Question Paper Code : 97105

B.E./B.Tech. DEGREE EXAMINATION, DECEMBER 2015/JANUARY 2016.

First Semester

Civil Engineering

HS 1102 — 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 inverse piezo electric effect?

2. Can we produce ultrasonic waves by passing high frequency current to the amplifiers? Give reasons.

3. The first line of the principal series of Sodium D-line at 5890 Å. This corresponds to a transition from the first excited state to the ground state. What is the energy of the excited state in electron volts?

4. Mention any four differences between holography and photography.

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 Rayleigh-Jeans law.

8. What is the physical significance of the wave function?

9. Draw the crystal planes for (210) and (111).

10. What is meant by coordination number?

PART B — (5 × 16 = 80 marks)

11. (a) Describe with principle the piezoelectric method of producing ultrasonic and mention its advantages and disadvantages.

Or

(b) Brief the three types of non-destructive testing methods using ultrasonic.

12. (a) Derive the Einstein's relations for absorption rate and emission rate of radiations by the matter and hence deduce the ratio of spontaneous emission to the stimulated emission rate. (16)

Or

(b) Explain the theory and working of homo junction and hetero junction semiconductor laser. (16)

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

Or

(b) Describe a fibre optic communication system. Mention the advantages of fibre optic communications.

14. (a) (i) Give an account of Planck's theory and derive Wiens displacement law and Rayleigh Jean's law from it.

(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.

Or

(b) (i) Derive Schrödinger's time dependent and time independent wave equation.

(ii) With a neat block diagram explain the construction and working of a scanning electron microscope.

15. (a) (i) Show that the packing factor for fcc is 74%. (10)

(ii) Write a short note on Bravais lattices. (6)

Or

(b) What are defects? Explain the various types of defects in crystal in detail.

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