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Question Paper Code : Q 2729

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Annual Pattern — First Year

Civil Engineering

PH 1X01 — ENGINEERING PHYSICS

(Common to all branches Except Metallurgical Engineering)

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. A music hall has a volume of 8500 m³. If the reverberation time required is 1.05, what should be the total absorption in the hall?
2. Name the Seven crystal systems and give the relation between the basic lattice parameters.
3. What are the isochromatic and isoclinic fringes?
4. Write down the Einstein expression for spontaneous and stimulated emission of light.
5. What are the concepts used in fiber optic sensor?
6. Define mobility of electrons.
7. With increase of temperature the conductivity of semiconductor increases while that of metal decreases. Give reasons.
8. What are the properties of superconductors?
9. Write a note on nanophase materials.
10. Distinguish radiography and fluoroscopy.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Derive an expression for the Reverberation Time (R.T.) of an auditorium and explain how this can be used for determining the absorbing power of surface involved. (10)
- (ii) Describe the acoustical grating method to determine the velocity of ultrasonic waves. (6)

Or

- (b) Calculate the packing factor for SC, BCC, FCC and HCP structures. (3 + 4 + 4 + 5)

12. (a) (i) How will you use Michelson's Interferometer to determine the thickness of a thin transparent sheet? (6)
- (ii) What is meant by plane, circularly and elliptically polarised light? Briefly describe how these can be produced and detected. (3 + 7)

Or

- (b) (i) Explain the process of stimulated emission. Draw a neat diagram to represent the component of a Nd-YAG laser. Explain the operation. (2 + 4 + 4)
- (ii) Explain the principle, construction and working of any type of optical fibre sensor. (6)

13. (a) (i) Derive the electrical conductivity of a conducting material and hence obtain Widemann-Franz law. (12)
- (ii) What is the significance of the waveform ψ ? (4)

Or

- (b) (i) Explain Compton effect and its physical significance. (5)
- (ii) Derive an expression for the density of states and based on that expression calculate the carrier concentration in metals. (11)

14. (a) (i) Derive an expression for the number of density of holes in an intrinsic semiconductor. (8)
- (ii) What is Hall coefficient? Derive an expression of Hall coefficient. (8)

Or

- (b) (i) Describe a method of determining band gap of a semiconductor. (8)
- (ii) Explain superconducting phenomena. Distinguish Type I and Type II superconductors. (3 + 5)

15. (a) What is meant by local field in a dielectric and how it is calculated for a cubic structure? Deduce the Clausius-Mosotti relation. (2 + 9 + 5)

Or

- (b) (i) What are biomaterials? Explain the conditions to be met for their effective use. (5)
- (ii) Draw a block diagram of ultrasonic flow detector. Explain the three different scan modes used for presentation of data. What are its advantages and limitations? (9 + 2)