

P. R. Thakur Govt. College

Department of Physics

B.Sc. Semester-VI Internal Examination, 2024

Paper – **PHSACOR13T**

Electromagnetic Theory

Time: 1 Hour

Full Marks: 20

1. Answer any five questions from the following:

2×5=10

- (a) Explain the concept of displacement current.
- (b) What are positive and negative crystals?
- (c) Find out the dimension of Poynting Vector.
- (d) Show that for electromagnetic waves in free space, energy is equally shared between electric and magnetic fields.
- (e) How can you convert a left-handed circularly polarized light into a right-handed circularly polarized light?
- (f) Show that for a good conductor skin depth $\delta = \lambda/2\pi$, where λ is the wavelength of electromagnetic waves in the conductor.
- (g) Calculate the thickness of half-wave plate for sodium light of wavelength 589.3 nm.
Given $n_o = 1.5442$ and $n_e = 1.5533$.

2. Answer any two questions from the following:

5×2=10

- (a) What do you mean by O-ray and E-ray? Explain the operation of a Laurent half-shade polarimeter to find the concentration of sugar solution. 2+3
- (b) State and explain Brewster's law. Find the refractive index of glass, if the Brewster angle for light of a given wavelength be 60° . Find the corresponding angle of refraction. 3+2
- (c) State and explain Malus's law. How one can get plane polarised light using double refraction in a crystal? 2+3
- (d) State Poynting's theorem. Write Fresnel's theory of rotation of the plane of polarisation by an optically active substance. 1+4