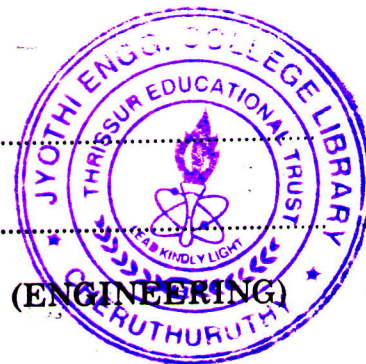


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Name.....

Reg. No.....



COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING)
DEGREE EXAMINATION, JUNE 2005

EN.04.103B ENGINEERING PHYSICS

(2004 Admissions)

(For CH, CE, ME, PE)

Time : Three Hours

Maximum : 100 Marks

Part A

- I. 1. A parallel beam of light ($\lambda = 5890 \times 10^{-10} \text{ m}$) is incident on a thin glass plate ($\mu = 1.5$) such that the angle of refraction into the plate is 60° . Calculate the minimum thickness of the plate to be dark during reflection.
2. In an air wedge forms uniform fringes when a wire of 0.05 mm. diameter is placed at a distance of 15 cm from the edge for the monochromatic $\lambda = 6000 \text{ \AA}$. Calculate the fringe width.
3. Mention the properties and application of X rays.
4. Explain 'Population Inversion'. What are the different methods to achieve it ?
5. Explain 'Piezo Electric Effect'.
6. Define 'decibel' and 'phon'.
7. Distinguish intrinsic and extrinsic semi conductors.
8. Mention a few applications of fiber optics in medical field and industry.

(8 × 5 = 40 marks)

Part B

- II. (i) a. Distinguish Fresnel and Frunhofer diffraction.
- b. Discuss the diffraction of light due to a straight edge and derive the condition for the given point to be at Maxima or Minima.

(6 + 9 = 15 marks)

Or

- (ii) a. Describe the construction of a Nichol Prism. Explain how it is used as a polarizer and as an analyzer.
- b. Calculate the thickness of a half wave plate of quartz for wavelength of $5000 \text{ \AA}$.
 $n_e = 1.553$ $n_o = 1.544$.

(10 + 5 = 15 marks)

- III. (i) a. Derive Bragg's law for X-ray diffraction.

Turn over

- b. Describe Bragg's spectrometer and explain how it is used to find out the inter atomic spacing of a crystal ?

(6 + 9 = 15 marks)

Or

- (ii) a. Explain briefly with a neat diagram the construction of a semiconductor laser and how the population inversion is achieved in it.
b. What are the advantages of semiconductor lasers compared to other types.

(10 + 5 = 15 marks)

- IV. (i) Describe McLeod gauge and explain how it is used to measure high vacuum.

(15 marks)

Or

- (ii) a. Discuss the constructional features and working of an LED. Mention its applications.
b. Discuss the characteristics of an LDR. Using a simple circuit diagram, illustrate how an LDR can serve as an optical switch.

(7 + 8 = 15 marks)

- V. (i) a. Describe the construction of a PN junction. Discuss its behaviour during (1) forward bias and (2) reverse bias.
b. Mention briefly one of its uses under reverse bias.

(10 + 5 = 15 marks)

Or

- (ii) a. With suitable block diagram describe how optical communication achieved through optic fibers. What are the advantages of optical fibers over cables ?
b. Bring out the applications of optic fiber in the field of medicine and industry.

(9 + 6 = 15 marks)