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Total No. of Questions : 09

B.Tech.(EE/EEE) (Sem.–4th)

ELECTRICAL ENGINEERING MATERIALS

Subject Code : EE-208

Paper ID : [A0410]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

SECTION-A

I. Write briefly :

a. Justify the presence of μ_r in the equation, $B = \mu_0\mu_r H$.

b. Define the quantity expressed by $\alpha_o = \frac{p_p^2}{3kT}$.

c. Write the relationship for combined polarization as function of ϵ_r and atomic constant α_e, α_i, α_o.

d. Write an expression for the current through the capacitor considering complex dielectric.

e. Explain the term "Debye Temperature".

f. Give the expression for Curie-Weiss rule, explain.

g. Give the material composition of soft solder rods.

h. Draw arrangement of dipole moments in different magnetic materials.

i. Draw B-H curves for transformer core and resistance filament materials.

j. Derive Electric flux density 'D' from Coulomb's law.

SECTION-B

2. What do you mean by polarization of dielectric n to static fields?
3. Explain electrical conductivity of metal. Explai materials.
4. Explain the term superconductivity. Explain the magnetic flux.
5. Explain the characteristics of magnetic materials use
6. Explain why, Curie Law was modified to Curie-W

SECTION-C

7. Derive the Clausius-Mosotti relation for dielectr deduce Lorentz-Lorenz equation.
8. A conduction wire has a resistivity of 2.04 × temperature. The Fermi energy for such a condu 5.8×10^{28} conduction electrons per m^3. Calculate
   (i) the mobility and relaxation time of the electron
   (ii) the average drift velocity of the electrons applied to the conductor is 1.1 V per m.
   (iii) velocity of an electron with the Fermi energy.
   (iv) the mean free path of the electrons.

Explain ferromagnetic domains. Explain B-H curve and induction motor design.

[N-2- 1839]