

International Islamic University Chittagong

Department of Computer Science and Engineering

B. Sc. in CSE

Mid-Term Examination, Autumn-2023

Course Title: **Physics-I**

Course Code: **PHY 1101**

Time: 1 hour 30 minutes

Full Marks: 30

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

Course Outcomes (COs) of the Questions	
CO1	Understand the basic knowledge of mechanics, optics and thermodynamics in the context of engineering.
CO2	Apply mathematical knowledge of mechanics, optics and thermodynamics to formulate and solve basic engineering problems.

Bloom's Levels of the Questions						
Letter Symbols	R	U	App	An	E	C
Meaning	Remember	Understand	Apply	Analyze	Evaluate	Create

- | | | | | |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|---|
| 1. | a) Define center of mass and moment of inertia. | CO1 | R | 2 |
| | b) Find the expression for the rotational kinetic energy of a rotating body. | CO1 | U | 5 |
| | c) A circular disc of mass 100 grams and radius 10 cm is making 120 rpm about an axis passing through its centre and perpendicular to its plane, Calculate its kinetic energy. | CO2 | An | 3 |
| | | | | |
| 2. | a) What is gravitational potential? | CO1 | R | 1 |
| | b) Derive an expression for gravitational potential due to spherical shell at a point outside shell. | | | |
| | Or | CO1 | U | 6 |
| | State and prove the theorem of perpendicular and parallel axes in momentum of inertia. | | | |
| | c) If an object of mass 5 kg is situated at a distance 100 cm from the center of a sphere of radius 110 cm. Determine the value of gravitational potential. | | | |
| | Or | | | |
| | Calculate the gravitational force of attraction between two metal spheres each of mass 90 kg, if the distance between their centres is 40 cm. Given $G = 6.67 \times 10^{-11} \text{ N m}^2/\text{kg}^2$. Will the force of attraction be different if the same bodies are taken on the moon, their separation remaining the same. | CO2 | An | 3 |
| | | | | |
| 3. | a) What is Wave Function? | CO1 | R | 1 |
| | b) Derive an expression of time independent Schrodinger wave equation. | CO1 | U | 6 |
| | c) An electron has a speed of $2 \times 10^4 \text{ cm/Sec}$ accurate to 0.01%. With what fundamental accuracy can we locate the position of this electron? | CO2 | An | 3 |