

Code No: RR100103

B.Tech I Year(RR) Supplementary Examinations, December 2010
ENGINEERING PHYSICS

(Common to Civil Engineering and Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Give the theory of colours in thin films with a ray diagram for a reflected system.
 (b) Thin film of thickness 0.2 mm is illuminated by light of wavelength 620 nm. If the 3rd dark band was observed at the refracting angle of $5^{\circ} 35'$. calculate the refractive index of the film. [12+4]
2. (a) Give the theory of Fraunhofer diffraction due to a single slit and hence obtain the condition for primary and secondary maxima. Using this obtain intensity distribution curve.
 (b) Find the angular width of the central maximum in the Fraunhofer diffraction using a slit of width 1 mm when the slit is illuminated by light of wavelength 600 nm. [12+4]
3. (a) Explain the following:
 - i. Polarization by selective absorption
 - ii. Polarization by scattering.
 (b) Prove that if the angle of incidence corresponds to the Brewster's angle, then the angle between reflected and refracted beams is 90° . [10+6]
4. (a) Describe the construction of a typical optical fiber and give the dimensions of the various parts.
 (b) Define the acceptance angle and numerical aperture. Obtain an expression for the numerical aperture of an optical fiber.
 (c) Calculate the numerical aperture and acceptance angle for an optical fiber with core and cladding refractive indices being 1.48 and 1.45 respectively. [6+6+4]
5. (a) Define molar specific heat of a solid.
 (b) Give an account of the various theories of specific heat of a solid. Discuss any one of them in detail. [4+12]
6. (a) Discuss in detail the different polarization mechanisms in dielectrics.
 (b) Write notes on "Porcelain". [10+6]
7. (a) What are paramagnetic materials? Explain.
 (b) Obtain an expression for paramagnetic susceptibility (χ). How does the paramagnetic susceptibility of a material vary with temperature?
 (c) A paramagnetic material has 10^{28} atoms per m^3 . Its susceptibility at 350 K is 2.8×10^{-4} . Calculate the susceptibility at 300 K. [6+6+4]
8. (a) What is the effect of stress and temperature on creep?
 (b) Explain with neat sketch the different types of creep and their mechanism.
 (c) What is the difference between creep and fatigue? [4+8+4]
