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Question Paper Code : 86610

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

First Semester

Civil Engineering

HS 1102 – ENGINEERING PHYSICS – I

(Common to all Branches)

(Regulations 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Mention the disadvantages of magnetostriction oscillator.
2. What are the medical uses of ultrasonic waves?
3. A laser beam has a bandwidth of 2800 Hz. Obtain the coherence length.
4. What are Einstein's coefficients? Show that they are inter related.
5. Calculate the numerical aperture (NA) and the acceptance angle of an optical fibre from the following data : μ_1 (Core) = 1.55 and μ_2 (cladding) = 1.45.
6. Distinguish between meridional rays and skew rays.
7. State Wien's displacement law.
8. What are matter waves?
9. Lead is a FCC with an atomic radius of 1.746 Å. Find the spacing of (a) 200 planes and (b) 220 planes.
10. What are the procedures for finding Miller indices?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is inverse piezoelectric effect? (2)
(ii) Describe the production of ultrasonic waves can be produced by Using Piezoelectric method and mention its advantages. (14)

Or

- (b) What is NDT? Explain the NDT with block diagram and write its advantages and limitations.

12. (a) (i) What is meant by hologram? (4)
(ii) Describe the construction and reconstruction of hologram. (8)
(iii) Write down the applications of holography. (4)

Or

- (b) Explain the construction and working of a CO₂ laser along with the energy level scheme and schematic device diagram.

13. (a) Explain the structure and light wave propagation through step index fibre and graded index fibre.

Or

- (b) Describe in detail about
(i) fibre optic temperature sensor and (8)
(ii) displacement (8)

14. (a) (i) Give an account of Planck's theory and derive Wiens displacement law and Rayleigh Jean's law from it. (12)
(ii) Calculate the de Broglie wavelength of an electron having a kinetic energy of 1100eV. Compare the result with the wavelength of X-rays having the same energy. (4)

Or

- (b) (i) Derive Schrödinger's time dependent and time independent wave equation. (10)
(ii) With a neat block diagram explain the construction and working of a scanning electron microscope. (6)

15. (a) Derive the relation for the number of atoms per unit cell for cubic type of crystal and hence estimate the total number of atoms per unit cell and packing factor for BCC structure.

Or

- (b) Describe ZnS and Graphite structure with neat diagram.
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