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Question Paper Code : 24085

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

First Semester

Civil Engineering

PH 2111 — 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. A quartz crystal of thickness 1 mm is vibrating at resonance. Calculate the fundamental frequency. The Young's modulus and the density of quartz are $7.9 \times 10^{10} \text{ N.m}^{-2}$ and 2650 kg.m^{-3} respectively.
2. What is cold welding?
3. Explain stimulated emission.
4. Name any two uses of lasers in medicine.
5. For a step index optical fiber with a core of refractive index 1.48 and numerical aperture 0.649, calculate the refractive index of cladding.
6. What is the principle by which temperature is measured using a fiber optical sensor?
7. Mention the physical significance of wave function ψ .
8. Define blackbody.
9. Distinguish between interplanar spacing and interatomic spacing.
10. What is the coordination number of ZnS?

PART B — (5 × 16 = 80 marks)

11. (a) (i) What is inverse piezo-electric effect? Describe the method of producing ultrasonic waves by piezo-electric method. (10)
- (ii) Describe about any two methods using which ultrasonic waves can be detected. (6)

Or

- (b) (i) Give an account on the application of ultrasonics in
- (1) Drilling (3)
- (2) Welding and (4)
- (3) Cleaning. (3)
- (ii) Explain the process of non destructive testing of materials using ultrasonic waves. (6)
12. (a) Discuss Einstein's theory of stimulated absorption spontaneous and Stimulated emission of radiation. What are the conditions for light amplification? (16)

Or

- (b) (i) Describe principle, construction and working of He-Ne laser with neat diagram. (10)
- (ii) Write notes on lasers in cutting, drilling and welding. (6)
13. (a) Explain the various types of optical fibres and discuss the double crucible technique of fibre drawing. (16)

Or

- (b) With suitable sketches, explain the construction and working of detectors. (16)
14. (a) Derive time independent Schrodinger wave equation. (16)

Or

- (b) Explain in detail about the principle, construction and working of scanning electron microscope. (16)
15. (a) What are Miller indices? Show that for a cubic lattice the distance between two successive (h k l) planes is given by $d = a/\sqrt{h^2 + k^2 + l^2}$. (4+12)

Or

- (b) Calculate the number of atoms per unit cell, coordination number and packing factors for F.C.C. and B.C.C. structures. (4+4+4+4)