

AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZAIABAD
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
SESSIONAL TEST – 2

Course: B. Tech
Session: 2017-18
Subject: Electrical & Electronics Engg. Material
Max. Marks: 50

Semester: III
Section: EN-1, 2
Sub. Code: REE -301
Time: 2 hour

Section-A

A. Attempt **all** parts.

(5x2 = 10)

1. Define the term Remanence and Susceptibility related to magnetic material.
2. Discuss the effect of ageing on magnetic materials.
3. Explain the transport phenomenon of mobile charge carriers in a semiconductor.
4. What is Feebly magnetic material?
5. Distinguish between Drift and Diffusion Current.

Section-B

B. Attempt **all** parts.

(5x5 = 25)

6. Explain the following:
 - (i) Ferromagnetism
 - (ii) Paramagnetism
7. Differentiate between Hard and Soft magnetic materials along with the magnetization characteristics.
8. Calculate the current produced in a Germanium Plate of area 1cm^2 and of thickness 0.3 mm when a potential difference of 2V is applied across faces. Given, concentration of free electron in Germanium is $2 \times 10^{19}/\text{m}^3$ and mobilities of electrons and holes are $0.36 \text{ m}^2/\text{V-s}$ and $0.17 \text{ m}^2/\text{V-s}$ respectively.
9. Discuss the process of manufacturing of IC from Ingot along with elaborative diagram.
10. Define the term magnetostriction and discuss the types of magnetostriction.

Section-C

C. Attempt **all** parts.

(2x7.5 = 15)

11. Derive the relation between Relative Permeability and Susceptibility. A magnetic field of 2400 A/m is applied to a material having a susceptibility of 1500. Determine (i) its relative permeability (ii) Intensity of magnetization (iii) Magnetic field intensity.
12. Write short notes on the following:
- (i) Atomic structure of Intrinsic and Extrinsic semiconductors
 - (ii) Application of Semiconductors
 - (iii) Thermistors

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Model Solution Sessional Test-2

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SECTION - A

Prepared by - Rahul Dixit
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Ques 1: Define the term Remanence and Susceptibility related to magnetic materials?

Solution: Remanence: It is defined as the magnetic flux density which still persists in magnetic material even when the magnetising force is completely removed. It is expressed in wb/m^2 .

Susceptibility:

It is denoted by letter χ and is defined as the ratio of intensity of magnetisation (I) to magnetising force (H). In other words $\chi = \frac{I}{H}$.

Ques 2: Discuss the effect of ageing on magnetic materials?

Solution: Ageing of a permanent magnet is the process of normal or accelerated change, under continued normal or specified artificial conditions, in the strength of the magnetic field maintained.

Ageing can be of following types

1. > Metallurgical
2. > Magnetic.

Magnets that have been metallurgical aged cannot be restored while magnets with magnetic ageing can be restored to their original strength by remagnetisation.