



AJEENKYA

D Y PATIL UNIVERSITY

End Term Examinations (December 2018)

School: School of Information Technology **Program:** B Tech (MACT/DS/CTIS)

Course: Introduction to Physical Sciences **Course Code:** ENG103

Semester: I

Max Marks: 50

Duration (mins): 90

Q1) Answer the following:

A) Define the following terms: (4 Marks)

- Unit Cell
- Crystallography
- Lattice Parameter
- Atomic Packing Factor

B) Molybdenum has a BCC structure. Its density is $10.2 \times 10^3 \text{ kg/m}^3$ and its atomic weight is 95.94. Determine the radius of Molybdenum atom. (3 Marks)

C) Explain various point defects in a crystal. (3 Marks)

OR

Q2) Answer the following:

A) Distinguish between Schottky and Frankel defects in ionic crystals.(any 4) (4 Marks)

B) The density of copper is 8980 kg/m^3 and unit cell dimension is 3.6 \AA . Atomic weight of copper is 63.54. Determine the crystal structure. Calculate the atomic radius and interplaner spacing of (1 1 0) plane. (6 Marks)

Q3) Answer the following:

A) What is magnetostriction effect? Draw a circuit diagram of magnetostriction oscillator and explain its working. (6 Marks)

B) A classroom has a dimensions $20 \times 15 \times 5 \text{ m}^3$. The reverberation time is 3.5 sec. calculate the total absorption of its surfaces and the average absorption coefficient. (4 Marks)

OR

Q4) Answer the following:

- A) A quartz crystal of thickness 0.001 m is vibrating at resonance. Calculate its fundamental frequency if Young's modulus of quartz is 7.91×10^{10} N/m² and density is 2660 kg/m³. (4 Marks)
- B) Explain the term 'reverberation' and 'reverberation time'. (3 Marks)
- C) Deduce Sabine's formula for the reverberation time. (3 Marks)

Q5) Answer the following:

- A) Define energy level and energy band. Explain how solids are classified as conductors, insulators and semiconductors on the basis of band theory. (5 Marks)
- B) What do you understand by intrinsic and extrinsic semi-conductors? (5 Marks)

OR

Q6) Answer the following:

- A) Define Hall Effect and Hall coefficient. Obtain an expression for the Hall coefficient. (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) Explain the significance of Curie temperature for ferromagnetic material. (5 Marks)
- B) What is hysteresis loop? What does it represent? What is the significance? (5 Marks)

OR

Q8) Answer the following:

- A) Explain the magnetic flux density B, magnetic field strength H and magnetization M. How are they related to each other? (5 Marks)
- B) Explain the importance of isotope effect in superconductivity? (5 Marks)

Q9) Answer the Following:

- A) Explain the function of moderator and control rods in fission reactor. (5 Marks)
- B) Define activity of radioactive substance. (5 Marks)

OR

Q10) Answer the Following:

- C) Write short note on current and future energy requirements of India. (5 Marks)
- D) Enlist the advantages of tidal energy, wind energy and solar energy. (5 Marks)