

Reg. No.:



Name:

University of Kerala

U8787

Second Semester FYUGP Degree Examination, April 2025

Discipline Specific Core Course

PHYSICS

UK2DSCPHY101 - Electricity, Magnetism and Acoustics

Academic Level: 100-199

Time: 1 Hour 30 Minutes(90 Mins.)

Max. Marks: 42

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

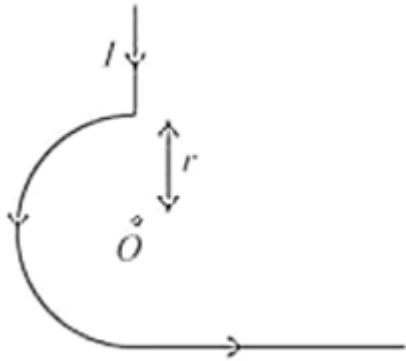
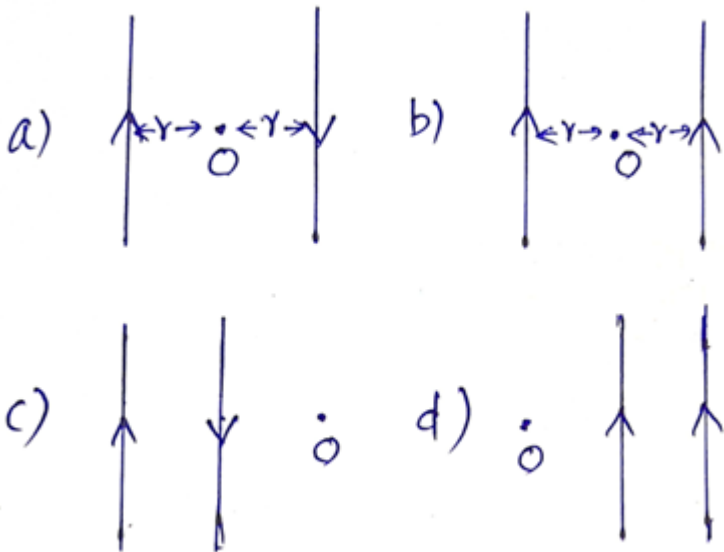
Qn No.	Question	CL	CO
1	Recall Biot Savart law.	RE	2
2	State Gauss's law.	RE	1
3	Explain the significance of the Gaussian surface in Gauss's theorem	UN	1
4	Explain an inductor and its role in a circuit	UN	4
5	Describe whether Peltier effect depends upon direction of current	UN	3
6	Explain the relation connecting M,B and H	UN	2

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Explain thermoelectricity.	UN	3
8	Magnetic force acting on a moving charged particle is perpendicular to its displacement. Why?	UN	2
9	Calculate the magnetic field at a point 0.05 meters away from a straight conductor carrying a current of 3 A	AP	2
10	What happens to the resistance and resistivity of a metal wire when its length is doubled without changing the area of cross section	AP	1

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) A uniformly charged insulating sphere of radius R carries a total charge Q distributed evenly throughout its volume. Using Gauss's law, determine the electric field intensity at the following points: 1. Outside the sphere ($r > R$) 2. Inside the sphere ($r < R$) 3. On the surface of the sphere ($r = R$)	AP	1, 1

Qn No.	Question	CL	CO
	OR B) Derive the relationship between electric potential and electric field. Using this relationship, analyze the equipotential surfaces around a point charge. How does the electric field behave about these surfaces?		
12	A) Deduce the equation for magnetic induction at O due to the conductor carrying current i as shown in figure.  OR B) Investigate how the introduction of a conductive material near a uniformly charged spherical conductor affects the distribution of equipotential surfaces in the surrounding space.	AN	2, 1
13	A) Appraise the role of Maxwell's equations in modern electromagnetism. OR B) Two equal and parallel conducting wires carry a current of I.  Choose the correct figure in which magnetic induction at 'O' is zero by giving a proper explanation for each figure.	EV	2, 2
14	A) Create an experimental setup to analyse AC through a capacitance and resistance in series. Derive the expression for the instantaneous value of current and phase angle. OR B)	CR	4, 1

Qn No.	Question	CL	CO
	Design a series RC circuit that will serve as a high-pass filter with a cutoff frequency of 1 kHz. Specify the values of the resistor and capacitor, and justify your choices. Additionally, explain how this circuit can be used to filter out low-frequency noise from an audio signal.		