSICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Understand the interatomic forces and bonds
- Gain basic knowledge of crystal systems and spatial symmetries
- Account for how crystalline materials are studied using diffraction
- Understand the principles of structure determination by diffraction.
- Understand the concept of reciprocal space and the significance of Brillouin zones
- Understand the conduction in metals
- Understand the Magnetic, optical and electrical properties of materials
- Gain an outline of superconductivity and its basic properties

Unit I- Crystal Structures and inter atomic forces (18 hrs)

Solids: Amorphous and Crystalline Materials. Lattice Translation Vectors. Lattice with a Basis – Unit Cell- Elements of symmetry-Types of Lattices -two and three dimensional- Miller Indices-Reciprocal Lattice.- Brillouin Zones. Diffraction of X-rays by Crystals. Bragg's Law. X-ray diffraction techniques-Inter atomic forces. Types of bonding.

Unit 2 – Conduction in metals – Free electron model (12 hrs)

Introduction-conduction electrons-free electron gas-electrical conductivity-electrical resistivity versus temperature-heat capacity of conduction electrons -Fermi surface-electrical conductivity-effects of the Fermi surface-thermal conductivity in metals - Hall effect and Hall coefficient - magneto resistance -A.C conductivity and optical properties-failure of free electron model.

Unit 3- Band Theory (10 hrs)

Bloch theorem-The Kronig -Penney model(derivation is excluded)- mass defect-construction of Brillouin zones- band gaps, conductors, semiconductors and insulators, P and N type of semiconductors. conductivity of semiconductor, mobility .

Unit 4- Magnetic Properties of materials (12 hrs)

Magnetic susceptibility,. Dia, Para, Ferri and Ferromagnetic Materials. Classical Langevin Theory of Dia and Paramagnetic Domains. Quantum Mechanical Treatment of Para magnetism. Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains. Discussion of B-H Curve. Hysteresis and Energy Loss

Unit 5- Dielectric and Optical properties of materials (12hrs)

Polarization- Local Electric Field at an Atom- Depolarization Field- Electric Susceptibility- Polarizability- Clausius Mosotti Equation- Classical Theory of Electric Polarizability- Normal and Anomalous Dispersion- Cauchy and Sellmeier relations- Langevin-Debye equation- Complex Dielectric Constant- Optical Phenomena- Application: Plasma Oscillations- Plasma Frequency- Plasmons

Unit 6-Superconductivity (8 hrs)

Introduction-Zero resistance-perfect diamagnetism or The Meissner effect-The critical field-electrodynamics of superconductors-Theory of superconductivity-London's equation and penetration depth-tunneling and the Josephson effect-miscellaneous topics (intermediate state, Type I & II superconductors).

Books for Study:

1. Solid State Physics – H.C. Gupta, 2nd edition, Vikas Publishing House Pvt Ltd
2. Solid State Physics – Structure and Properties of Materials, M.A. Wahab, 2nd edition, Narossa Publishing House.
3. Solid State Physics – S.O. Pillai, 6th edition, New Age International Publishers
4. Introduction to Solid State Physics, Kittel, Wiley & Sons, 7th edition
5. Solid State Physics – AJ Dekker, Macmillan Publishers India Ltd
6. Solid State Physics – Puri&Babbar, S.Chand

Books for Reference :

1. Concepts of Modern Physics by Beiser, Tata McGraw Hill, 5th Edition, 1997.
2. Fundamentals of Solid State Physics, Saxena-Gupta-Saxena, 9th edition (2004-05), PragathiPrakasan, Meerut.
3. Fundamentals of Physics, 6th Edition, by D.Halliday, R.Resnick and J.Walker, Wiley. NY, 2001.
4. Physics, 4th Edition, Vols I, II & II Extended by D.Halliday, R.Resnick and K.S.Krane, Wiley, NY. 1994.
5. The Feynman Lectures on Physics, Vols. I, II, and III, by R. P. Feynman, RB Leighton and M Sands, Narosa, New Delhi, 1998.
6. Introductory Solid State Physics by H.P.Myers, Viva books, New Delhi, 1998
7. Elementary Solid State Physics – Principles and Applications, M.A.Omar

MODEL QUESTION PAPER
19UPH641:SOLID STATE PHYSICS

Time :3 Hr

Max.Mark:80

Section A

Answer the following. Each question carries 1 mark.

1. Define Crystal structure
2. Write the total no of atoms in unit cell of BCC lattice
3. What is meant by primitive cell.
4. Define reciprocal lattice.
5. What is meant by forbidden energy gap.
6. How does the susceptibility of a diamagnetic material depend on the temperature?
7. Define London penetration depth for a superconductor.
8. Write the Matthiessen rule for determining the resistivity of a metal.
9. Give Einstein's photoelectric equation. Explain the terms.
10. Give the expression for local electric field at an atomic site with cubic symmetry.

(10 X 1=10 Marks)

Section B

Answer any eight of the following. Each question carries 2 marks.

11. What is meant by cohesive energy in crystal.
12. Give the characteristics of ionic bonds in crystals.
13. Give the difference between basis and unit cell.
14. Draw the diagram of an FCC lattice crystal.
15. Obtain the Bragg's law from Laue's equations.
16. Write a note on 'domains' and its growth.
17. What are the factors contributing to the local electrical field at an atomic site?
18. What is superconductivity? Give its salient features.
19. Write the Clausius-Mosotti relation for dielectrics. Give its physical significance.
20. Distinguish between Type I and Type II superconductors.
21. Explain Weidmann-Franz law.
22. Explain Meissner Effect.

(8X2=16 Marks)

Section C

Answer any six questions of the following. Each question Carries 4 marks.

23. Explain miller indices with an example.
24. Write down the difference between amorphous solids and crystalline solids.
25. Describe the procedure for finding d values of reflecting plane in a power diffraction pattern.
26. Determine the electronic specific heat of copper at 600 K. Take the Fermi energy at 0 K as 7.04 eV.
27. Copper has density and electrical conductivity as $8.95 \times 10^3 \text{ kg/m}^3$ and $6.4 \times 10^7 \Omega^{-1}\text{m}^{-1}$ respectively at room temperature. Determine its relaxation time.
28. A superconducting material (Sn) has critical temperature of 3.7 K at zero-magnetic field and a critical field of 0.0306 T at 0K. Find the critical field at 2 K.
29. A metal has a superconducting transition temperature at 4.2 K. Find the temperature at which its critical magnetic field becomes half its value at 0 K.
30. Explain the classification of solids on the basis of band theory .
31. Explain the construction of Brillouin zones.

(6X4=24 Marks)

Section D

Answer two of the following. Each question carries 15 marks.

32. State and explain Bloch theorem. Using Bloch theorem explain the concept Kronig penny model
33. Explain in details the x-ray diffraction techniques.
34. Explain 'local field' in a solid dielectric. Derive Clausius-Mosotti formula which relates macroscopic dielectric constant with microscopic polarizabilities.
35. What is superconductivity? Derive London equation and explain how they help in explaining the super conducting state.

(2X15=30 marks)

Core Course XI

19UPH642: NUCLEAR AND PARTICLE PHYSICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Gain a thorough understanding of the constituents of a nucleus, its basic properties, stability etc
- Understand about the various models used to explain the nucleus
- Understand the alpha, beta and gamma decay
- Apply the concepts of fission and fusion to power generation
- Understand the theory behind particle detectors
- Gain knowledge about the basics of particle physics and the conservation laws obeyed by them

Unit 1. General Properties of Nuclei(14hrs)

Constituents of nucleus and their Intrinsic properties-quantitative facts about size- mass- charge density (matter energy), binding energy- average binding energy and its variation with mass number- main features of binding energy versus mass number curve- nuclear stability- angular momentum- parity- magnetic moment- nuclear quadrupole moments- Nuclear forces.

Unit 2. Nuclear Models(11 hrs)

Liquid drop model -semi empirical mass formula and significance of various terms, condition of nuclear stability. Shell model-evidence for nuclear shell structure, nuclear magic numbers, basic assumptions of shell model. Collective model.

Unit 3. Radioactivity:(12 hrs)

Alpha decay-basics of α -decay processes, theory of α -emission, Gamow's theory, Geiger-Nuttall law, β -decay-energy kinematics for β -decay, positron emission, electron capture, neutrino hypothesis, Gamma decay: Gamma ray emission & kinematics, internal conversion.

Unit 4. Nuclear Reactions (9 hrs)

Types of Reactions, Conservation Laws, kinematics of reactions, Q-value- reaction rate- reaction cross section- reaction mechanism-Concept of compound nucleus.

Unit 5. Particle Detectors & Accelerators (6 hrs)

GM counter-scintillation counter- Linear accelerator- Cyclotron- Synchrotron-betatron.

Unit 6 – Nuclear fission and fusion (12 hrs)

Nuclear fission-energy released in fission-Bohr and Wheeler's theory-chain reaction -multiplication factor-critical size-atom bomb-nuclear reactors-breeder reactors-uses of nuclear reactors. Nuclear fusion-sources of stellar energy-thermonuclear reactions-hydrogen bomb-controlled thermo-nuclear reactions-magnetic bottle-Tokamak- inertial confinement-nuclear power in India.

Unit 7. Particle physics: (8 hrs)

Particle interactions- basic features- types of particles and its families-Symmetries and Conservation Laws- baryon number- Lepton number- Isospin- Strangeness and hypercharge- concept of quark model-quark combinations of mesons and baryons.

Books for Study

1. Modern Physics: R. Murugesan, S. Chand & Co., Reprint,2008
2. Modern Physics: G. Aruldas and P. Rajagopal, PHI, New Delhi, 2005.
3. Nuclear Physics: D. C. Tayal, Himalaya Publishing House, 4thEdn.
4. Concepts of Modern Physics: A. Beiser, Tata McGraw-Hill, New Delhi, 6thEdn.
5. Atomic and Nuclear Physics:N. Subramaniam and Brijlal, S.Chand & Co.
6. Atomic Physics: J.B.Rajam, S.Chand & Co.
7. Introduction to Elementary Particles: D. Griffith, John Wiley & Sons
8. Nuclear Physics: S.N.Ghoshal, S.Chand & Co.

Books for Reference:

1. Concepts of nuclear physics: Bernard L. Cohen, Tata Mcgraw Hill, 1998
2. Nuclear Physics: Kaplan, Narosa publications
3. Introductory nuclear Physics: Kenneth S. Krane, Wiley India Pvt. Ltd., 2008
4. Introduction to the physics of nuclei & particles: R.A. Dunlap, Thomson Asia, 2004
5. Quarks and Leptons: F. Halzen and A.D. Martin, Wiley India, New Delhi
6. Basic ideas and concepts in Nuclear Physics An Introductory Approach: K. Heyde, Institute of Physics Publishing, 2004
7. Radiation detection and measurement: G.F. Knoll, John Wiley & Sons, 2000
8. Theoretical Nuclear Physics: J.M. Blatt & V.F. Weisskopf, Dover Pub.Inc., 1991

MODEL QUESTION PAPER
19UPH642: NUCLEAR & PARTICLE PHYSICS

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. What are magic numbers?
2. What is mass defect?
3. Define the range of an α -particle.
4. Find the number of neutrons present in $^{238}\text{U}_{92}$ nucleus.
5. The isotope $^{11}\text{C}_6$ decays into $^{11}\text{B}_5$. What kind of particle is emitted?
6. What are hadrons?
7. What is the charge of the quark combination “uds”?
8. What is the isospin of a doublet?
9. Which region of earth’s atmosphere has minimum cosmic ray intensity?
10. Which are the main components of primary cosmic rays?

(10 X 1=10 Marks)

Section B (Answer any eight questions; Two mark each)

11. State the law of conservation of lepton number and strangeness.
12. Differentiate isobars and mirror nuclei with examples.
13. Write the characteristic features of the binding energy curves.
14. Define the terms: Mass defect and Binding Energy.
15. What are the conservation laws in Radioactive decays.
16. Explain Geiger-Nuttal law.
17. What are the general features of the nuclear forces ?
18. Define the units of radioactivity, Curie and Becquerel.
19. Explain the principle of ^{14}C dating.
20. Describe the features of strong, weak and electromagnetic force.
21. List out the values of charge, spin, baryon number and strangeness of the six quarks.
22. Explain Bohr and Wheeler theory of nuclear fission.

(8X2=16 Marks)

Section C (Answer any six questions; Four mark each)

23. Check the conservation of charge, baryon number and strangeness in the reactions:
(i) $\pi^+ + n \rightarrow \Lambda^0 + K^+$ and (ii) $p \rightarrow n + e^+ + \nu_e$.
24. Calculate the charge and strangeness of the quark combinations:(i) uds and (ii) udd.
25. Given the following isotope masses, ${}_3\text{Li}^7 = 7.016004$, ${}_3\text{Li}^6 = 6.015125$ and ${}_0n^1 = 1.008665$ u. Calculate the Binding energy of a neutrons in the ${}_3\text{Li}^7$ nucleus. Express the result in MeV and Joules.
26. A GM Counter operates at 1000 volts and a wire diameter of 0.2mm. The radius of the cathode is 2cm and the tube has a life time of 10^9 counts. What is the maximum radial field?
27. A cyclotron of maximum radius 0.25m , accelerates proton in a 2T magnetic field. Calculate the frequency needed for the applied alternating voltage. Also evaluate the K.E of protons.
28. A $^{232}\text{U}_{92}$ nucleus decays to $^{228}\text{Th}_{90}$ with emission of an α -particle. If the kinetic energy of the α -particle is 5.32 MeV, what is the atomic mass(in u) of ^{228}Th . The atomic mass of $^{232}\text{U}_{92} = 232.037131$ u and the atomic mass of $^4\text{He} = 4.002603$ u.
29. The radius of Ho^{165} is 7.731 fermi. Deduce the radius of He^4 .
30. Calculate the charge and strangeness of the quark combinations:(i) uds and (ii) udd.
31. Suggest a quark combination having charge “-e” and strangeness “-2”.

(3X7=21 Marks)

Section D (Answer any two question; 15 marks each)

32. Explain the classification of elementary particles and tabulate their properties.
33. What are the similarities between the nucleus and a liquid drop. Explain Weizacker’s Semi-empirical Mass formula.
34. Discuss the evidences of magic numbers. Explain the shell model of the nucleus.
35. What is mean by energy balance in a nuclear reaction? Obtain an expression for Q-value of a nuclear reaction? Classify the nuclear reactions according to the Q-value?

(2X15=30 marks)

Core Course XII

19UPH643: CLASSICAL AND MODERN OPTICS

No. of credits: 4

No. of instructional hours per week: 4

Course Outcome

- Analyze the intensity variation of light due to Polarization, interference, diffraction and dispersion
- Understand a knowledge about optical fiber, its types and its application in communication
- Understand the working principle, recording, reconstruction and types in holography
- Understand the working principle of lasers

Unit 1–Interference of Light (12 hrs.)

The principle of superposition – coherent sources –spatial and temporal coherence– Double slit interference (theory of interference fringes and band width) – Interference by division of wave front and amplitude –Fresnel’s biprism– interference in thin films–classification of fringes–wedge shaped films–testing of optical flatness–Newton’s rings(reflected system)–refractive index of a liquid– Michelson interferometer – determination of wavelength

Unit 2–Diffraction (14 hrs.)

Fresnel diffraction: Half–period zones – explanation of rectilinear propagation of light– diffraction at a straight edge–zone plate–Fraunhofer diffraction– Diffraction at a single slit, double slits – plane transmission grating – Rayleigh’s criterion for resolution – resolving power of diffraction grating.

Unit 3 – Polarization(12 hrs.)

Plane polarized light –polarization by reflection – Brewster’s law – pile of plates – Malus law – Double refraction – Huygens explanation for double refraction in uniaxial crystals – Nicol prism – Nicol prism as a polarizer and analyzer – Theory– production and analysis of plane, circularly and elliptically polarized light – quarter and half wave plates– Polaroids

Unit 4– Dispersion (6 hrs.)

Normal dispersion– Elementary theory of dispersion – Cauchy’s and Hartmann dispersion formula– anomalous dispersion

Unit 5–Fibre Optics (8 hrs.)

Introduction–optical fibre– the numerical aperture– coherent bundle–pulse dispersion in step index fibre– graded index fibre– single mode fibre– multimode fibre–Fibre optic sensors (qualitative)–fibre optic communication (qualitative)– Advantages of fibre optic communication system.

Unit 6 –Holography: (6 hrs.)

Principle of holography–recording of holograms–reconstruction of images (Theory not needed)– application of holography– different types of holograms–transmission and reflection types

Unit 7–Laser (14 hrs.)

Basic principle of laser operation–characteristics of laser beams–Einstein coefficient–light propagation through medium and condition for light amplification population inversion by pumping and cavity threshold condition– optical resonators (qualitative)– Q factor various laser systems –Ruby laser – He–Ne laser–Dye laser–semiconductor laser(working principle only)– Application of lasers in industry and medicine

Books for Study

1. *Text Book of Optics*: Subramaniam&Brijlal, Avadhanulu, 23rd edition,2006
2. *Optics*: AjoyGhatak, TMH, 2005
3. *Optics and Spectroscopy*: R.Murugesan and K Sivaprasad, S. Chand & Co., 2010
4. *Lasers Principles, Types and applications*: K.R.Nambiar, New Age International Pvt. Ltd. 2006

Books for Reference:

1. *Optics*: P. Vivekanandan
2. *Fundamentals of Optics*: Jenkins and White, MCH
3. *Modern Classical Optics*: Geoffrey Brooker, Oxford University Press, 2003
4. *Principles of Optics*: B.K. Mathur
5. *Fundamentals of Optics*: Khanna and H. R. Gulati, R. Chand,1984
6. *Lasers &Non-Linear Optics*: B. B. Laud,New Age International Pvt. Ltd., 2011
7. *Electronic Communications*: Dennis Roddy& John Coolen, Pearson, 1995

MODEL QUESTION PAPER
19UPH643: CLASSICAL AND MODERN OPTICS

Time: 3 hours

Max. Marks : 80

Section A

Answer all questions. Each question carries 1 mark.

1. Write down Sellmeier's formula
2. What is a LASER?
3. What do you mean by coherent bundle?
4. What is numerical aperture?
5. What is holography?
6. What are Haidinger fringes?
7. State Brewster's law
8. What will be the phase difference between two successive Fresnel's half period zone?
9. State superposition principle of waves
10. Explain the term double refraction.

(10 X 1=10 Marks)

Section B

(Answer any eight questions; Two mark each)

11. What are fiber optic sensors?
12. Differentiate normal and anomalous dispersion?
13. Explain the principle of a semiconductor laser
14. Give four applications of holography
15. What are zone plates?
16. Explain Rayleigh's criterion for resolution of spectral lines?
17. What is meant by optical pumping?
18. What are the basic differences between a holograph and photograph?
19. How will you test the optical flatness of a glass plate?
20. Give the differences between interference bands and diffraction bands?
21. What is a quarter wave plate ?
22. Differentiate spatial and temporal coherence?

(8×2= 16 Marks)

Section C

(Answer any six questions; Four mark each)

23. Find the thickness of a quarter wave plate when the wavelength of light is 5893\AA . $n_1 = 1.553$ and $n_2 = 1.544$
24. Determine the specific rotation of a given sample of sugar solution if the plane of polarization is turned through 13.2° . The length of the tube containing 10% sugar solution is 20 cm.
25. An optical fibre has $n_1 = 1.62$ and $n_2 = 1.45$. Calculate the i) numerical aperture ii) fractional refractive index change and the iii) capturing angle?
26. In a biprism experiment, the distance between two points were covered by 11 fringes when the length of the light used is 546nm . When the same points is covered by 12 fringes. Find the wavelength of that light.
27. a) Deduce the missing orders for a double slit Fraunhofer diffraction pattern, if the slit widths are 0.16 mm and they are 0.8 mm apart
28. Find the ratio of populations of the two states in a He-Ne Laser that emits light of wave length 6328\AA at 27°C .
29. In Fraunhofer diffraction due to narrow slit a screen is placed 2 m away from the lens to obtain the pattern. If the slit width is 0.2 mm and the first minima lie 5 mm on either side of the central maximum, find the wavelength of light.
30. In a Newton's ring experiment, the diameter of the 15th ring was found to be 0.590 cm and that of the 5th ring was 0.336 cm. If the radius of the plano convex lens is 100 cm, find the wavelength of light used.
31. An optical fibre has a core diameter of 10 micrometer and core refractive index 1.58. Calculate the number of reflections of an optical signal launched at 5° into a fibre of length 1 m?

(6X4=24 Marks)

Section D

Answer any two questions. Each question carries 15 marks.

32. a) Classify the fibres on the basis of the refractive index profile, on the basis of mode, and on the basis of material.
b) Obtain the expression for the capturing angle
33. Describe the Michelson Interferometer and explain how different types of fringes are formed in it. How wavelength of light is measured using it.
34. Explain the basic principle of Lasers. Discuss the working of a He-Ne Laser briefly. Mention three applications of Lasers.
35. Give an account of the phenomenon and the related theory of diffraction due to a straight edge
(15X2=30 marks)

Core Course XIII

19UPH644: DIGITAL ELECTRONICS AND COMPUTER SCIENCE

No. of credits: 3

No. of instructional hours per week: 4

Course Outcome

- Gain a deep knowledge on number systems, types, conversion, coded number systems etc
- Equipped to design, construct and analyze basic logic circuits using logic gates
- Understand the arithmetic circuits and sequential circuits
- Understand the functioning of computer components, the process of problem solving using computer, internal organization of computer, memory hierarchy etc
- Able to enhance their analyzing and problem solving skills and use the same for writing programs in C.

Unit-1 (22hrs)

Number systems :-Decimal number system-binary number system-conversion of binary number to decimal and decimal number to binary-binary addition and subtraction-1's complement-2's complement-binary subtraction using 2's complement- -conversion of real numbers-conversion of decimal fraction to binary fraction-binary coded decimal -hexadecimal number system-conversion of hexadecimal number to decimal, decimal to hexadecimal, binary to hexadecimal and hexadecimal to binary- -ASCII code.

Boolean algebra and logic gates: - Logic gates AND, OR, NOT, NAND, NOR And Ex-OR gate-realization of other logic functions using NAND / NOR gates--Boolean laws- Demorgan's theorem-Simplification of Boolean equations using Boolean laws. Karnaugh map

Arithmetic circuits:-Half adder-full adder-controlled inverter-binary adder- subtractor.

Sequential circuits:-Flip-Flop, S-R Flip Flop, J-K Flip-flop, Master slave JK Flip- Flop

Unit2 (11hrs)

Basics of computers:-Hardware- input and output units- memory unit-ALU-control unit–basic operational concepts-Software

The memory systems:- Basic concepts-semiconductor RAM-static memories-asynchronous and synchronous DRAM-structure of large memories– ROM,PROM,EPROM, EEPROM–flash memory-speed size and cost-Basic concepts of cache memory and virtual memories. Secondary storage-magnetic hard disks-optical disks-magnetic tape systems

Unit-3: Programming in C++ (25 hrs)

Features of c++ - basic structure of c++ program – library files-header files – preprocessor directives- inbuilt functions- output using cout- input with cin - constants and variables – data types – declaration of variables – integer variables, character variables, floating point types, type bool - assigning values to variables–manipulators-operators and expressions–arithmetic operators, relational operators, logical operators, short hand operators-control statements-for loops , while loop, do...while loop- if statement, if.....else, else....if constructions, switch statement- break, continue, goto statements-user defined functions–function definition, function declaration, function header and body, function call and execution, passing arguments to functions, returning values from functions, storage classes-Arrays-array elements, array initialization, multidimensional arrays, passing arrays to functions-strings-basics of structures and pointers in c++, classes and objects (introduction only)-basic file operations-serial and sequential files, reading and writing -simple examples of c++ programs for solving problems in physics

Unit 4: Introduction to microprocessors (14 hrs)

Microprocessors and microcontrollers (definition only)-intel 8085- 8 bit microprocessor-pin disruption - 8085 instructions - addressing modes(definition only)- interrupts (definition only) -assembly language - simple programs- addition, subtraction.

Books for study:

1. Fundamentals of Microprocessors and Microcomputers: B. Ram,Dhanpat Rai Publications
2. Digital principles and Applications: Malvino and Leach.TMH, New Delhi, 4th Edn.
3. Fundamentals of Computers: V.Rajaram, PHI, New Delhi, 4th Edn.
4. A first course in Computers: S. Saxena, Vikas Publishing House Pvt. Ltd.,
5. Programming in C++: D. Ravichandran, Tata Mc Graw Hill, 2011

6. Object oriented programming in C++:Robert Lfore,Galgotia publications Pvt Ltd., 3Edn., 2004
7. The C++ programming language:Bjome Stroustrup, 4th Edn. Addison Wesley
8. Object oriented programming with C++: E. Balaguruswami, 5Edn., Tata Mc Graw Hill
9. Programming in C++: M.T. Somasekharan, PHI Pvt. Publishing,2005
10. Numerical Methods with computer programs in C++:P. Ghosh, PHI Learning Pvt. Ltd.
11. The 8085 microprocessors:K. Udayakumar and B. S. Umasankar, Dorling Kindersley (India) Pvt. Ltd.,2008
12. Microprocessor 8085,8086:Abhishek yadav, University Science Press, New Delhi 2008
13. Microprocessor-Architecture, Programming and applications with 8085:R.S. Gaonkar

Books for Reference: -

1. Introduction to digital electronics:NIIT, PHI.
2. A first course in Computers:Sanjay Saxena, Vikas publishing house Pvt. Ltd.

MODEL QUESTION PAPER
19UPH644: DIGITAL ELECTRONICS AND COMPUTER SCIENCE

Time: 3Hrs

Maximum Marks: 80

Part A

Answer all questions each in a word or a sentence .Each question carries 1 mark.

1. Find the binary equivalent of 17_{10} .
2. Find the number next $ABCD_{16}$.
3. Find the 2's complement of 111000111.
4. What is a flash memory?
5. Expand the term MAR .
6. What is a global variable?
7. Write down the syntax for a "for loop".
8. Name the type of parameters used in a function call.
9. Find $11\%2$.
10. Find the solution $:(4+3)*(2+3)/(1+4)$.

(10 x 1 =10marks)

Part B

Answer any 8 questions. Each question carries 2 marks.

11. Explain the working of a NAND gate with truth table. Draw the symbol.
12. State the DeMorgan's theorem.
13. Find the hexadecimal equivalent of 32.909_{10} .
14. Distinguish between PROM and EPROM.
15. Write a note on the cache memory.
16. What is the importance of `#include<stdio.h>` in C-program?
17. What is the output of the following program?

```
main()
{ int x,y,z;
x=100;
y= 125;
z=(x+y)/(y-x);
printf("z=%d,z);
}
```

18. What are the differences between do-while and while loop?
19. What is the difference between break statement and continue statement?
20. What is a recursion function?
21. Distinguish between automatic and static variables.
22. Explain the Runge-Kutta method.

(8 x 2 =16marks)

Part C

Answer any 6 questions .Each question carries 4 marks.

23. Subtract 1101 from 1010 using 2's complement method.
24. Explain the working of a SR flip flop using NOR gates.
25. Simplify the expression using Karnaugh map:
 $Y = ABCD + ABCD + ABCD + ABCD + ABCD$
26. Show that $(A+B) + (A+B) = A$
27. Convert the following
 - a. $(25.AB3)_{16} = (\quad)_{10}$;
 - b. $(11110011.1011)_2 = (\quad)_{10}$
28. Write a C-program to find the sum and average of a set of numbers.
29. Write a C-program to add two 3x3 matrices.
30. Write a C-program to find the factorial of a given number using a function.
31. Write a C-program to get the address of a given location using pointer.

(6x 4 =24 marks)

Part D

Answer any 2 questions. Each question carries 15 marks.

32. What are flip flops? Describe the working of a master-slave JK flip flop with a neat diagram.
33. (a) Explain the working of a full adder using the truth table.
(b) Obtain the expressions for the sum and carry of a full adder. Hence draw the detailed circuit using logic gates.
34. Write a note on any three types of looping programs with example.
35. Describe the “if-else” statement and using it write a C-program to find the roots of a quadratic equation.

(2x 15 =30marks)

Elective Course

19UPH661.1: ELECTRONIC INSTRUMENTATION

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the concepts of measurement various electrical parameters with accuracy, precision, resolution, passive or active transducers for measurement of physical phenomenon etc
- Understand the functioning of signal generator, frequency counter, CRO and digital IC tester for appropriate measurement etc.

Unit 1 (13 hrs)

Basic concepts of measurements- Instruments for measuring basic parameters- ammeter-voltmeters-multimeter- digital voltmeter-accuracy and resolution of DVM.

Unit 2 – Oscilloscopes (14 hrs)

Cathode ray tubes- CRT circuits- vertical deflection system- delay line- horizontal deflection system-multiple trace- oscilloscope probes and transducer- analog storage oscilloscopes- components and working .

Unit 3 – Transducers (11 hrs)

Basic principles- classification of transducers- Passive and Active transducers strain gauges- temperature measurements- Thermistor-photosensitive devices.

Unit 4 – Signal Generation and Analysis (16 hrs)

Sine wave generator- frequency synthesizer- sweep generator- astable multivibrator- laboratory pulse generator- function generator- wave analysers harmonic distortion analyzer- wave meter- spectrum analyzer (qualitative idea only).

Books for Study:

1. Modern Electronic Instrumentation and Measurement Techniques: Albert D.Helfrick & William D.Cooper, PHI, Ltd.
2. Electronic Instrumentation:Kalsi H. S, 2nd Edn, TMH Publishers.
3. Instrumentation-Devices and Systems: C.S. Rangan, G.R.Sarma, V.S.V.Mani, TMH Publishers. 4.Electronic Instruments and Instrumentation Technology: M.M.S.Anand, PHI Ltd.

Books for Reference:

1. Sensors and Transducers: D.Patranabis, Wheeler Publishing Co. Ltd.
2. Industrial Electronics and Control: S.K.Bhattacharya & S.Chatterjee, TMH Publishers.
3. Electronic measurement and Instrumentation: K.B.Klaassen, Cambridge University Press.
4. Measurement Systems-Applications and Design: Ernest O.Doebelin & Dhanesh N.Manik, 5th Edn. TMH Publishers.
5. Principles of Measurement systems: John P.Bentley, Longman, Pearson Education Publishers. 3rd Edn.

MODEL QUESTION PAPER
19UPH661.1: ELECTRONIC INSTRUMENTATION

Time: 3 Hrs

Max.Marks:80

Section A (Answer all questions; one mark each)

1. Define Accuracy?
2. What is D'Arsonval Principle?
3. Write the basic principle of Ammeter?
4. Write any two advantages of Taut band Instrument?
5. What do you mean by harmonic distortion?
6. Name a material which shows piezo electric effect.
7. Mention the use of trigger pulses in the C.R.O.
8. By adjusting the potential difference between deflection plates and accelerating electrode, we can control
9. What is systematic error?
10. Define variance.

Section B (Answer any eight questions; Two mark each)

11. What is the difference between accuracy and precision?
12. List the sources of possible errors in instruments?
13. What do you mean by standard resistance?
14. Draw and explain the block diagram of a measurement system?
15. Explain the basic principle of voltmeter?
16. Draw a diagram which shows the operating voltages for different electrodes of a CRT
17. Define the deflection sensitivity and deflection factor of a Cathode Ray Tube
18. What are thermistors? Which are the two types of thermistors?
19. What are strain gauges? Define gauge factor of a strain gauge
20. Give the block diagram of sweep generator
21. What is a delay line? Where is it situated in a C.R.O.?
22. Explain the vertical deflection system of a CRO

Section C (Answer any six questions; Four mark each)

23. Explain standards of measurement?
24. A voltmeter, having sensitivity of 1,000 ohm/V, reads 100 V on its 150-V Scale when connected across an unknown resistor in series with a milliammeter. When the milliammeter reads 5mA calculate a) The apparent resistance of the unknown resistor B)The actual resistance of the unknown resistor C) The error due to the loading effect of the volt meter.
25. The waveform shown in figure is observed on the screen of an oscilloscope. The vertical attenuation is set to 0.5V/div and the time per division is set to 2 μ s/div. Determine the peak to peak voltage and frequency of the signal
26. What is the minimum distance between screen and centre of deflection plate that will allow full deflection of 4 cm at the oscilloscope screen with a deflection factor of 100V/cm and with an accelerating potential of 2000V?
27. A resistance strain gauge with a gauge factor of 2 is cemented to a structure, which is subjected to a strain of 1×10^{-6} . If the original resistance value of the gauge is 130 Ω , calculate the change in resistance.
28. A 1mA meter movement having an internal resistance of 100 Ω is used to convert into a multi range ammeter having range 0-10mA ,0-20mA, and 0-50mA determine value of shunt required.
29. A D'Arsonval movement with a full scale deflection current of 10mA and internal resistance of 500 Ω is to be converted into a multi range voltmeter. Determine value of resistance required for 0-20V, 0-50V, and 0-100V
30. Show that the path of electron travelling through an electric field of uniform intensity, which enters the field at right angles, is parabolic.
31. What is the maximum velocity of electron that has been accelerated through a potential of 2000V?

Section D (Answer any two question; 15 marks each)

32. Explain the basic principle of D' Arsonval movement? Draw and explain the theory and construction of a PMMC movement?
33. Draw a labelled diagram indicating the different parts of a Cathode Ray Tube (CRT). Show that in a CRT, the deflection of the electron beam on the screen is directly proportional to the deflection voltage
34. Explain
 - a) Distributed parameter delay line and lumped parameter delay line
 - b) Active probes and current probes
 - c) Dual beam CRO and dual trace CRO
35. Explain with neat block diagram the working principle of function generator

Elective Course

19UPH661.2: SPACE SCIENCE

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the structure of the universe
- Understand the evolution of stars
- Gain a detailed knowledge about the sun and all related phenomena like solar wind, corona, sun spot etc.
- Understand the earth's atmosphere and its different layers, magnetic field of earth etc.

Universe (12 hrs)

Large Scale Structure of the Universe-Astronomy and Cosmology-Our Galaxy-Galaxy types- Radio sources-Quasars-Structures on the largest scale-Coordinates and catalogues of astronomical objects-Expansion of the Universe
Ref; Introduction to Cosmology- J. V. Narlikar (1993), Cambridge University Press, Art. 1.1 to 1.8 (Pages 1 to 26)

The evolution of Stars (9hrs)

Introduction-Classification of Stars-The Harvard classification- Hertzsprung-Russell diagram- Stellar evolution-White dwarfs-Electrons in a white dwarf star-Chandrasekhar limit-Neutron stars-Black holes-Supernova explosion-Photon diffusion time-Gravitational potential energy of a star-Internal temperature of a star-Internal pressure of a star.
Ref; Modern Physics-R. Murugesan, KiruthikaSivaprasath, S.Chand& Company Ltd. (2007), Art. 78.1 to 78.15(Pages 963 to 976)

The active Sun (10 hrs)

Introduction, Sunspots and Solar storms-Sunspots and Solar activity-Cosmic rays of Solar origin- The Solar wind-Solar corona and the origin of the solar wind-Disturbed Solar wind.
Ref; Earth's Proximal Space- ChanchalUberoi (2000), Universities Press (India) Limited, Art 3.1 to 3.6 (Pages 36 to 55)

The earth's Atmosphere (15 hrs)

Introduction-Nomenclature and temperature profile-Temperature distribution in the troposphere-Temperature of stratosphere-temperature of mesosphere and thermosphere-Temperature variability-The pressure profile-Scale height-Density variation-The Ionosphere-Effect on scale height-Ionospheric electric fields-Ionization profile-Layer of charge-Ionospheric hydrogen and Helium.
Ref; Introduction to Space Science- Robert C. Haymes (1971) John Wiley & Sons Art. 3.1 to 3.9 and 3.12 to 3.17 (Pages 54 to 65 and 69 to 78)

Magnetosphere (8 hrs)

Introduction-The magnetic field of Earth-Earth's variable magnetic field-Solar activity and Earth's magnetic weather-solar wind interaction-The Chapman-Ferraro closed magnetosphere- Dungey's open magnetosphere-Structure of the magnetosphere-Magneto tail and Plasma sheet- Plasma sphere-Earth's radiation belts.
Ref; Earth's Proximal Space- ChanchalUberoi (2000), Universities Press (India) Limited, Art. 4.1 to 4.6 and 4.8 to 4.8.3 (Pages 56 to 67 and 71 to 74)

Books for Study

1. Introduction to Space Science – Robert C Hymes (1971), John Wiley & Sons Inc.
2. Earth's Proximal Space- ChanchalUberoi (2000), Universities Press (India)
3. Introduction to Cosmology- J. V. Narlikar (1993), Cambridge University Press
4. Modern Physics- R. Murugesan, KiruthikaSivaprasath (2007), S.Chand& Company Ltd.

Books for reference

1. Space Physics and Space Astronomy – Michael D Pappagiannis (1972), Gordon and Breach
2. Science Publishers Ltd.
3. Introductory Course on Space Science and Earth's environment- Degaonkar (Gujarat University,1978)
4. Introduction to Ionosphere and magnetosphere- Ratcliffe (CUP, 1972)
5. The Physics of Atmospheres-Houghton (Cambridge University Press)
6. Introduction to Ionospheric Physics-Henry Rishbeth&Owen K. Garriot (Academic Press, 1969)
7. Space Science –Louise K. Harra& Keith O. Mason(Imperial College Press,London, 2004)
8. Introduction to Space Physics- Kivelson and Russel
9. Introduction to Astrophysics – BaidyanadhBasu
10. Astrophysics - K. D. Abhayankar (University Press)

Elective Course

19UPH661.3: PHOTONICS

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Gain knowledge about the fundamental principles of photonics and light matter interactions.
- Understand processes that help to manipulate the fundamental properties of light and hence their applications in semiconductor photon sources, lasers, detectors etc
- Understand the fundamental optical effects such as electrooptics, acoustooptics and nonlinear optics, applied in photonic components and systems

Unit 1: (7 hrs)

Photons in semiconductors-semiconductors-energy band and charge carriers-semi conducting materials-electron and hole concentrations-generation-recombination and injection-junctions-hetero junctions-quantum wells and super lattices

Unit 2: (6 hrs)

Semiconductor photon sources-light emitting diodes-injection-electroluminescence-LED characteristics-internal photon flux-output photon flux and efficiency-responsivity-spectral distribution-materials-response time-device structures

Unit 3: (8 hrs)

Semiconductor laser amplifiers-gain-amplifier band width-optical pumping-electrical current pumping-hetero structures-semiconductor injection lasers-amplification-feedback and oscillators-resonator losses-gain condition-internal photon flux-output photon flux and efficiency-spectral distribution-spatial distribution-single frequency operation quantum well lasers (qualitative)

Unit 4: (8 hrs)

Semiconductor photon detectors-The external photo effect-photo electron emission-The internal photo effect-semiconductor photo detection-quantum efficiency-responsivity devices with gain-response time-photoconductors-photo diodes-PIN photo diodes-hetero structure photo diode- Schotky barrier photodiodes-array detectors-avalanche photodiodes-gain and responsivity- response time.

Unit 5: (8 hrs)

Electro optic-Pockels and Kerr effects-electro optic modulators and switches-scanners directional couplers-spatial light modulators-electro optics of liquid crystals-wave retarders and modulators-spatial light modulators.

Unit 6: (7 hrs)

Nonlinear optics-second order and third order optical non linearity-intensity dependent refractive index-optical Kerr effect-self focusing.

Unit 7: (10 hrs)

Photonic switching and computing-opto mechanical-electro optic, acousto-optic and magneto optic switches-all optical switches-bistable systems-principle of optical bistability-bistable optical devices-optical inter connectors-optical computing-digital optical computing-analog optical processing.

Book of Study

1. Fundamentals of Photonics: BFA Saleh and M.C.Teich, John Wiley & Sons, Inc.

Reference books

1. Semiconductor optoelectronic devices: Pallab Bhattacharya, Printice Hall of India.
2. Optics and Photonics- An introduction: F. Graham Smith and Terry A.King, John Wiley & Sons, Inc.
3. Lasers and Nonlinear Optics: B.B.Laud, New Age International Pvt Ltd.

Elective Course

19UPH661.4: NANOSCIENCE AND TECHNOLOGY

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the background on Nanoscience ,properties of nanomaterials
- Understand the synthesis and characterization of nanomaterials and their application and the impact of nanomaterials on environment

Unit 1 Introduction to Nanoscience and Nanotechnology (10 Hours)

Nanoscience and nanotechnology-Definition-Historical development, scope and applications [Book 1, Chapter 1].Comparison of bulk and nanomaterials-classification of nanostructured materials-one, two and three dimensional confinement, size and dimensionality effects-size effects-conduction electrons and dimensionality-Fermi gas and density of states-Potential wells- Partial confinement-Properties dependent on density of states-excitons. [Book 2 Chapter 9.1, 9.3, 9.4]

Unit 2 Properties of nanomaterials and scaling laws (6 Hours)

Introduction-size dependent properties-Properties of nanomaterials-chemical reactivity- solubility-melting points-electronic energy levels-electrical conductivity-Super-paramagnetism- Electron confinement-Integrated optics-Optical properties-Mechanical properties- Thermodynamic properties-scaling laws. [Book 1 Chapter 3.1 to 3.4]

Unit 3 Synthesis and characterization (16 Hours)

Synthesis of nanoscale materials and structures-Zero Dimensional materials-Inert gas condensation-Inert gas expansion-Sonochemical processing-Sol-gel deposition-Molecular self assembly-1D and 2D-Foil beating-Electro-deposition-PVD-CVD-3D Rapid solidification- Equiangle extrusion-Milling and Mechanical alloying-Micromachining-Consolidation of nanoclusters and milled powders-Methods for nanoprofilng[Book 3 chapter 8.1]-Electron microscopy-Scanning probe microscopy-Optical microscopy-XRD [Book 4, Chapter 2.1 to 2.4, 2.6]-IR and Raman Spectroscopy-Photoemission and X-ray spectroscopy [Book 2 Chapter 3.4]

Unit 4 Carbon nanostructures (10 Hours)

Carbon nanostructures-carbon molecules, carbon clusters-Fullerene-structure of C-60 and its crystal-larger and smaller fullerenes-other bucky balls-Carbon nanotubes-fabrication-structure-electrical properties-vibrational properties-mechanical properties-Applications of carbon nano tubes-Field Emission and shielding-computers-fuel cells-chemical sensors-catalysis-mechanical reinforcement. [Book 2, Chapter 5]

Unit 5 Nanomachines and nanodevices (12 Hours)

Resonant Tunneling diode, quantum cascade lasers, single electron transistors-operating principles and applications. [Book 5, Chapter 9.1 to 9.4]

Books for study

1. Nanotechnology, An Introduction to synthesis, Properties and Applications of Nanomaterials,Thomas Varghese and KM Balakrishna, Atlantic Publishers and Distributors (P) Ltd, New Delhi
2. Introduction to Nanotechnology, Charles P. Poole Jr and Frank J Ovens, Wiley Interscience,USA
3. Nanomaterials, Nanotechnologies and design, Michael F Ashby, Paulo J Ferreira and Daniel L Schodek, Elsevier Publishers, UK
4. Nano, The Essentials, T. Pradeep, Tata McGraw Hill, New Delhi
5. Nanotechnology and Nanoelectronics, W.R. Fahrner, Springer, Newyork.

References

1. Encyclopedia of Nanoscience and Nanotechnology, H.S.Nalwa (Ed), American Scientific Publishers, Los Angels
2. Nanotubes and Nanowires, C.N.R. Rao and Govindraj, RSC Publishing
3. Nanotehnology, An Introduction, Jeremy J Ramsden, Elsevier Publishers, UK
4. Nanotechnology, Mick Wilson, KamaliKannagara, Geoff Smith, Michelle Simmons and BurkhardRaguse, Overseas Press, New Delhi

Elective Course

19UPH661.5: COMPUTER HARDWARE & NETWORKING

No. of credits: 2

No. of instructional hours per week: 3

Course Outcome

- Understand the names and functions of hardware parts and the parts of the motherboard, different kinds of input and output device, how the CPU processes data and instructions and controls the operation of all other devices.
- Understand the names, distinguishing features, and units for measuring different kinds of memory and storage devices.
- Understand and take precautions about various types of viruses affecting a PC ,the basic networking essentials, ip addressing etc.

Unit 1 - 3 hrs

P.C. Architecture-Functional block diagram of a computer-Processors-Introduction to Microprocessor-CISC-RISC processors-Type of Processors and their specification.(Intel: Celeron-Pentium family-PII, PIII, PIV, dual core, core 2duo - AMD-K5,K6 series)

Unit 2 -10 hrs

Motherboards-Motherboard components-Types-Form factor-Different components of Motherboard (BIOS, CMOS,BICMOS, RAM, CMOS Battery, I/O slots, I/O connectors)-Riser architecture-Main Memory (SIMM, DIMM, RIMM)-extended/expanded/cache memories- Chipsets (Intel & AMD)-ROM, DRAM, SDRAM, CDRAM, RDRAM, WRAM. Bus standards-Types of Buses (PC, ISA,MCA, AGP, PCI, USB, IEEE FireWire)-Add on Cards-Different latest Add on Cards (TV Tuner Card,DVR card, Video Capture,Internal Modem, Sound Card)

Unit 3 -9 hrs

Drivers:

(1) Floppy Disk Drive- Floppy Drive Components(overview only)

(2) Hard Disk Drive (HDD)

Types, Capacity-Hard Disk Components (Media, Read/Write Head, Spindle Motor Head Actuator)-Connector-Jumper setting-trouble shooting in HDD-Hard Disk Controller (HDC)–Block diagram-Working-Interfacing (IDE,SCSI, ATA and SATA series) Configuration of HDD-Installation-Formatting-File Format (FAT, NTFS)-Pen drive- i-pods

(3) Optical Disk Drive

Types (ROM, R/W, DVD ROM, DVD R/W)-Capacity-Difference between CD &DVD (capacity,format)-trouble shooting.

Unit 4 -5 hrs

Peripherals-Keybaord and Mouse-operation-Types of VDU (CRT, LCD, and TFT)-Resolution- and Dot pitch-Printers-Types (dot matrix, inkjet, laser) Scanner-operation-Power conditioning device-SMPS-Block diagram operation-UPS-Types (online, off line, Hybrid)-trouble shooting in all these devices.

Unit 5- 4 hrs

Viruses & Vaccines-Virus-Introduction-infection methods-Types of viruses-Different symptoms of virus attack-precautions-Vaccine-Method of vaccine-Different types of Antivirus used in PC,Firewalls

Unit 6- 7 hrs

NETWORKING ESSENTIALS

Introduction-Need for networking-Network Topology-OSI Model-Types of networks (LAN, WAN, MAN) Protocols-LAN Protocols-Classification- Examples-Ethernet networking-WAN Protocols-PPP, X.25, PPTP, L2TP, ISDN

Unit 7-- 8 hrs

LAN Connectivity Devices-NIC-Repeater-Hub-Switch-Bridge-Internet Connectivity-Device-Routers-Gateways-CSU/DSU-TCP/IP Protocol Suite-What is TCP/IP-Importance-OSI vs TCP/IP

Unit 8- 6 hrs

IP Addressing-Overview-Address classes-Network ID-Host ID and Subnet Mask-Addressing guidelines-Reserved IP Address-Subnetting and Supernetting (overview)

Unit 9 -2 hrs

Emerging Technologies-Wireless Technology-Bluetooth-WAP-Mobile Technology-GSM- CDMA-GPRS

Books for Study:

1. D. Balasubramanian, "Computer Installation & Servicing", Tata McGraw Hill.
2. Rom Gilster, Black book, "PC Upgrading and Repairing", Dream tech New Delhi.
3. Street Smart, James Pyler, "PC Upgrading and Repairing", Wiley Publishing, Inc.
4. Stephen.J.Bigelow,"Bigelow's Troubleshooting, Maintenance & Repairing PCs",Tata McGraw Hill
5. Craig Zacker, "The Complete Reference- Networking", Tata McGraw Hill
6. Douglowe, "Networking All in One Desk Reference"-3Edn, Wiley India Pvt Ltd

References:

1. Mark Minasi, "The Complete PC Upgrade & Maintenance Guide" BPB Publication
2. C.A. Schmidt, "The Complete Computer Upgrade & Repair Book", Dreamtech
3. Craig Zacker, John Rourke, "The Complete Reference- PC Hardware" Tata McGraw Hill
4. Scott Mueller, "Upgrading & Repairing PC's", Pearson Education
5. Vishnu Priya Sing &Meenakshi Singh, "Computer Hardware Course", Computech
6. ManaharLotia, Pradeep Nair, PayalLotia, "Modern Computer Hardware Course",BPB Publication.
7. Richard Mc Mohan, "Introduction to Networking", Tata McGraw Hill.

Internet Resources:

1. www.edugrid.ac.in/webfolder/courses/cn/cn_resources.htm
2. www.howstuffwork.com
3. www.e-tutes.com
4. www.learnthat.com
5. www.intel.com
6. www.amd.com
7. <http://en.wikipedia.org>

Core Course XIV

19UPH645: OPTICS ELECTRICITY AND MAGNETISM

(Minimum 18 experiments to be done)

Course Outcome

- Ability to think critically and to use appropriate concepts to analyze qualitatively problems or situations involving the fundamental principles of physics especially the fields of optics, electricity, magnetism, electronics, computer programming etc
- Ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
- Demonstrate basic experimental skills by the practice of setting up and conducting an experiment with due regards to minimizing measurement error.
- Demonstrate basic communication skills by working in groups on laboratory experiments and the thoughtful discussion and interpretation of data.
- Recognize and explain aspects of the application of the topics covered in this module in everyday life.

1. Spectrometer-A, D and n of a solid prism.
2. Spectrometer –Dispersive power and Cauchy's constants
3. Spectrometer Grating—Normal incidence- N & wavelength
4. Spectrometer-i-d curve
5. Spectrometer- Hollow prism
6. Liquid lens-refractive index of liquid and lens
7. Newton's Rings—Reflected system
8. Air wedge-diameter of a wire
9. Potentiometer-Resistivity.
10. Potentiometer-Calibration of ammeter
11. Potentiometer –Reduction factor of T.G
12. Potentiometer –Calibration of low range voltmeter
13. Potentiometer – Calibration of high range voltmeter
14. Thermoemf -measurement of emf using digital multimeter.
15. Carey Foster's bridge -Resistivity
16. Carey Foster's bridge -Temperature coefficient of resistance.
17. Mirror galvanometer-figure of merit.
18. BG- Absolute capacity of a condenser
19. Conversion of galvanometer into ammeter and calibration using digital Multimeter
20. Conversion of galvanometer into voltmeter and calibration using digital Voltmeter.
21. Circular coil-Calibration of ammeter.
22. Study of network theorems-Thevenin's & Norton's theorems and maximum power transfer theorem.
23. Circular coil-Study of earth's magnetic field using compass box.
24. Absolute determination of m and Bh using box type and Searle's type vibration magnetometers.
25. Searle's vibration magnetometer-comparison of magnetic moments.

References

1. Yarwood and Wittle; Experimental Physics for Students, Chapman & Hall Publishers.
2. An advanced course in practical physics, Chathopadhyaya, Rakshit and Saha, New central agency, Kolkata.
3. A text book of practical physics, S.Viswanathan & Co., Chennai.
4. Advanced Practical Physics, B.L.Worsnop and H.T.Flint, Khosla Publishers, Delhi

Core Course XV

19UPH646: ELECTRONICS AND COMPUTER SCIENCE

(Minimum 18 experiments to be done – 4 from Computer Science)

Course Outcome

- Ability to think critically and to use appropriate concepts to analyze qualitatively problems or situations involving the fundamental principles of physics especially the fields of optics, electricity, magnetism, electronics, computer programming etc
- Ability to use appropriate mathematical techniques and concepts to obtain quantitative solutions to problems in physics.
- Demonstrate basic experimental skills by the practice of setting up and conducting an experiment with due regards to minimizing measurement error.
- Demonstrate basic communication skills by working in groups on laboratory experiments and the thoughtful discussion and interpretation of data.
- Recognize and explain aspects of the application of the topics covered in this module in everyday life.

ELECTRONICS

1. PN junction Diode (Ge & Si) characteristics-To draw the characteristic curves of a PN junction diode and to determine its ac and dc forward resistances.
2. Full wave (centre tapped) rectifier-To construct a full wave rectifier using junction diode and to calculate the ripple factor with and without shunt filter (10 readings for RL 100 to 5000).
3. Full wave (centre tapped) rectifier-To construct a full wave rectifier using junction diode and to study effect of L,C, and LC filters on the ripple factor (for different RL).
4. Bridge rectifier-To construct a bridge rectifier using junction diodes and to calculate the ripple factor with and without shunt filter (10 readings for RL 100 to 5000).
5. Bridge rectifier- Dual power supply-To construct a dual power supply using bridge rectifier and measure the output voltages for different pair of identical load resistors.
6. Zener diode characteristics-To draw the I-V characteristic of a Zener diode and to find the break down voltage and the dynamic resistance of the diode.
7. Zener diode as a voltage regulator-To construct a voltage regulator using Zener diode and to study the output voltage variation (i) for different RL and (ii) for different input voltage with same RL.
8. Transistor characteristics-CE-To draw the characteristic curves of a transistor in the CE configuration and determine the current gain, input impedance and output impedance.
9. Transistor characteristics-CB-To draw the characteristic curves of a transistor in the CB configuration and determine the current gain, input impedance and output impedance.
10. Single stage CE amplifier-To construct a single stage CE transistor amplifier and study its frequency response.
11. OP amp. IC741- Inverting amplifier-To construct an inverting amplifier using IC741 and determine its voltage gain.
12. OP amp. IC741- Non inverting amplifier . To construct a non inverting amplifier using IC741 and determine its voltage gain.
13. OP amp. IC741- Differentiator-To construct an OP amp. Differentiator, determine its voltage gain and study the output response to pulse and square wave.
14. OP amp. IC741- Integrator-To construct an OP amp. Integrator, determine its voltage gain and study the output response to pulse and square wave.
15. Phase shift oscillator-To construct a phase shift oscillator using transistor and measure the frequency of the output waveform.
16. Logic gates- OR and AND-To verify the truth tables of OR and AND gates using diodes.
17. Logic gate- NOT-To verify the truth tables of NOT gate using a transistor.
18. Network theorems (Superposition, Thevenin's & Norton's theorems). To verify the (i) Superposition, (ii) Thevenin's & (iii) Norton's theorems
19. RC-Filter circuits (Low pass) To construct an RC –low pass filter circuit and to find the upper cut off frequency.

20. RC-Filter circuits (High pass)-To construct an RC –high pass filter circuit and to find the lower cut off frequency.

Computer Science (C++ Programs)

1. Program to find the roots of a quadratic equation (both real and imaginary root)
2. Program to find the dot product and cross product of vectors
3. Program to plot the functions Sin x, Tan x and ex
4. Program to find the matrix addition, multiplication, trace, transpose and inverse.
5. Program to convert hexadecimal to decimal number, decimal to hexadecimal number, binary to hexadecimal numbers and hexadecimal to binary numbers
6. Program to find the result of binary addition and subtraction.
7. Program to find the moment of inertia of regular bodies about various axes of rotation.
8. Program to find the velocity of a rolling body (without sliding) at any point in an inclined plane
9. Program to study the motion of a spherical body in a viscous fluid
10. Program to study the motion of projectile in central force field
11. Program to study the planetary motion and Kepler's law
12. Monte carlo simulation

References:

1. Basic electronics and linear circuits; N.N. Bhargava, D.C. Kulshreshtha, S.C.Gupta
2. OP- Amps and linear integrated circuits; Ramakant A. Gayakwad
3. Basic electronics; Santiram Kal
4. Basic electronics; B. L. Theraja
5. Principles of electronics; V. K. Mehta
6. A first course in Electronic s; Anwar A. Khan, Kanchan K. Dey