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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Mid Examination, Spring 2025

Course Code: PHY102, Course Title: Physics II

Level: 1 Term: 2 Batch: 67

Time: 01:30 Hrs. **Marks: 25**

Answer ALL the Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	*a)*	Recall the concept of potential in an electric field.	1	CO1
	b)	Draw the circuit connection between a galvanometer and a shunt.	1	
	c)	Define the conductivity of conducting material.	1	
	d)	Describe the Lorentz force with its components.	1	
	e)	State Faraday's law of induction.	1	
2.	*a)*	Explain how Coulomb's law can be derived from Gauss's law.	3	CO2
	b)	Construct an expression for magnetic induction at a point due to a long straight wire carrying current.	3	
	c)	You found a capacitor in the physics lab that looks like a tennis ball. Discover the exact equation for the capacitance of this capacitor and hence show that it depends only on the radius of the capacitor in a fixed medium.	4	
3.	*a)*	The values of two-point charges are +5C and +3C, respectively. They are situated 2 cm apart. At which point on the line joining them will the electric field intensity be zero?	2.5	CO3
	b)	What shunt resistance is to be added to a galvanometer of resistance of 20 Ω so that 10 % of total current flows through the galvanometer?	2.5	
	c)	If an electron moves at a velocity of 10^5 m/s in a uniform magnetic field of 0.5 Tesla making an angle of 60° with the field, compute the magnetic force acting on the electron.	2.5	
	d)	Two concentric circular coils have radii 8cm and 10cm, with 40 and 10 turns, respectively. A current of 5A flows through each coil in the same direction. Calculate the magnetic field *in Gauss* at the center of the coils.	2.5	