

II B.Tech II Semester Examinations, April/May 2012
ENGINEERING PHYSICS
Bio-Technology

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) How do you use the phenomenon of double refraction to produce a plane polarized light? Explain in detail.
(b) Describe the construction of a Nicol prism, and show how this can be used as a polarizer and as an analyzer.
(c) If the refractive index of a plane glass sheet is 1.55, find the angle of incidence at the plane glass sheet, placed in air, to get fully polarized light by reflection. Also, find the corresponding angle of refraction. [4+8+4]
2. (a) With the help of suitable diagrams, explain the principle, construction and working of He-Ne gas laser.
(b) Discuss the following:
 - i. Direct band gap semiconductors
 - ii. Indirect band gap semiconductors.
(c) Energy gap of a semiconductor is 3 eV. Calculate wavelength of emitted photons. [8+4+4]
3. (a) Explain briefly the basic principle of an optical fiber.
(b) Describe the structure of different types of optical fibers with ray paths.
(c) Calculate the fractional index change for a given optical fiber if the respective indices of the core and cladding are 1.563 and 1.498 respectively. [6+6+4]
4. (a) Explain how the X-ray diffraction can be employed to determine the crystal structure.
(b) Describe, in detail, Debye-Scherrer method for the determination of crystal structure.
(c) Monochromatic X-rays of wavelength 0.15 nm are incident on a crystal face having an interplanar spacing of 0.16 nm. Find the highest order for which Bragg's reflection maximum can be seen. [4+8+4]
5. (a) Explain the terms:
 - i. magnetic induction,
 - ii. magnetic susceptibility,
 - iii. permeability and
 - iv. intensity of magnetization.

- (b) What are the characteristics of diamagnetic, paramagnetic and ferromagnetic substances? Explain their behavior with the help of examples. [6+10]
6. (a) What are ultrasonic waves? Write their properties.
(b) What is magnetostriction effect? How this effect is employed in the generation of ultrasonics?
(c) Discuss the use of ultrasonics for non-destructive testing. [4+6+6]
7. (a) What are Nano materials and explain.
(b) Describe the applications of Nanomaterials. [8+8]
8. (a) Discuss about Dulong and petit's law.
(b) What is piezoelectric effect? Describe the process to produces piezoelectric effect in quantz crystal.
(c) Explain the important requirements of insulators. [4+8+4]

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Code No: 07A4BS05

R07

Set No. 1

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