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Question Paper Code : 65032

5 Year M.Sc. DEGREE EXAMINATION, MAY/JUNE 2013.

First Semester

Computer Technology

XCS 113/10677 SW 103 — APPLIED PHYSICS

(Common to M.Sc. — Software Engineering and M.Sc. — Information Technology)

(Regulation 2003/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the effect of impurities on the elasticity of a material?

2. List the methods of producing high vacuum.

3. Define loudness.

4. List the medical applications of ultrasonic waves.

5. Define thermal conductivity of a material.

6. State the first and second laws of thermodynamics.

7. An anti-reflection coating is to be made with a material of refractive index 1.38 upon a substrate to minimize the reflection of light with wavelength 550 nm. Calculate the minimum thickness of coating needed.

8. What is known as photo-elasticity?

9. What is called population inversion?

10. Define numerical aperture and angle of acceptance of an optical fiber.

PART B — (5 × 16 = 80 marks)

11. (a) Discuss the theory of a cantilever and hence use it to obtain the depression of non-uniform bending of beams. Also explain why girders are made in I-shape. (12 + 4)

Or

(b) Explain the principle and working of

(i) Diffusion pump, and,

(ii) Pirani gauge. (8 + 8)

12. (a) Derive Sabine's formula of reverberation time. (16)

Or

(b) (i) Explain the magnetostriction method of producing ultrasonic waves. (12)

(ii) Briefly discuss any two engineering applications of ultrasonic waves. (4)

13. (a) Discuss the theory of radial flow of heat through cylindrical objects and hence explain an experimental method to determine the thermal conductivity of rubber. (16)

Or

(b) (i) Explain the various working strokes of an ideal Diesel engine and obtain an expression for its efficiency. (12)

(ii) Discuss the entropy-temperature diagram of Carnot's cycle. (4)

14. (a) (i) Discuss the theory of air-wedge and obtain an expression for the fringe-width. (12)

(ii) Outline the applications of Michelson's interferometer. (4)

Or

(b) With neat diagrams, explain the principle and working of

(i) sextant, and,

(ii) metallurgical microscope. (8 + 8)

15. (a) With a neat diagram, explain the construction and working of a CO_2 laser. (16)

Or

(b) (i) Explain the different types of optical fibers based on index, mode and nature of materials, with necessary diagrams. (8)

(ii) Discuss in detail the different means of signal losses in optical fibers. (8)

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