Total No. of printed pages = 6

END SEMESTER EXAMINATION – 2020

Subject Code : CAI-405

ELECTRONIC COMPONENTS AND MATERIALS

Full Marks : 70

Time : Three hours

The figures in the margin indcate full marks for the questions.

PART – A

Marks – 25

1. Determine the correct options for the following questions : 1×10=10

   (i) For n-type semiconductor impurity type is

   (a) Acceptor (b) Donor

   (c) May be both (d) None of these

   (ii) If the length of a wire is halved, its resistance becomes

   (a) one-fourth (b) half

   (c) twice (d) four times

[Turn over

(iii) If an IC contains 101 components on it the IC will fall in which category ?

(a) SSI (b) MSI

(c) LSI (d) VLSI

(iv) The non-linear variation of magnetic flux (B) with magnetizing force (H) during magnetization and demagnetization is known as

(a) Piezoelectricity (b) Magnetostriction

(c) Hysteresis (d) None of these

(v) For metals the temperature coefficient (α_o)

(a) Negative

(b) Zero

(c) Positive

(d) May be positive or may be negative

(vi) Which of the following is a common application of Tungsten ?

(a) PCB fabrication (b) Batteries

(c) Transformer coils (d) Filament.

(vii) Nichrome contains

(a) 2% chromium (b) 12% chromium

(c) 22% chromium (d) 32% chromium

(viii) ICs in which all the components are fabricated together on a single chip are called as

(a) Digital (b) Hybrid

(c) Monolithic (d) Linear

(ix) The units of μ_0 and μ_r are

(a) H/m for both

(b) H/m for μ_r and no units for μ_0

(c) H/m for μ_0 and no units for μ_r

(d) Wb/m for μ_0 and no units for μ_r

(x) Which of the following material is used for temperature measurement ?

(a) Platinum (b) Silver

(c) Gold (d) Copper.

2. State whether the following statements are true or false : $1 \times 10 = 10$

(i) Ceramic materials are made from clay.

(ii) Both Silicon and Germanium are used as semiconductors.

(iii) The phenomenon of conversion mechanical energy into magnetic flux and vice versa is known as magnetostriction.

(iv) The conductivity of a material depends on purity of the material.

(v) Copper is used in making PCBs.

(vi) At a very low temperature, a semiconductor becomes an insulator.

(vii) Hard ferromagnets are used in transformer.

(viii) Gallium Arsenide is a semiconductor.

(ix) Soft ferromagnet remains magnetized even after removal of magnetizing force.

(x) In SSI ICs number of components is 100-1000.

3. Fill in the blanks : 1×5=5

(i) Nickel is a _____.

(ii) If a conductor is used for a long duration, its reistivity _____.

(iii) A transformer works on the principle of _____.

(iv) Dielectric loss is directly proportional to _____.

(v) Bakelite is an _____.

PART – B

Marks – 45

4. State the intrinsic and extrinsic factors affecting conductivity of a material. 10

5. Explain the manufacturing process of a carbon film resistor. 8

6. Give the general comparison of metal/alloy film reistor, metal oxide resistor and carbon film resistor. 5

7. What are self inductance and mutual inductance ? How they are related ? 7

8. Write short notes on : 5×3=15

(a) High resistivity alloys

(b) Classification of IC

(c) Ceramic materials.