Roll No.

Time: 3 Hours   Max. Marks: 100

Answer ALL questions

PART A — (10 x 2 = 20 Marks)

1. Define angle of contact and interfacial tension.

2. What would be the pressure inside a small air bubble of 10^{-4} m radius, situated just below the surface water? The surface tension of water may be taken as 70×10^{-3} N/m and the atmospheric pressure to be 1.012×10^5 N/m^2.

3. Distinguish between streamline flow and turbulent flow.

4. Calculate the mass of water flowing in 10 minutes through a tube of 0.001m diameter and 0.4m long if there is a constant pressure head of 0.2m of water. The coefficient of viscosity of water is 0.00082 Nsm^{-2}.

5. What is the magnetic principle used in computer data storage?

6. What is the principle of phase change recording?

7. What is injection luminescence?

8. How a typical photo-detector functions?

9. How to realize a AND logic gate using optical spatial light modulators?

10. Draw the configuration for coherent image processing system.

PART B — (5 x 16 = 80 Marks)

11. Discuss about spatial filtering and describe the Abbe-Porter Experiment (4 + 12)

12. (a) Describe Jaegar's method of studying the variation of surface tension of water with temperature (16)

OR

(b) Describe the experimental study of the variation of surface tension with temperature and the method of drop-weight to determine the surface tension (16)

13. (a) Derive Poiseuille's formula along with corrections for the flow of a liquid through a capillary tube (16)

OR

(b) (i) Describe the Stoke's method for determining the coefficient of viscosity of a viscous fluid (8)

(ii) Describe the experiment for determining coefficient of viscosity of a liquid using variable pressure head method (8)

14. (a) (i) What is meant by holography? (4)

(ii) Explain with neat diagrams the construction and working of holographic data storage unit (12).

OR

(b) Discuss in detail the magneto-optic write/read head disc system with suitable Layout (16).

15. (a) Explain the theory and working of LCD. What are the different types? Explain the advantages (8+4+4)

OR

(b) Describe with theory, the principle, construction and working of an electro-optic amplitude modulator (16)

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