

Reg. No.:



Name:

University of Kerala

U8994

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 the relationship between electric current and the magnetic field it produces	RE	2
2	Identify the shape of the Gaussian surface of point charge.	RE	1
3	Describe the condition for the electric flux through a closed surface to be zero	UN	1
4	Outline resonance in an AC circuit.	UN	4
5	Explain whether Thomson coefficient is a constant for a given metal	UN	3
6	Discuss what will happen to the magnetic field's strength if the current through a solenoid is increased	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	Describe Thomson coefficient based on its basic equation.	UN	3
8	Write a comparison between Coulomb's law and Biot-Savart's law.	UN	2
9	A solenoid of length 0.2 m contains 1000 turns and is filled with a material of relative permeability 500. Apply the formula for magnetic permeability to find the magnetic field strength when a current of 3 A is passed through it.	AP	2
10	A conductor carries a current of 2 A. Calculate the amount of charge passing through a cross-sectional area of the conductor in 5 seconds.	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) Determine the equation for the magnetic field induction at a point due to current carrying straight conductor by applying Biot-Savart's law. OR B) Use Gauss's law to determine the electric field intensity due to a uniformly charged sphere.	AP	2, 2
12	A) Describe the procedure, equipment required, and how you would apply the Biot-Savart law to analyze the experimental results. OR B) Differentiate between the electric field of a point charge and that of a charged sphere.	AN	2, 1
13	A) Evaluate how an increase in temperature affects the resistivity of a metallic conductor and the resulting current density when a constant voltage is applied. OR	EV	1, 2

Qn No.	Question	CL	CO
	B) Evaluate the expression for magnetic field inside a long solenoid carrying current using Ampere's circuital law		
14	A) Design an AC circuit with inductance and capacitance in series and obtain the equation for resonance. OR B) Design an ac circuit containing capacitance only. Obtain expression for current and voltage using operator method.	CR	4, 4