Reg. No. : | | | | | | | | | | |

Question Paper Code: 11003

B.E./B.Tech. DEGREE EXAMINATION, APRIL 2015.

First Semester

Civil Engineering

01UPH103 ENGINEERING PHYSICS

(Common to All Branches)

(Regulation 2013)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Ultrasonic waves higher than 3MHz cannot be produced using magnetostriction oscillator. Why?
2. What is sonogram?
3. Define population inversion.
4. The wavelength of light emitted by InP laser is 1.50μm. What is its bandgap in eV?
5. The refractive index of core and cladding are 1.50 and 1.49 respectively. Calculate the numerical aperture and acceptance angle for the fiber in water which has a refractive index of 1.33.
6. Distinguish between an active and passive sensor.
7. State Compton effect.
8. Give the physical significance of the wave function Ψ.
9. Sketch the (011) and (111) in a cubic crystal.
10. What are miller indices?

PART - B (5 x 16 = 80 Marks)

11. (a) Define inverse piezoelectric effect. With neat sketch describe the piezoelectric method of generating ultrasonic waves. (16)

Or

(b) Explain in detail the ultrasonic method of flaw detection by reflection and transmission modes with a suitable block diagram. Briefly explain the three different ultrasonic scans and their displays which are common in practice. (16)

12. (a) Explain the various modes of vibration of CO_2 molecule. With neat diagram explain the construction and working of CO_2 laser. (16)

Or

(b) What is holography? With neat diagram explain the construction and reconstruction of hologram. (16)

13. (a) (i) How are fibers classified? Explain the classification in detail. (8)

(ii) With a neat block diagram, explain the working of fiber optical communication system. (8)

Or

(b) Discuss the various losses in optical fibers? (16)

14. (a) Derive Planck's law for black body radiation and hence deduce Wien's displacement ;aw and Rayleigh-Jean's law. (16)

Or

(b) (i) Explain the construction and working of transmission electron microscope. (12)

(ii) Calculate the minimum energy, an electron can possess, in an infinite potential well of width 4*nm*. (4)

15. (a) Show that the packing factor for Face Centered Cubic and Hexagonal Closed Packed structure are same. (16)

Or

(b) With relevant diagram explain in detail its various crystal defects. (16)