

16054(D)

- 0 DEC 2016

B. Tech 3rd Semester Examination

Electrical Engineering Materials and Applications (NS)

EE-213

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt any five questions in all, selecting one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. (a) What is difference between thermionic emission and photoelectric emission? (10)
(b) Derive Maxwell-Boltzmann equation and write expression for mean free path and mean free time. (10)
2. (a) What do you mean by energy levels of the molecule? How does Fermi-Dirac distribution used for energy level? (10)
(b) Explain the phenomenon of motion of electron in an electric field and hence the current carried by electron. (10)

SECTION - B

3. (a) What do you mean by polarisation? Describe the phenomenon and its effect. Which materials are called ferroelectric materials? (10)
(b) Describe different types of polarisation mechanism. (10)
4. (a) What are requirements for a good insulating material? (8)
(b) Describe two properties each for mica and rubber. (8)
(c) What do you mean by ferroelectricity? (4)

SECTION - C

5. (a) Compare paramagnetism and ferromagnetism. (10)
(b) How does magnetic materials are classified? (10)
6. (a) Differentiate between antiferromagnetism and ferrimagnetism. (10)
(b) Describe factors affecting magnetic properties of materials. (10)

SECTION - D

7. (a) Differentiate between p-type and n-type semiconductors. (10)
(b) Describe Hall effect and Hall coefficient. Derive the expression for Hall coefficient. (10)
8. (a) A sample of n-type semiconductor has a resistivity of $0.1\Omega\text{-m}$ and Hall coefficient of $110\text{ cm}^3/\text{coulomb}$. Determine electron density and mobility. Assume electron as carriers. (10)
(b) Explain the conductors, semiconductors and insulators with respect to energy bonds in solid. (10)

SECTION - E

9. (a) Write two factors affecting resistivity of conductors.
(b) Explain field emission.
(c) What is contact potential?
(d) Write Langevin-Debye equation for dielectric.
(e) What do you mean by breakdown in dielectric?
(f) Define magnetostriction.
(g) What are the materials used in power insulation?
(h) Write four magnetic materials name.
(i) Define drift velocity.
(j) Why copper can not be regarded as semiconductors?
(10×2=20)