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B. Tech.
(SEM III) THEORY EXAMINATION 2017-18
ELECTRICAL & ELECTRONICS ENGINEERING MATERIALS

Time: 3 Hours   *Total Marks: 70*
Note: (i) Attempt all questions. If required any missing data; then choose suitably.
           (ii) All questions carry equal marks.

SECTION -A

1. Attempt all question in brief: (2x7=14)
    a) What are Magnetostriction and its types?
    b) Write about spontaneous polarization.
    c) What is Coercivity and Retentivity explain with diagram?
    d) Calculate the thermal voltage equivalent to 123°c.
    e) Differentiate between solid, liquid and gaseous insulating materials.
    f) What are Piezoelectric and Pyroelectric materials?
    g) What is resistivity and conductivity give a relation between them

SECTION -B

2. Attempt any three parts of the following   :   (7x3=21)

    a) Explain electrical conductivity in solid, liquid and gaseous dielectrics.
    b) Explain the following:
        i.   Name some dielectrics which are used in capacitors
        ii.   Explain the breakdown in dielectric materials.
        iii. Discuss the properties of transformer oil.
    c) What are different integration techniques, differentiate between LSI and VLSI, also list the number of transistors we can integrate in each technique.
    d) What is a resistor, what are their types? Explain the color coding of resistors with an example.
    e) What is ageing of magnets and its type, how a permanent magnet is affected by ageing?

SECTION -C

3. Attempt any **one** parts of the following: (7x1=7)

    a) What are the methods of making permanent magnets, explain each process involved in detail?
    b) What are soft and hard magnetic materials? Differentiate with the help of BH curve.

4. Attempt any **one** parts of the following: (7x1=7)

    a) Describe the behavior of dielectrics in alternating fields and use it to explain the phenomenon of dispersion.
    b) Explain the terms piezoelectricity and ferroelectricity. Discuss the materials having these properties and there uses.

5. Attempt any **one** parts of the following: (7x1=7)
    a) Adoped semiconductor has hall coefficient = 3.6×10^{-4} and resistivity= 9×10^{-3} Ω-m. Assuming single carrier concentration (e^-), the mobility and charge density of carrier in the specimen approximately are given as.
    b) Explain Hall Effect with diagram; give the expressions for hall voltage, charge density, hall coefficient and mobility. Also state the applications of Hall Effect?

6. Attempt any **one** parts of the following: (**7x1=7**)

    a) What is a PN junction diode, how it is formed, what happens when it is reversed biased, give the significance of Break over voltage (VBR) with I-V characteristics of diode.

    b) How we can get silicon wafers from a raw silicon ingot, give and explain all the process involved in silicon shaping with proper diagram, what's need to be done to avoid vibration and deflections in the blade?

7. Attempt any **one** parts of the following: (**7x1=7**)

    a) Classify the magnetic materials based on their dipole moments, also give the examples of each.

    b) Explain spontaneous magnetization in ferromagnetic materials. Write down the factors affecting permeability and hysteresis.