

Bachelor of Computer Application (BCA) Examination
II Semester

Physics-II

Time : 3 Hours]

[Max. Marks : 40

Note: Attempt all the five questions. Solve any two parts from each question. All questions carry equal marks.

1. (a) How are the electromagnetic waves produced? Write down the basic concepts of electromagnetic wave propagation.
- (b) What is Ionosphere? Discuss the role of ionosphere in reflection and refraction of electromagnetic waves.
- (d) Show that the skip distance for a frequency f is expressed as :

$$D = 2h \sqrt{\frac{f^2}{f_c^2} - 1}$$

where symbols have their usual meanings.

2. (a) What do you mean by Interference? Give its analytical treatment.
- (b) Discuss the interference of light in a thin parallel film and explain it with proper theory.
- (c) Explain the Michelson's Interferrometer with neat and labelled diagram.
3. (a) What is meant by Diffraction? How many kinds it have? Explain each of them.
- (b) What is meant by Zone Plate? How is it constructed? Show that a zone plate behaves like a convex lens.
- (c) Explain the construction and principle of a plane transmission grating and explain the formation of spectrum by it.
4. (a) What do you mean by Polarization of Light? Discuss Huygen's Theory of Double Refraction.
- (b) For Na light of wavelength 5893 \AA , calculate the thickness of quartz for (i) quarter wave plate (ii) half wave plate.
Given : $\mu_e = 1.5533$ and $\mu_o = 1.5442$.

- (c) A tube of length of 20 cm filled with a sugar solution is placed in between the two crossed nicols and illuminated with a light of wavelength 6000 \AA . If specific rotation of sugar is $65 \text{ cm}^3/\text{g}$ decimetre and the angle of rotation produced by the solution in the tube is 13° , find the percentage of sugar in solution.
5. (a) What do you mean by Doppler's effect of light? Give its applications also.
- (b) What do you mean by LASER? Discuss the concepts of coherence and hence describe spatial and temporal coherence.
- (c) Calculate the coherence length and coherence time for 20 waves of light of wavelength 6600 \AA .

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