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Question Paper Code : 91780

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014

First Semester

Civil Engineering

PH 2111/PH 13/080040001 — ENGINEERING PHYSICS — I

(Common to All Branches)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is magnetostriction effect?
2. Write few properties of ultrasonic waves.
3. Write the difference between spontaneous and stimulated emission.
4. What is holography?
5. What does the numerical aperture signify?
6. What is splicing in fiber optics?
7. State Kirchoff's law of heat radiation.
8. Write the principle of electron microscope.
9. What is coordination number?
10. What is burger vector?

PART B.— (5 × 16 = 80 marks)

11. (a) Explain the phenomenon of magnetostriction. How will you produce high frequency sound wave with its help? (16)

Or

- (b) Explain in detail how the ultrasonic pulse technique is used for non destructive testing materials. Write the applications of ultrasonics on drilling, welding, soldering and cleaning. (16)

12. (a) Explain the operation of a gas laser with the essential components. How does stimulated emission take place with the exchange of energy between He-Ne atoms? (16)

Or

- (b) With a neat sketch explain the function of homojunction semiconductor laser. Explain the preparation of hologram with a suitable diagram. (16)

13. (a) (i) Describe the structure of a typical optical fibres used in practice. (6)
(ii) Describe schematically the basic elements of a fibre optics communication system. (10)

Or

- (b) Explain the double crucible method for fibre drawing. How does fibre optic cable function as a temperature sensor? (16)

14. (a) What is Compton shift? Prove that the Compton shift $\Delta\lambda = \frac{h}{M_0C} [1 - \cos\theta]$
Where the parameters have usual meaning. (16)

Or

- (b) Describe the construction of electron microscope and explain its operation. Write few advantages and disadvantages of electron microscope. (16)

15. (a) Calculate the coordination number, $\frac{c}{a}$ ratio and packing fraction for FCC and HCP structures. (16)

Or

- (b) Write an essay on point defects and line defects. (16)