davv bca question papers

May 2004

Bachelor of Computer Application (BCA) Examination

II semester

Physics –II

Time 3 Hours   [Max. Marks 50]

Note : *Attempt al five questions. Each question carries equal marks and has internal choice. Objective type questions are compulsory.*

1   (a)   Describe electromagnetic waveguide in detail. What do you mean by the cut off frequency?

OR

Explain the mechanism of reflection of electromagnetic waves from the ionosphere layers. Hence explain the critical frequency of ionosphere layer and skip distance.

(b)   Answer the following :

(i)   Phase velocity of electromagnetic radiation in a waveguide can never be greater than the velocity of light (true/false)

(ii)   The ions present in the ionosphere are only the positive ions (True/False)

2   Solve any two

(a)   Discuss the formation of colures in thin films and show that with monochromatic light, the interference patterns of reflected and transmitted light are complementary.

(b)   Explain how Newton's rings are formed and describe the method for determination of wavelength of light with their use.

(c)   Describe Michelson interferometer and explain the formation of fringes in it. How this can be used for measuring the wavelength of monochromatic light ?

3   (a)   What is a plane diffraction grating? Describe how would you employ it for determining the wavelength of light? Deduce in expression for its dispersive power.

(b) ·   A parallel beam of sodium light is allowed to be incident normally on a plane grating having 4250 lines per cm and a second order spectral order spectral line is observed to be deviated through $30°$ Calculate the wavelength of spectral line.

OR

(a)   What is a zone plate and how is it made? Explain how a zone plate acts like a convergent lens having multiple foci. Deduce the expression for its focal length.

(b) Find the radii of the first three transparent zones of a zone plate whose first focal length is one meter for $\lambda = 5893$ A.

4. (a) Explain what do you mean by polarisation of light? What is a Nicol Prism? How it can be used as a polariser or as an analyser?

OR

What is optical activity? Discuss Fresnel's theory of optical rotation.

(b) Answer the following :

I. Polarisation of light conclusively proves that light waves are transverse (True/False)

II. The substance that rotate the plane of polarization are said to be optically active (true/false)

5 (a) What is Doppler effect? Calculate the change in wavelength when the source is moving away from a stationary observer. Discuss some of its applications.

OR

What do you mean by lasers? Explain the operation of a gas laser with essential components. What are different uses to which laser beams are put ?

(c) Answer the following

I. Laser is a monochromatic source of light (True/False)

II. Laser works on the principle of population inversion (True/false)

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