Q.1 a. Attempt any TEN of the following
1. Define modulus of rigidity. What is its S I unit?
2. Define Viscosity and Surface tension. What are its S I unit?
4. Mention two applications of Ultrasonic in Textiles.
5. What is Total Internal Reflection?
6. Define Interference and Diffraction.
7. What is Polarization? Mention the types of Polarization.
8. Mention seven crystal systems.
10. What is the principal of Optical fiber? Mention the types of Optical fiber.
11. Give two examples for; (i) Spontaneous emission (ii) Stimulated emission
12. Define specific heat of solids.
13. Mention two applications of Nanotechnology.

Q.2 a. Write a note on acoustics and buildings.

b. Derive Poiseuille’s formula for the rate of flow of a liquid through capillary tube.

c. Define the laws of Friction. Explain the mechanism of Friction.

Q.3 a. Define the Fresnel and Fraunhofer diffraction.

b. What do you understand by diffraction of light? Distinguish clearly between interference and diffraction of light.

c. What is plane polarized light? Describe the construction and working of nickel prism.

Discuss how you obtain a plane polarized beam with it.

Q.4 a. Define magnetic field, intensity of magnetization, susceptibility, magnetic induction and permeability.

b. Explain how you distinguish para, dia, ferro-magnetic substances.
c. Write a note on hard and soft magnetic materials.  

Q5  

a. Explain the uses of microwaves, UV and IR radiations in textiles.  

b. Mention the seven crystal systems. What are Bravais lattices? Deduce the packing factors of simple cubic, bcc and fcc structures.  

c. Describe Bragg's spectrometer. Explain how it is used to determine the wavelength of the X-rays?  

Q6  

a. Write a note on Type I and Type II superconductors. Derive an expression for acceptance angle.  

b. What is holography? Discuss the recording and reconstruction process in holography with the help of suitable diagram.  

Q7  

a. Explain the terms absorption, spontaneous emission and stimulated emission of radiation.  

b. What is population inversion in laser? Describe the construction of He-Ne laser and explain its working with energy level diagram.  

Q8  

a. Explain the concept of super conductivity. Write a note on (i) transmission temperature (ii) Meissner effect (iii) critical magnetic field.  

b. What are dielectric materials? Explain their properties. Describe the different polarization mechanisms.  

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