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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Final Examination, Summer-2025

Course Code: PHY101, Course Title: Physics I

Level: 1 Term: 2 Batch: 68

Time: 2 Hour **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a)	Recall the concept of Polarization of light.	1	CO1
	b)	State Fermat's Principle.	1	
	c)	Explain the postulates of Kinetic theory of gas.	2	
	d)	Write down difference between isothermal and adiabatic process.	2	
	e)	Tell the concept of entropy and its significance.	2	
	f)	Define critical angle and total internal reflection with diagram.	2	
2.	a)	Explain the relation between pressure and volume of a gas in adiabatic change (PV^{γ} = constant).	4	CO2
	b)	Demonstrate to the entropy change in reversible and irreversible process.	4	
	c)	Show the theory of interference fringes for Young's Double slit experiment.	4	
	d)	Explain with the aid of a diagram, how optical fibers are constructed and operated based principle of total internal reflection?	3	
3.	a)	In a sound interference experiment, the distance between two consecutive bright fringes is 12 mm on a screen placed 250 cm away. If the wavelength of the sound is 3.4 cm, find the separation between the slits.	3	CO3
	b)	The specific rotation of a solution is 65°. When the solution was placed in a polarimeter tube 120 cm long, the observed rotation was 19°. Calculate the concentration of the solution?	3	
	c)	A sample of gas at 57°C is suddenly expanded to one-third of its original volume in an insulated cylinder. Assuming the process is adiabatic and γ=1.33, what is the final temperature of the gas?	3	
	d)	The efficiency of a Carnot refrigerator is 50% when the cold reservoir (sink) is at 17°C. What must be the change in the hot reservoir (source) temperature (in °C) to increase the efficiency to 70%?	3	
	e)	0.5 kg of water at 70 °C is converted into steam at 100 °C. Find the change in entropy. The latent heat of vaporization of water is 2.26×10^6 J/kg.	3	

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