



(Following Paper ID and Roll No. to be filled in your Answer Book)	
PAPER ID : 2053	Roll No. <input type="text"/>

B. Tech.

(SEM. IV) EXAMINATION, 2008-09

ELECTRICALS &

ELECTRONICS ENGINEERING MATERIALS

Time : 3 Hours]

[Total Marks : 100

- Note :*
- (1) Attempt all questions
 - (2) All questions carry equal marks.

1 Attempt any **four** parts of the following : 5×4

- (a) Explain briefly the following :
 - (i) Body centered cubic structure (BCC)
 - (ii) Face centered cubic structure (FCC)
- (b) Explain with suitable examples the ionic, covalent and metallic bonding in crystals.
- (c) Describe edge and screw dislocations.
- (d) A beam of X-rays of wavelength 0.842\AA is incident on a crystal at a grazing angle $8^\circ-35'$ when the first order Bragg's reflection occurs. Calculate the angle of incidence for third order reflection.



(e) What is Millar Indices? Describe the procedure for finding it with an example. <http://www.uptuonline.com>

(f) Show that for a simple cubic system :

$$d_{100} : d_{110} : d_{111} :: \sqrt{6} : \sqrt{3} : \sqrt{2}$$

2 Attempt any **four** parts of the following : 5×4

- (a) Explain zone theory of solids
- (b) Explain superconductivity. Describe briefly the properties of superconductors.
- (c) What is electrical conductivity? Enlist the factors affecting the electrical conductivity of metals.
- (d) Derive an expression for heat developed in a current carrying conductor.
- (e) A resistance wire of 1 metre length and diameter 0.08 mm has a resistance of 95.5 ohm. Calculate the resistivity of the wire material.
- (f) Explain thermal conductivity and obtain an expression for coefficient of thermal conductivity.

3 Attempt any **two** parts of the following : 10×2

- (a) What do you understand by the term dielectric loss and loss angle? How do loss factor and dielectric constant vary with temperature and frequency of an alternating field? Explain.

2053)



2

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- (b) (i) Explain the phenomenon of polarisation in dielectric materials. <http://www.uptuonline.com>
- (ii) Discuss Electronic polarization and Ionic polarisation.
- (c) Explain with examples:
- (i) Ferroelectricity and
- (ii) Piezoelectricity

4 Attempt any **two** parts of the following: **10×2**

- (a) (i) Differentiate between intrinsic and extrinsic semiconductors.
- (ii) What is semiconductor? Differentiate between N-type and P-type semiconductors and how are they produced?
- (b) What is Hall Effect? Derive the relation between Hall Coefficient and carrier density.
- (c) What are the advantages of FET over conventional bipolar junction transistor? Give the constructional details of JFET.

5 Attempt any **two** parts of the following : **10×2**

- (a) Distinguish between soft and hard magnetic material. Draw B-H curve for a soft magnetic material and explain the significance of the nature of the curve.

2053]



3

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- (b) (i) Describe hysteresis loop of a magnetic material and explain residual magnetism and coercive force. <http://www.uptuonline.com>
- (ii) Explain the phenomenon of magnetostriction.
- (c) (i) State the relative advantages and disadvantages of aluminium as compared to copper as a conductor of electricity.
- (ii) How do you classify the materials as dia, para or ferromagnetic?