

2006-COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY
B.TECH DEGREE EXAMINATION JUNE-2006
ENGINEERING PHYSICS

TIME- 3HOUR
MARKS-100

ANSWER ALL QUESTIONS

MARKS [10*10=100]

- 1a. Explain with necessary theory the interference of light from a plane parallel sided thin transparent film, illuminated by a monochromatic light
- b. Explain why an extended source of white light is required to see colours in thin films
- c. Determine the minimum wavelength reflected by a thin film of thickness 4.66×10^{-5} cm and of refractive index 1.5 when it is illuminated by a white light.
- 2a. Distinguish between continuous X-ray spectrum and characteristic X-ray spectrum
- b. What is Moseley's Law? Explain its importance
- c. An X-ray machine has an accelerating potential difference of 50 kV. Calculate the shortest wavelength and the corresponding maximum frequency
- 3a. Compare Fresnel and Fraunhofer types of diffraction
- b. Explain Fresnel's half period zone and show that the areas of Fresnel's half period zones are equal
- c. Light of wavelength 5461 Å is incident normally on a grating having a grating element 1.5×10^{-4} cm. Find the angle at which the first diffracted beam is observed
- 4a. Describe the construction, working and uses of a Nicol prism
- b. Explain positive and negative crystals
- c. What are the uses of polarized light?
- 5a. Explain spontaneous emission and stimulated emission
- b. How population inversion is achieved?
- c. Explain the working of Helium-Neon laser
- 6a. Explain the principle of Holography
- b. Discuss the application of lasers in engineering
- c. How magnetic tape recording is done
- 7a. Explain the following terms: numerical aperture, acceptance angle, acceptance cone
- b. Explain the advantages of optical fibres over ordinary cable
- c. Calculate the numerical aperture and acceptance angle of an optical fibre from the following data: refractive index of core= 1.55 and refractive index of cladding= 1.55

8a. Discuss the single and multimode optical fibres

b. Explain the working of optical fibre sensors

c. Write a short note on integrated optics

9a. Explain the different types of electric polarisation in dielectrics

b. Draw the planes with the following : Miller Indices (111) (110) and (010)

c. Calculate the interplanar spacing for a (321) plane in a simple cubic lattice with a lattice constant $a = 2.54 \text{ \AA}$

10a. Explain superconductivity

b. Compare type I and type II superconductors

c. Write a short note on SQUIDS

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