Reg. No. ☐☐☐☐☐☐☐☐☐☐☐☐☐

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 is 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 CO_2 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 crystallizers in FCC structure. The density of sodium chloride is 2.18×10^3 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)

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