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Question Paper Code : 52092

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

First Semester

Civil Engineering

PH 2111 PH13/080040001 – ENGINEERING PHYSICS – I

(Common to all branches)

(Regulations 2008/2010)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is acoustic grating ?
2. What is inverse piezoelectric effect ?
3. What are the conditions needed for laser action ?
4. Name the properties of laser, which are making it suitable for industrial applications.
5. What are the conditions to be satisfied for total internal reflection ?
6. The refractive index of core and cladding are 1.60 and 1.49 respectively. Calculate the critical angle at core-cladding interface.
7. Which law is most suited to explain the black body radiation ? Why ?
8. Why is SEM preferred in surface analysis than TEM ?
9. Give the co-ordination number of BCC and FCC structures.
10. What are Schottky defects ?

PART – B (5 × 16 = 80 Marks)

11. (a) (i) What are magnetostriction and piezoelectric effect ? (4)
(ii) Write down the complete experimental procedure with a neat circuit diagram of producing ultrasonic waves by piezoelectric effect. (12)

OR

- (b) (i) How is acoustic grating used in determining the velocity of ultrasound ? (8)
(ii) Explain the process of non-destructive testing of materials using ultrasonic waves by pulse-echo method. (8)

12. (a) Explain the principle, construction and working of CO₂ laser.

OR

- (b) Explain holography. How will you create a hologram of an object and recreate the image of the original object ?

13. (a) Give an account of fibre optic communication system and its advantages. (16)

OR

- (b) Discuss about the various types of optical fibres. (16)

14. (a) State and explain Compton effect. Hence drive the expression for analysing the wavelength patterns.

OR

- (b) Discuss the physical significance of wave function and explain how it is used in the case of "Particle in a one dimensional box".

15. (a) (i) Explain the hexagonal closed packed structure and obtain its atomic packing factor. (10)

- (ii) Sodium chloride crystallizes in FCC structure. The density of sodium chloride is $2.18 \times 10^3 \text{ kg/m}^3$. Calculate the distance between two adjacent atoms. The atomic weight of sodium and chlorine are 23 and 35.5 respectively. (6)

OR

- (b) (i) What is line defect ? Explain edge dislocation using a neat diagram. What are positive and negative edge dislocations ? (10)

- (ii) Describe the method of determining Miller indices of a given plane in a cubic lattice. (6)