

- N.B. :-** (1) Question **No.1** is compulsory.
(2) Attempt any **four** Questions from remaining questions.
(3) Figures to the right indicate full marks.

Que.No. 1. Attempt any FIVE.

- (a) What is difference between sound intensity and loudness ? (3)
(b) Draw the following with respect to cubical unit cell (3)
(1 2 3) , (2 0 0) , [2 3 0]
(c) Define superconductors ,critical temperature , critical magnetic field. (3)
(d) Explain different phases of liquid crystal. (3)
(e) Explain use of CRO to determine phase difference between two signals. (3)
(f) Explain cavitation effect and its 'applications. (3)
(g) Explain characteristic X – ray spectra. (3)

- Que.No. 2 (a) Define Piezoelectric effect . Explain construction and working of piezoelectric Oscillator. (8)
(b) Explain the concept of Fermi level .What is the probability of an electron being Thermally excited to conduction band in silicon at 20 °c .the band gap energy is 1.12ev Given Boltzman constant 1.38×10^{23} J/K (7)

- Que.No. 3 (a) Find the following parameters for HCP structure (i) co-ordination No. (ii) Atomic Radius (iii)No. of atoms pre unit cell (iv)APF (v)c/a ratio. (8)
(b) State Bathe law. Explain electrostatic focusing. (7)

- Que No. 4 (a) Derive Bragg's equation .Explain construction and working of Bragg's Spectrometer. (8)
(b) An electrically deflected CRT has a anode voltage 2000v and parallel deflecting Plates 1.5 cm long and 20 mm apart. If the screen is 50 cm from the center of deflecting Plates .Find (i) Beam speed (ii) the deflection sensitivity of the tube and (iii) Deflection Factor of the tube. (7)

- Que No. 5 (a)Define Reverberation time. Explain how the reverberation time is affected by (i)size (ii)Nature of it's wall surface (iii) Audience (8)

(b) What is eco sounding techniques ? Velocity of ultrasonic in mild steel is 5.9×10^3 m/s
Velocity of ultrasonic in brass measured by an ultrasonic gauge meter ,calibrated for
Mild steel is 4.3×10^3 m/s .If thickness of brass plate measured by the gauge meter is
15 cm . What is the real thickness? (7)

Que. No. 6 (a) What is Meissner effect ? Explain Type I and Type II superconductors (8)

(b) The radiation of an x –ray tube operated at 50 KV are diffracted by a cubical KCl FCC
Crystal of molecular wt. 74.6 and density 1.99 gm/cc .Calculate (i) The shortest wave length
(ii)Glancing angle for first order reflection. (7)

Que.No. 7 (a) What is Hall effect ? State it's significance. How can mobility be determined by using Hall
Effect? (8)

(b) Calculate P. F. for Chromium having BCC structure. Given density 5.98 gm/cc, atomic
weight 50. (7)
