



# AJEENKYA

## D Y PATIL UNIVERSITY

---

### End Term Examination (December 2019)

School: School of Engineering

Program: B Tech

Course: Introduction to Physical Science

Course Code: ENG103

Semester: I

Max Marks: 50

Duration (mins) : 90 Min

---

*Instructions:*

- 1) Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10
  - 2) Non programmable electronic pocket calculator is allowed.
- 

Q1) Answer the following:

A) Define the following terms: (4 Marks)

- a) Lattice
- b) Crystallography
- c) Unit Cell
- d) Atomic Packing Factor

B) Obtain the relationship between lattice parameter and atomic radius for body centered cubic and face centered cubic lattice. (3 Marks)

C) Distinguish between crystalline solids and amorphous solids. (3 Marks)

**OR**

Q2) Answer the following:

A) Explain various point defects in a crystal. (4 Marks)

B) Find the theoretical density of copper assuming the atoms to be hard spheres. Atomic weight of copper is 63.54 gm/mole & radius of atom is 1.278Å.

(3 Marks)

C) Distinguish between Schottky and Frankel defects in ionic crystals.(any 3)  
(3 Marks)

Q3) Answer the following:

A) Explain the term 'reverberation' and 'reverberation time'. (4 Marks)

B) A hall has a volume of  $12500 \text{ m}^3$  and reverberation time of 1.5 sec. If 200 cushioned chairs are additionally placed in the hall, what will be the new reverberation time of the hall? The absorption of each chair is 1.0 *O.W.U.*

(6 Marks)

**OR**

Q4) Answer the following:

A) A quartz crystal of thickness 0.001 m is vibrating at resonance. Calculate it's fundamental frequency if Young's modulus of quartz is  $7.91 \times 10^{10} \text{ N/m}^2$  and density is  $2660 \text{ kg/m}^3$ . (4 Marks)

B) Explain the phenomenon of magnetostriction. How will you produce high frequency sound waves with its help? (6 Marks)

Q5) Answer the following:

A) Define Hall Effect and Hall coefficient. Obtain an expression for the Hall coefficient. (5 Marks)

B) What do you understand by intrinsic and extrinsic semi-conductors? (5 Marks)

**OR**

Q6) Answer the following:

A) Define energy level and energy band. Explain with proper diagrams, how on the basis of band theory, solids are classified as conductors, insulators and semiconductors. (5 Marks)

B) How does the band theory differ from the free electron model in explaining the properties of the metal? (5 Marks)

Q7) Answer the following:

A) What is hysteresis loop? What does it represent? What is the significance?

(5 Marks)

B) Explain the significance of Curie temperature for ferromagnetic material.

(5 Marks)

**OR**

Q8) Answer the following:

A) What are ferrites? What is their importance?

(4 Marks)

B) Write short note on:

(6 Marks)

a) Diamagnetic substances

b) Paramagnetic substances

Q9) Answer the following:

A) Write short note on solar thermal power plant.

(5 Marks)

B) Explain the function of moderator and control rods in fission reactor. (5 Marks)

**OR**

Q10) Answer the following:

A) Write short note on current and future energy requirements of India. (5 Marks)

B) State the advantages of solar thermal plant over nuclear power plant. (5 Marks)