



Holy-wood Academy, Kolhapur's

SANJEEVAN ENGINEERING AND TECHNOLOGY INSTITUTE

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DEPARTMENT OF ELECTRICAL ENGINEERING

SUBJECT -: ENGINEERING MATERIALS SCIENCE (EMS)

CLASS -: S.Y. B-Tech ELECTRICAL

QUESTION BANK

UNIT-: 1. ELECTRICAL CONDUCTING MATERIALS

- 1) Explain crystal structure of conducting materials.
- 2) Explain (ionic & covalent) atomic bonding.
- 3) Define the following terms- Ohm's law, Drift velocity, Mobility, Collision Time, and Mean free path, Relaxation Time, Electron Scattering.
- 4) Define & derive Thermal conductivity of conducting materials.
- 5) Define & derive electrical conductivity of conducting materials.
- 6) Write a note on resistance and resistivity of conducting materials.
- 7) Explain Fermi-Dirac distribution function.
- 8) Explain Joule's law.
- 9) Prove the ratio of thermal conductivity to electrical conductivity of a metal is directly proportional to the absolute temperature of the metal.
- 10) Explain the term superconductivity with their application.

UNIT 2: DIELECTRIC MATERIALS

- 1) Explain application of superconductivity in details.
- 2) Explain Dielectric as electric field medium.
- 3) Explain polarization with their types.
- 4) Derive Local or internal field in dielectric
- 5) Derive Clausius- Mosotti relation in dielectric.

- 6) Explain dielectric breakdown with their types.
- 7) Write a note on Pyroelectric & Piezoelectric Materials.
- 8) Write a note on Dielectric constant, Dielectric loss, Dielectric strength, and Dielectric leakage current.
- 9) Explain the application of dielectric materials

UNIT 3: SEMICONDUCTOR MATERIALS

- 1) Explain types of semiconducting materials.
- 2) Write a note on
 - (a) Electron-holes concentration
 - (b) Fermi Energy Level
 - (c) Generation & Recombination.
- 3) Derive current carrier in Intrinsic and Extrinsic semiconductor
- 4) Derive Einstein relation in semiconducting materials.
- 5) Explain LASER in details.
- 6) Derive and Explain Hall effect
- 7) Write a note on Alloy steel with their types

UNIT 4: MAGNETIC MATERIALS

- 1) Explain Classification of magnetic materials.
- 2) Explain spontaneous magnetization in ferromagnetic materials
- 3) Write a note on
 - (a) Magnetostriction
 - (b) Diamagnetism
 - (c) Anti-ferromagnetic
 - (d) Feebly magnetic materials
 - (e) cast and cermet permanent magnets
 - (f) Ageing of magnets
- 4) Explain ferrimagnetisms (ferrites) and application.
- 5) Explain Tape and Memory Devices in details.
- 6) Differentiate soft and hard magnetic materials.

UNIT 5: SPECIAL PURPOSE MATERIALS

- 1) Explain indetails Refractory Materials.
- 2) Explain indetails Structural Material's.
- 3) Explain indetails Radioactive Materials.
- 4) Explain indetails Galvanization and Impregnation of materials.
- 5) Explain indetails Ultrasonic Radiography.
- 6) Explain indetails X-ray diffraction- Bragg's law.

**Prepared By,
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