THE COCHIN COLLEGE

Koovapadam, Kochi-2

Affiliated To Mahatma Gandhi University
Re-accredited by NAAC With B+ Grade

**Fourth Cycle
NAAC Accreditation 2024**

Criterion 1
Curricular Aspects

1.1 - Curricular Planning and Implementation

Metric No. 1.1.1

The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment.

OBE Mapped Question Paper

Submitted to

National Assessment and Accreditation Council

DECLARATION

This is to certify that The Cochin College conducts internal examinations using OBE mapped question papers to ensure that course and programme outcomes are duly achieved. A sample of OBE mapped question papers are presented as proof.

MRUDULA MENON V.

Mrudula Menon V.
Principal-in-Charge
The Cochin College

OBE MAPPED QUESTION PAPERS

Outcome-Based Education (OBE) is a student-centric learning model that helps teachers to plan the course delivery and assessment with the end point in mind. As per OBE, each question in the internal tests allows the teacher to measure a particular Course outcome (CO) of student performance and hence the performance of students in each question must be monitored to measure the attainment of CO. While preparing question papers for exams, questions must be chosen based on their corresponding CO's weightage and must be mapped to their COs. This helps us to calculate the performance of a student for a CO. The internal assessment procedures of The Cochin College adopts OBE mapped question papers to ensure the attainment of course and programme outcomes.

Mrudula Menon V.
Principal-in-Charge
The Cochin College

THE COCHIN COLLEGE, KOCHI-2

First Internal Examination 2023-24

Programme Name: B.Sc Physics

Course Code:PH5CRT05	Course Title: Electricity and Electrodynamics	Semester: V

Faculty In Charge Dr. Manjusha M V, Ms. Alphonsa Rani T A	Max marks:30	Duration: 1.5 hours

Course Outcomes
CO1: Understanding electrical circuits
CO2: Knowledge of electromagnetic fields and forces
CO3: Understanding Maxwell's equations
CO4: Problem-solving and mathematical analysis

SECTION - A (Answer any 5 of the following. Each carries ONE marks)

1. Derive an expression for r.m.s value of an alternating current (2. Understand Outcomes Relevant:CO1)

2. What is meant by skin effect (1. Remember Outcomes Relevant:CO1)

3. Explain Q factor (2. Understand Outcomes Relevant:CO1)

4. Define solinoidal and irrotational vectors (1. Remember Outcomes Relevant: CO2)

5. Define Curl of a vector filed (2. Understand Outcomes Relevant: CO2)

6. What is the physical significance of divergence of a vector function? (2. Understand Outcomes Relevant :CO2)

SECTION - B (Answer any 3 of the following. Each carries 2 marks)

7. A coil of resistance 2 milli-henry and resistance 15 ohm is connected in parallel with a capacitance of 0.001µF. Find (a) the frequency at which the current from an a.c. source to this circuit is minimum, (b) the peak-value of ths make-up current if the peak value of supply voltage is 2 volts. (3. Apply Outcomes Relevant:CO4)

8. Deduce the equation for the e.m.f induced in a coil rotating in a uniform magnetic field (3. Apply Outcomes Relevant:CO1)

9. If $F= -y\,i + x\,j$ evaluate Curl F (3. Apply Outcomes Relevant: CO2)

10. If $F= 2xz^2 i -yzj+3xz^3 k$ find $V \times (V \times F)$ at the point (1,1,1) (3. Apply Outcomes Relevant: CO2)

SECTION - C (Answer any ONE of the following. Each carries 10 marks)

11. An alternating e.m.f is applied in a circuit containing an inductor, capacitor and resistor in series. Obtain the expressions for the current, impedance and phase of current. Obtain the condition for the current to be in resonance with the applied e.m.f. Obtain the resonant frequency (Outcomes Relevant:CO1)

12. Explain the divergence of a vector field. If $A = 3x^2 i + 5xy^2 j + xyz^2 k$ find DEL.A at the point (1,2,3) (3. Apply Outcomes Relevant: CO2)

THE COCHIN COLLEGE, KOCHI-2

Second Internal Examination 2023-24

Programme Name: B.Sc Physics

Course Code:PH5CRT05	Course Title:Electricity and Electrodynamics	Semester:V

Faculty In Charge Dr. Manjusha M V, Ms. Alphonsa Rani T A	Max marks:30	Duration: 1.5 hours

Course Outcomes
CO1:Understanding electrical circuits
CO2:Knowledge of electromagnetic fields and forces
CO3:Problem-solving and mathematical analysis

SECTION - A (Answer any 5 of the following. Each carries ONE marks)

1. State and explain Thevenin's theorem (1. Remember Outcomes Relevant:CO1)

2. When a LCR circuit is said to be critically damped? (3. Apply Outcomes Relevant:CO1)

3. The Peltier effect is the inverse of the Seebeck effect. Explain(2. Understand Outcomes Relevant:CO1)

4. Obtain Poisson equation from Gauss law.. Write down it's unit. (1. Remember Outcomes Relevant:CO2)

5. What is the Lorentz force? Write down the relation. (2. Understand Outcomes Relevant: CO2)

6. Define electric potential. What is its unit. (2. Understand Outcomes Relevant CO2:)

SECTION - B (Answer any 3 of the following. Each carries 5 marks)

7. In an LCR circuit C=0.2μF, L= 0.05H and R=100Ω. Check whether it is oscillatory or not. Calculate the frequency of the circuit. (3. Apply Outcomes Relevant:CO3)

8. A generator develops 200V and has an internal resistance of 100Ω. Find the power delivered to a load of (i) 100Ω (ii) 300 Ω also find their efficiencies.(3. Apply Outcomes Relevant:CO1)

9. Derive integral and differential form of Gauss law(3. Apply Outcomes Relevant:CO2)

10. State and explain in detail Ampere circuital theorem. (3. Apply Outcomes Relevant: CO2)

SECTION - C (Answer any ONE of the following. Each carries 10 marks)

11. Discuss the LCR parallel resonant circuit in detail (Outcomes Relevant:CO1)

12. State and explain Biot-Savart law. Find the magnetic field due to a straight conductor carrying current (Outcomes Relevant:CO2)

THE COCHIN COLLEGE, KOCHI-2

First Internal Examination September 2023

Programme Name: B.Sc. Physics

Course Code:PH3CRT03	Course Title: Optics, Laser and Fiber Optics	Semester:3

Faculty In Charge: Dr.Manjusha M V Dr.Sathyanarayanan K	Max marks:30	Duration: 1.5 h

Course Outcomes
CO1: **Understanding the principles of optics**
CO2: **Knowledge of optical instruments**
CO3: **Understanding laser technology**
CO4: **Familiarity with Fiber optics**

SECTION - A (Answer any Five of the following. Each carry ONE marks)

1. What is stimulated emission (1. Remember Outcomes Relevant:CO3)
2. What is population inversion (2. Understand Outcomes Relevant:CO3)
3. What is an active medium (2. Understand Outcomes Relevant:CO3)
4. What is coherence length and coherence time (1. Remember Outcomes Relevant:CO3)
5. Explain superposition principle of waves (2. Understand Outcomes Relevant: CO1)
6. What do you mean by polarisation of light waves? (2. Understand Outcomes Relevant: CO1)

SECTION - B (Answer any THREE of the following. Each carry FIVE marks)

7. A mercury lamp has a band width of 1000MHz. Calculate the coherence length and coherence time of its light (3. Apply Outcomes Relevant:CO3)
8. A typical He-Ne laser emits radiation of wavelength 632.8nm. How many photons per second would be emitted by a one milliwatt He-Ne laser? (3. Apply Outcomes Relevant:CO3)
9. What is Einstein's coefficient? Show that the Einstein Coefficient for stimulated emission and absorption are equal. (2. Understand Outcomes Relevant:CO3)
10. Explain the term coherence in optics (2. Understand Outcomes Relevant: CO1)

SECTION - C (Answer any ONE of the following. Each carry TEN marks)

11. With a neat schematic, explain the construction and working of a ruby laser. What are its limitations? (2. Understand Outcomes Relevant:CO3)
12. What is population inversion? With suitable examples explain different methods for achieving population inversion in laser systems. (1. Remember Outcomes Relevant:CO3)

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THE COCHIN COLLEGE
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THE COCHIN COLLEGE, KOCHI-2

First Internal Examination September 2023

Programme Name: B.Sc Chemistry

Course Code:PH1CMT02	Course Title: Properties of Matter and Thermodynamics	Semester: First
Faculty In Charge: Alphonsa Rani T.A, Greeshma Mohan	Max marks:30	Duration: 1.5 Hrs

Course Outcomes
CO1: Understand the physical, chemical properties and the states of matter.
CO2: Explain and measure the properties of solids and illustrate the use of material with their properties.
CO3: Develop and solve problems involving the following concepts
CO4: Hooke's Law and other stress-strain laws, Determination of rigidity modulus, Uniform and Non- uniform bending I Section girder Construct an idea of properties of liquids and explain different phenomena associated with it.
CO5: Understand and analyse fluid mechanics, exploring the concepts of surface tension, viscosity, Poiseuille's Law and Bernoulli's Equation.
CO6: Develop a strong foundation in the basic concepts of thermodynamics, the laws and its implications in various thermodynamic processes. And analyse heat engines.

SECTION - A (Answer any five of the following. Each carries one marks)

1 Define stress. Give its unit. (1. Remember Outcomes Relevant:CO1)

2.Different types of modulus of elasticity. (1. Remember Outcomes Relevant:CO1)

3 What is meant by the term elastic limit? (2. Understand Outcomes Relevant: CO1)

4.State Hooke's law. (2. Understand Outcomes Relevant:CO1)

5.Define isothermal process. (1. Remember Outcomes Relevant: CO6)

6.State first law of thermodynamics. (2. Understand Outcomes Relevant: CO6)

SECTION - B (Answer any three of the following. Each carries five marks)

7.Illustrate stress strain graph of a metallic wire (1. Remember Outcomes Relevant:CO1)

8.The length of the suspended wire increases by1/10000 of its original length when a stress of 10 to the power of 7 N/M2 is applied on it. Calculate the youngs modulus (5. Evaluate Outcomes Relevant: CO1)

9.Explain briefly on Carnot engine. (4. Analyze Outcomes Relevant:CO6)

10.A certain quantity of air is adiabatically compressed so that its pressure increases from 1 atmosphere to 150 atmosphere if the initial temperature of air is 27°C. Calculate (i) Rise in temperature and (ii) the work done (r of air 1.4) (3. Apply Outcomes Relevant: CO6)

SECTION - C (Answer any one of the following. Each carry ten marks)

11.Determine the workdone per unit volume when a body undergoes linear, volume and shear strain (2. Understand Outcomes Relevant:CO1)

12.Explain Isothermal process. Derive the work done for an isothermal process and provide graph.(4. Analyze Outcomes Relevant: CO6)