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Question Paper Code : 53023

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

First Semester

Civil Engineering

PH 103 — ENGINEERING PHYSICS — I

(Common to all Branches)

(Regulation 2007)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State Hooke's law of elasticity.
2. Define streamline flow of liquid.
3. A hall has a volume 7000 m^3. What should be the total absorption in the hall if the reverberation time of 1.5 seconds is to be maintained.
4. Mention the methods to detect ultrasonic waves.
5. What are Bravais lattice?
6. Lattice constant of copper is 0.38 nm calculate the distance between (110) planes.
7. What is an air wedge?
8. State stress - optical law.
9. Give the medical applications of laser.
10. What are the differences between step index and graded index fiber?

PART B — (5 × 16 = 80 marks)

11. (a) Give the theory of Torsional pendulum and describe a method to find rigidity modulus of a wire. (16)

Or

(b) (i) Define coefficient of viscosity of a liquid. (2)

(ii) Derive Poiseulle's formula for flow of liquid through a capillary tube. (14)

12. (a) (i) What are sound absorbing materials? Give a few examples. (4)

(ii) Explain the various factors affecting acoustics of building. (12)

Or

(b) (i) Mention the properties of ultrasonic waves. (2)

(ii) Describe with neat diagram of the contraction and production of ultrasonic waves using piezoelectric oscillator. (14)

13. (a) (i) What are the miller indices? (2)

(ii) Derive an expression for the interplanar spacing for (hkl) planes of a cubic structure. (10)

(iii) Calculate the interplanar spacing between (111) and (220) planes in FCC crystal where atomic radius is 1.246 A°. (4)

Or

(b) (i) What is packing factor? (2)

(ii) Determine the atomic radius, co-ordination number and packing factor for BCC and FCC structure. (14)

14. (a) Explain the construction and working of a Michelson's interferometer and hence explain how it is used to find the refractive index of a transparent layer. (16)

Or

(b) (i) What are isoclinic and isochromatics? (4)

(ii) Describe the construction and working of scanning electron microscope. (12)

15. (a) Describe the different types of vibration of a co_2 molecule. Describe the principal construction and working of a co_2 laser. (16)

Or

(b) (i) Describe the fiber optical communication system with a suitable diagram. (8)

(ii) What is a fiber optical sensor? Describe any one type of the sensor. (8)