

International Islamic University Chittagong (IIUC)

Department of Computer and Communication Engineering

Midterm Examination

Program: **B.Sc (Engg.) in CCE**
 Course Code: **PHY-1101**
 Total Marks: **30**

Semester: **Spring 2023**
 Course Title: **Physics I (Mechanics, Waves, Optics, Heat & Thermodynamics)**
 Time: **1 Hour 30 Minutes**

- (i) Answer all the questions. The figures in the right-hand margin indicate full marks.
 (ii) Course Learning Outcomes (CLOs) and Bloom's Levels are mentioned in additional Columns.

Course Learning Outcomes (CLOs) of the Questions

- CLO1** Understand the concepts of Electricity and Magnetism, and basic circuit Laws for Electricity and Magnetism.
CLO2 Use various laws to analysis the circuits, problems.

Bloom's Levels of the Questions

Letter Symbols Meaning	Bloom's Levels of the Questions					
	R Remember	U Understand	Ap Apply	An Analyze	E Evaluate	C Create
1. a) Elaborate your understanding on "moment of inertia".					3	U CO1
b) Derive an expression for moment of inertia of a fly wheel about its axis of rotation.					5	An CO1
c) Evaluate the moment of inertia of a body of mass 1.2kg rotating about an axis passing through a point 10 cm away from the center of mass. Consider K= 13 cm.					2	Ap CO2
2. a) Explain gravitational potential in brief.					2	U CO1
b) Derive the expression for gravitational potential at any point on the surface of a spherical shell.					6	An CO1
c) A compound pendulum oscillates with a time period of 1.52 sec, when suspended by a pivot at a distance 10 cm from the center of mass. Calculate the value of radius of gyration, K.					2	Ap CO2
3. a) Discuss shortly on "normal stress" and "shearing stress".					2	R CO1
b) Work done per unit volume = $\frac{1}{2} \times \text{stress} \times \text{strain}$. Prove this statement.					5	An CO1
c) Sketch the "stress-strain diagram" and discuss in brief.					3	An CO2
Or,						
3. a) Illustrate your understanding on "beam".					2	U CO1
b) Derive the expression $K = \frac{1}{3(\alpha-2\beta)}$, where the symbols have their usual meaning.					6	An CO1
c) Estimate the Young's modulus of a wire of length 2m and radius 0.5 mm, when the wire is stretched by 3mm due to a load 5kg applied to its bottom.					2	Ap CO2