ASSIGNMENT QUESTIONS – PART – A

ACOUSTICS AND ULTRASONICS

1. What are the factors affecting the acoustical quality of a building?
2. Define absorption coefficient of a material.
3. Give the importance of Sabine's law for a good auditorium.
4. A hall of volume 1000 m^3 has a sound absorbing surface of area 400 m^2. If the average absorption coefficient of the hall is 0.2 , what is the reverberation time of the hall?
5. What is meant by resonance effect in acoustics?
6. What is echolen effect?
7. The volume of a room is 1500 m^3. The wall area of the room is 260 m^2, the floor area is 140 m^2 and the ceiling area is 140 m^2. The sound absorption coefficient for the wall is 0.03 , for the ceiling 0.8 and for the floor 0.06 . Calculate the average absorption coefficient and the reverberation time.
8. State Sabine' s law.
9. What is optimum reverberation time? Give its value for concert halls and theatres.
10. A quartz crystal of thickness 0.001 m vibrates in its fundamental frequency. Calculate its frequency. Given that, Young's modulus is 7.9 x 10^{10} N/ m^2 and density is 2650 kg/m^3 for quartz.

CRYSTALLOGRAPHY

1. Differentiate crystalline and non-crystalline materials.
2. What is meant by primitive and non- primitive cell? Give examples
3. State the conditions imposed on the cell parameters for the crystal systems having the largest number of bravais lattices and the least number of nearest neighbours.
4. Give the relation between the density of the crystal and the lattice constant.
5. What are bravais lattices?
6. Draw the following planes in a cubic structure : (001), (100), $(100)^{-}$,(111)
7. What are the lattice parameters of an unit cell?
8. Explain graphite structure.
9. What is epitaxial growth? Write any two applications.
10. What are the advantages of Bridgmann technique?

PROPERTIES OF MATTER AND THERMAL PHYSICS

1. Define Hooke's law.
2. Define neutral surface and neutral axis.
3. Draw the stress-strain curve.
4. What is an I-shaped girder? Write its advantages.
5. A copper wire of 3m length and 1mm diameter is subjected to a tension of 5 N. Calculate the elongation produced in the wire if the Young's modulus of elasticity of copper is 120 GPa
6. Calculate the work done in stretching a wire of length 1 m and of diameter 1 mm by 5 cm.
7. Define the coefficient of thermal conductivity.
8. Define Newton's law of cooling.
9. How are heat conduction and electrical conduction analogous to each other?
10. How much heat will be conducted through a slab of area 90x10^{-4} m^2 and thickness 1.2 x 10^{-3}m in one sec? When its opposite faces are maintained at temperature difference of 20 K. The coefficient of thermal conductivity of that material is 0.04 Wm^{-1} K^{-1}.