Programme: Diploma (D)/Semester-II/Paper Code: DPH206

2023

SUBJECT NAME: Applied Physics – II (Theory)

Full Marks: 100

Time: Three hours

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

Answer any five questions.

1.	a)	Explain of refraction of light with diagram. Mention the two laws of refraction.	3 + 2 = 5
	b)	Draw ray diagrams of the formation of images due to a convex lens for an object placed at various positions between pole and infinity.	10
	c)	A 4.5 cm needle is placed 12 cm away from a convex mirror of focal length 15 cm. Find the location, nature, magnification and size of the image formed.	5
2.	a)	What is refractive index of a material? Does refractive index depend on the colour of light? Explain.	2+2 = 4
	b)	Define Critical angle and total internal reflection with ray diagram.	4
	c)	Write short notes on: (i) Mirage (ii) Looming	3+3 =6
	d)	Define Power of a lens. What is its unit? Calculate the power of a rear view mirror used in a car whose focal length is 500cm.	2+1+3=6
3.	a)	Mention few properties of electric lines of force.	3
	b)	State and obtain the mathematical expression for Coulomb's inverse square law in electrostatics in C. G. S and S. I. units.	2+5 = 7
	c)	Define electric field intensity and electric potential. Give their S. I. units.	4
	d)	Calculate the electric field intensity and electric potential due to an isolated charge of 100 C at a point at a distance of 10cm from it.	3+3 = 6
4.	a)	Define electric current? What is its S. I. unit? How many electrons moves through the cross-section of a wire if a current of 10A flows through it for 2 sec.	2+2=4

	b)	State two differences between the Primary and Secondary Cell.	2
	c)	What are reasons of local action and polarization in a cell? What are remedies for their removal?	2+2 = 4
	d)	Calculate the equivalent resistance of the three resistors 5Ω, 10 Ω and 15 Ω connected in (i) series and (ii) parallel.	3+3 = 6
	e)	State Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL).	4
5.	a)	What is the comparison between a natural magnet and an artificial magnet?	4
	b)	Discuss the elements of Terrestrial Magnetism	10
	c)	What do you mean by the magnetic effect of current? State Fleming's Right Hand Rule. If current passes through parallel conductor along same direction, what would happen to them, explain?	2+2+2=6
6.	a)	Define threshold frequency and work function of a metal.	2+3=5
	b)	State Einstein's photoelectric equation.	5
	c)	Define mass defect and binding energy.	2+3=5
	d)	How much energy can be obtained in MeV in expense of 1amu? Find out the atomic and mass number of $_{92}U^{238}$ & $_{56}Ba^{144}$	1+4=5
7.	a)	What do you mean by thermionic emission? Explain the working of a thermionic valve.	2+3=5
	b)	What do you mean by rectification of wave? Which thermionic valve is used as rectifier, explain.	2+3=5
	c)	Discuss conductor, semiconductor and insulator on the basis of band diagram.	5
	d)	Write the difference between p-type and n-type semiconductor.	5