International Islamic University Chittagong (IIUC)

Department of Electronic and Telecommunication Engineering

Mid-Term Examination

Program: B.Sc. (Engg.) | **Semester: Autumn 2022**
Course Code: PHY-1101 | **Course Title: Physics - I**
Total Marks: 30 | **Time-1.5 Hours**

1	Illustrate your understanding on "moment of inertia."	2	U	CO1
	Formulate an expression for the moment of inertia of a fly-wheel about its axis of rotation	5	R, U	CO1
	Estimate the moment of inertia of a flywheel due to a suspended load of 3kg that is wound by a rope with the axle of the wheel. The load was allowed to fall from a height of 101 cm that rotated the wheel by 18 rotations and the wheel rotated 57 times after the load detached the wheel and stopped at 17 seconds. Consider the radius of the axle of the wheel is 1.1 cm.	3	E, Ap	CO2
2. a)	Explain gravitational potential with necessary figure.	1.5	U	CO1
b)	"Gravitational potential inside any point of a hollow spherical shell is constant", justify this statement.	7	An, Ap	CO1
c)	Determine the time period of a compound pendulum which is oscillating about a point 14 cm away from its center of mass. Consider k = 12.5 cm.	1.5	E, Ap	CO2
3. a)	Discuss shortly on "stress" and its types in case of elasticity.	3	R,U	CO1
b)	Develop a simple relation between work done per unit volume of an elastic material with stress and strain, in case of linear strain.	4	An	CO1
c)	A steel wire of length 2m and diameter 2.4 mm is suspended from a ceiling. The wire gets elongated by 5mm due to a 3Kg load applied at the free end. Determine the Young's modulus of the material of the wire.	3	E, Ap	CO2
	Interpret your idea about "beam".	2	R, U	CO1
	Derive the expression $K = \frac{1}{3(\alpha - 2\beta)}$, where the symbols have their usual meaning.	6	An	CO1
c)	Determine the limiting values of Poisson's ratio.	2	An	CO2