Model Question Paper
B.Tech I & II Semester 2010 Admissions Onwards
Subject : EN010 102 ENGINEERING PHYSICS

Time : 3 hours **Max Marks: 100**

PART A: All questions are compulsory. Each question carries 3 marks

1. Distinguish between spontaneous & stimulated emissions
2. Briefly explain Isotope Effect
3. What is a Unit Cell?
4. What is Reverberation time? What is its relevance?
5. Discuss how step index fiber differs from graded index fiber.

(5 x 3 = 15 marks)

PART B: All questions are compulsory. Each question carries 5 marks

6. (a)What is metastable state in connection with laser?
   (b)A system has three energy levels E_1,E_2 & E_3. The energy levels E_1,and E_2 are 0 eVand 1.4 eV respectively. If the lasing action takes place from E_3 to E_2 and the wavelength of light emitted is 1.15μm , find the value of E_3.
7. (a)Why nano composite is different from ordinary composite?
   (b)A superconducting tin has a critical temperature 3.7 K at 0 magnetic field.The critical field at 0K is 0.0306 T. Find the critical field at 2K.
8. (a)What are the properties of metallic glass?
   Find the Miller indices of a set of parallel planes 3a:4b on X and Y axes respectively and parallei to Z axis where a,b,c are primitive vectors of a unit cell.
9. (a)Explain Rayleigh Scattering.
   (b)Calculate the frequency of 4mm thick quartz crystal. Y= $9x10^{10}Nm^{-2}$ and density of crystal is 2650 kgm^{-3}.
10. (a)Explain the principle of Optical Fiber.
    (b)An optical fiber has a numerical aperture 0.15 and cladding refractive index 1.55. Determine the acceptance angle of the fiber in water whose refractive index is 1.33.

PART C: Each question carries 12 marks

11. Describe the principle, construction and working of a semiconductor laser with the help of a neat diagram.

OR

12. (a) What are the characteristics of Laser?
    (b) Explain the principle of Holography and mention its applications

13. Discuss the terms (i) Type I (ii) Type II superconductors (iii) Josephson's effect

OR

14. (a) Explain top-down and Bottom up process
    (b) What is a nano shell? What are its applications in medical field

15. (a) Explain how Bragg's Spectrometer can be used in the study of crystal structure analysis
    (b) An X-ray analysis of crystal is made with monochromatic X-rays of wavelength 0.58 A^{0}. Bragg' s reflections are obtained at angles of a)6.45^{0} b) 9.15^{0} c)13^{0} . Calculate the interplanar distance of the crystal.

OR

16. With a neat diagram, explain the construction and working of a liquid crystal display system

17. What are Ultrasonic Waves? Describe its production by piezoelectric method.

OR

18. (a)What is Raman Effect?
    (b)Explain Raman Effect on the basis of Quantum theory

19. What is meant by Numerical aperture of an Optic Fiber? Derive the expression for the NA of a step index fiber.

OR

20. Draw the block diagram of an optic fiber communication system. Explain its various functional blocks.