Total number of printed pages: **Programme (Diploma)/II/DPH-206**

2022

APPLIED PHYSICS-II

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) State the two laws of refraction. 2

   b) Define: Refractive index, Critical Angle, Total Internal Reflection, Minimum deviation. 1 × 4 = 4

   c) Show that the refractive index of a prism is given by $n = \frac{\sin\left[\left(A+\delta_m\right)/2\right]}{\sin\left(A/2\right)}$, where n is the refractive index of prism, A is the angle of prism and D_m is the minimum deviation. Define Minimum deviation. 8

   d) A small candle, 2.5cm in size is placed at 27cm in front of a concave mirror of radius of curvature 36cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image? What is the nature and size of the image? 6

2. a) Write the differences between natural and artificial magnet. 2

   b) State and write the expression of the Inverse law in magnetism? 2+2 = 4

   c) Obtain the expression of magnetic field induction due to a bar magnet at a point on the end-on position or on the broad side on position? 8

   d) Two poles of 30 and 40 units of strength are 20 cm apart in air. What will be the force acting between them in SI unit? 6

3. a) Write few properties of electric lines of force. 2

   b) Define: Coulomb, Electric field intensity, Electric Potential, Capacitance, 1 × 4 = 4

   c) Obtain the expression for equivalent capacitance of combination of a number of capacitors combined in (i) Series and (ii) in parallel. 8

   d) Find the equivalent capacity of three capacitors 400µF, 3.3µF and 47µF are connected in (a) in series (b) in parallel. 6

4. a) Define: Current, Electromotive force, resistivity, Conductivity. 1 × 4 = 4

	b)	Write few differences between Primary and Secondary cell.	2
	c)	What do mean by local action and polarization in Simple voltaic cells? How can they be removed?	6
	d)	Find the equivalent resistance of combination of the three resistances 2Ω, 6Ω, 8Ω are in (i) series and (ii)n parallel.	4
	e)	A 100 W electric light bulb is connected to a 250 V supply. Determine (i) the current flowing in the bulb, and (ii) the resistance of the bulb.	4
5.	a)	Define self and mutual induction.	4
	b)	What is electromagnetic induction? State the laws of electromagnetic induction.	2+4=6
	c)	State Lenz's law. Explain the statement 'Lenz's law in accordance with law of conservation of energy'.	4
	d)	What is the effect of current flowing two parallel conductors?	4
6.	a)	What is photoelectric effect?	2
	b)	Write the Einstein's Photoelectric equation. Define the threshold frequency, Work function and stopping potential.	2+3 = 5
	c)	Define: atomic mass unit, mass-energy equivalence, mass defect, electron volt(eV).	8
	d)	What are X-rays. Mention some of its properties and applications.	5
7.	a)	Explain about intrinsic and extrinsic semi-conductor.	4
	b)	Explain about the n-type and p-type semiconductors with examples.	8
	c)	What is the difference between diode and triode? Explain how can a diode be used as rectifier.	2+6 = 8