Total No. of Questions : 8]

SEAT No. :

P611

[Total No. of Pages : 2

[5869]-233
S.E. (Electrical)
MATERIAL SCIENCE
(2019 Pattern) (Semester - III)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Figures to the right indicate full marks.***
3) ***Assume Suitable data if necessary.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) Explain the properties of solid insulating material. **[6]**

b) Give the property of following **[6]**

i) PVC

ii) Bakelite

c) Explain the property of ceramic material. **[5]**

OR

Q2) a) State the property of insulating material used for transformer. **[6]**

b) State the requirement of material used for rotating machines. **[5]**

c) Give the property of line insulator and explain anyone. **[6]**

Q3) a) Explain the terms diamagnetism, paramagnetism, ferromagnetism and antiferromagnetism and ferrimagnetism with the reference to magnetic dipoles of the atom. **[6]**

b) Define: **[6]**

i) Permeability

ii) Magnetic susceptibility

iii) Magnetic Moment

iv) Magnetization

c) Define with units **[6]**

i) Magnetic Dipole moment

ii) Magnetization

iii) Magnetic Susceptibility

OR

P.T.O.

Q4) a) Differentiate between hard and soft magnetic material. **[6]**

b) Derive curie-weiss law for magnetic material. **[6]**

c) Explain the behaviour of ferromagnetic material under curie temperature. **[6]**

Q5) a) Write short notes on **[6]**

i) Thermocouple

ii) Thermal Bimetal

b) What do you mean by an alloy, hence write property of kanthal and constantan. **[6]**

c) Discuss briefly energy band in conductor and insulator. **[5]**

OR

Q6) a) State properties of material used for solders. **[6]**

b) Which material is suitable for lamp filament, give its suitable properties. **[5]**

c) Write down properties and application of **[6]**

i) Silver and its alloy

ii) Copper and its alloy

Q7) a) Give any two application of any two nano - molecular machines. **[6]**

b) Explain nano wires **[6]**

c) Explain carbon nano tubes **[6]**

OR

Q8) a) Describe molecular machines with neat diagrams. **[6]**

b) Describe single electron transistor with neat diagram. **[6]**

c) Write down application of carbon nano tubes and BN nano tubes. **[6]**