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B.E/B.Tech (FULL-TIME) DEGREE END SEMESTER EXAMINATIONS, DECEMBER 2011
Common to ALL Branches
FIRST SEMESTER (Regulations 2008)

PH9111 – ENGINEERING PHYSICS

Time: 3 hr

Max. Marks 100

Answer ALL Questions

PART-A (10 × 2 = 20 Marks)

1. Mention the factors affecting the Elasticity of Materials.
2. Write the relation connecting the three moduli of Elasticity.
3. A hall has a volume 2265 m^3 . Its total absorption is equivalent to 92.9 m^2 of open window. What will be the effect on reverberation time if the audience fills the hall and thereby increases the absorption by another 92.9 m^2 of open window?
4. What is meant by acoustic grating?
5. Explain about the refrigerator.
6. Explain the entropy in thermodynamic processes.
7. Determine the numerical aperture and acceptance angle with a core and cladding refractive indices respectively of 1.55 and 1.50.
8. What is the necessity of antireflection coatings.
9. Draw (111) and (110) planes of a cubic crystal.
10. Explain the screw dislocation.

PART – B (5 × 16 = 80 Marks)

11. (i) Describe in detail with neat relevant diagrams the construction and working of CO_2 Laser. **(13 marks)**

(ii) Give the applications of Lasers in different fields. **(3 marks)**

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12. (a) (i) Describe in detail with schematic any one method of growing single crystals preferably through melt to solid transformation. **(14 marks)**

(ii) What are Frenkel and Schottky imperfections? **(2 marks)**

(OR)

(b) (i) What is co-ordination number? Derive expression for atomic packing factor for Hexagonal close packed (HCP) structure. **(2 + 11 marks)**

(ii) Find the volume of the unit cell of an element which exhibits HCP structure when the radius (r) of the atom is 1.605 \AA . **(3 marks)**

13. (a) Describe with theory in detail the Lees' disc method of determining the thermal conductivity of a poor (bad) conductor.

(OR)

(b) Describe in detail the various strokes in Diesel engine and derive an expression for its efficiency.

14. (a) (i) Describe in detail with a neat circuit diagram the production of ultrasonic waves by Magnetostriction method and mention a few applications. **(13 marks)**

(ii) Calculate the natural frequency of a pure iron rod of 40 mm length. The density of pure iron rod is $7.25 \times 10^3 \text{ kg/m}^3$ and its Young's modulus is 115 GPa. Can we use it in magnetostriction oscillator to produce ultrasonic waves? **(3 marks)**

(OR)

(b) Derive Sabine's formula for reverberation time with the explanation of growth and decay of sound energy.

15. (a) What is cantilever? Derive an expression for the depression at the free end of a cantilever with rectangular and circular cross-sections when the other end is rigidly fixed. **(2 + 14 marks)**

(OR)

(b) Derive an expression for the period of oscillation of a Torsional pendulum and describe the method of determining the rigidity modulus of a wire.