Code.No: R05010103 | R05 | SET-1

I - B.TECH EXAMINATIONS, DECEMBER – 2010
ENGINEERING PHYSICS
(COMMON TO CE, ME, CHEM, MCT, MMT, MEP, AE, AME)

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

Answer any FIVE questions
All questions carry equal marks

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1.a) Distinguish between interference and diffraction of light.
b) What is a plane transmission grating? Explain the spectra, with theory, formed by a plane transmission grating. Show that the intensity is not uniformly distributed over all the maxima.
c) In the case of a plane transmission grating the angle of diffraction for second order maxima for wavelength of 500 nm is 30^0. Calculate the number of lines per centimeter of the grating surface. [4+8+4]

2.a) What are ultrasonic waves? Describe a method to detect these waves.
b) What is piezoelectric effect? How this effect is employed in the generation of ultrasonics?
c) Write the applications of ultrasonics in medical field. [6+6+4]

3.a) What is the significance of critical temperature, critical magnetic field and critical current density in the case of super conductors?
b) Distinguish between soft super conductors and hard super conductors.
c) The critical temperature of lead is 7.2 K. Determine the penetration depth of lead at 5.1 K, if the penetration depth at 0 K is 38 nm. [6+6+4]

4.a) What are the important characteristics of a laser beam?
b) Describe various methods to achieve population inversion for lasing action.
c) Describe the construction and working of a semiconductor laser. [4+6+6]

5.a) Derive the expression for the acceptance angle of an optical fiber.
b) Write notes on attenuation in optical fibers.
c) The refractive indices for core and cladding for a step index fiber are 1.52 and 1.41 respectively. Calculate:
i) Critical angle
ii) Numerical aperture and
iii) Maximum incidence angle. [6+4+6]

6.a) Find the magnetic dipole moments due to orbital and spin motion of electrons in an atom.
b) Distinguish between soft and hard magnetic materials.
c) Calculate the magnetization and flux density of the diamagnetic material if its magnetic susceptibility is -0.4×10^{-5} and the magnetic field in it is 10^4 A/m. [6+6+4]

7.a) What is Bragg's law of X-ray diffraction? Explain.
b) Describe, in detail, Laue method in the determination of a crystal structure.
c) When a monochromatic X-ray beam of X-rays of wavelength 0.1542 nm is used, the first order reflection from (1 1 3) planes occurs at θ. What is the value of θ?
[5+7+4]

8.a) Distinguish between Frenkel and Schottky defects.
b) Write notes on:
i) Edge dislocation and
ii) Screw dislocation in the case of crystals. [8+8]

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Code.No: R05010103 | R05 | SET-2

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ENGINEERING PHYSICS
(COMMON TO CE, ME, CHEM, MCT, MMT, MEP, AE, AME)

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Code.No: R05010103 | R05 | SET-3

I - B.TECH EXAMINATIONS, DECEMBER – 2010
ENGINEERING PHYSICS
(COMMON TO CE, ME, CHEM, MCT, MMT, MEP, AE, AME)

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