International Islamic University Chittagong (IIUC)
Department of Electronic and Telecommunication Engineering
Mid-Term Examination

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

Semester: Autumn 2023
Course Title: Physics - I
Time-1.5 Hours

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

Course Outcomes (COs) of the Questions	
CLO1	Demonstrate an understanding of mechanics, waves, optics, heat and thermodynamics
CLO2	Apply basic physics laws and formulae to complex cases like; Fly wheel, Elastic bending, forced oscillation, Compound Pendulum, Heat engine, Polarization etc.

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

1. a)	Illustrate your understanding on "moment of inertia."	2	U	CO1
b)	State and prove the conservation theorem of momentum.	6	U	CO1
c)	Discuss the parallel axes theorem of moment of inertia with example.	2	Ap	CO2
2. a)	Interpret "escape velocity" in your words.	2	U	CO1
b)	Derive an expression for time period of a compound pendulum of any shape.	6	An	CO1
c)	Estimate the gravitational potential at a distance 20 cm from a hollow spherical shell of mass 120 gm.	2	Ap	CO2
3. a)	Discuss shortly on "beam" with proper figure.	2	U	CO1
b)	Derive the expression $y = \frac{WL^3}{3YI_g}$, where the symbols have their usual meanings.	7	An	CO1
c)	A rectangular shaped cantilever is loaded at the free end with 2Kg weight. The bending is pure at the middle section of the beam. If the breadth and width of the beam is 3 cm and 2 cm respectively, determine the geometrical moment of inertia of the beam.	1	Ap	CO2

Or

3.a)	Interpret your idea about "Poison's ratio".	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)	A 2 kg weight is applied tangentially at the surface of an elastic cube due to which its shape changed by an angle 5 degree. Find the modulus of rigidity.	2	Ap	CO2