

International Islamic University Chittagong (IIUC)

Department of Electronic and Telecommunication Engineering

Final Examination

Program: **B.sc (Engg.)**
 Course Code: **PHY-1101**
 Total Marks: **50**

Semester: **Spring 2023**
 Course Title: **Physics - I**
 Time: **2 Hours 30 Minutes**

(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	Analyse	Evaluate	Create

PART A						
Q1.	a)	Explain your idea on surface energy.	CLO1	R	1	
	b)	Prove that surface tension can be considered as free energy of the liquid surface.	CLO2	An	6	
	c)	The Surface energy of a soap film is 20 joules and surface tension is $2.2 \times 10^{-3} \text{ Nm}^{-1}$. Calculate the heat lost by the film due to surface tension.	CLO2	Ap	3	
Q2.	a)	Illustrate your idea on viscosity	CLO1	R	2	
	b)	Derive the relation $p + \frac{1}{2} \rho v^2 = C$, where the symbols hold corresponding meanings.	CLO2	An	6	
	c)	The value of dynamic pressure is 18 Nm^{-2} if a liquid is flowing through a horizontal pipeline with a velocity 66 ms^{-1} . Find the density of the liquid.	CLO2	Ap	2	
OR						
Q2.	a)	Explain critical velocity.	CLO1	U	2	
	b)	Determine the equation of coefficient of viscosity from Stokes' formula.	CLO2	An	6	
	c)	A fluid of density 1000 Kgm^{-3} is flowing through a narrow pipeline of inner radius 1.1 cm. If the value of coefficient of viscosity of the fluid is 140, determine the value of critical velocity.	CLO2	Ap	2	
PART B						
Q3.	a)	Illustrate your idea on phase of a wave.	CLO1	U	2	
	b)	Prove that oscillation of a weightless spring can be treated as simple harmonic motion.	CLO2	An	6	
	c)	A particle of mass 2gm is oscillating in simple harmonic motion. If the force constant of the medium is 14 and the amplitude of oscillation is 2 cm, determine the energy applied on the particle.	CLO2	Ap	2	
Q4.	a)	What do you understand by thermodynamic system? Depending on interaction with boundary, how many types of systems are possible?	CLO1	R	1+1	
	b)	Explain zeroth law of thermodynamics.	CLO1	R	2	

	c)	State isothermal process with necessary figure and equations.	CLO1	An	4
	d)	A Carnot engine has efficiency 33%, it's temperature at source is 120^0 C. Find the temperature of the sink.	CLO2	Ap	2
OR					
Q4.	a)	Explain a heat engine with block diagram.	CLO1	R	2
	b)	Prove that Carnot heat engine is perfectly reversible.	CLO2	An	8
Q5.	a)	Explain interference of light, in your words.	CLO1	R	2
	b)	Prove that energy is conserved during interference of light.	CLO2	An	6
	c)	Mention some differences between Fresnel and Fraunhofer diffraction.	CLO1	U	2