Total No. of Questions : 8]

SEAT No. :

P1498

[Total No. of Pages : 2

[6002]-126
S.E. (Electrical)
MATERIAL SCIENCE
(2019 Pattern) (Semester - III) (203142)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Attempt 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 various factors which affects breakdown of solid insulating material. **[6]**

b) Discuss insulating materials used for transmission line. **[6]**

c) State the properties and application of **[5]**

i) Mica

ii) SF_6

OR

Q2) a) Classify insulating materials and hence write properties and applications of any two materials from Class C type. **[6]**

b) Explain properties of insulating materials which are used in line insulator. **[6]**

c) Give properties and application of PVC and polyethylene. **[5]**

Q3) a) What do you mean by spontaneous magnetization? And derive curie-Weiss law for ferromagnetic material. **[6]**

b) Define the following terms. **[6]**

i) Magnetic dipole moment

ii) Magnetization

iii) Magnetic susceptibility

P.T.O.

c) A magnetic field strength of a material is 10^6 *A/m*. Given that magnetic susceptibility of material at room temperature is $1.25x\ 10^{-3}$. Calculate **[6]**

i) Induced magnetization.

ii) Flux density

iii) Permeability

OR

Q4) a) Compare paramagnetic and ferromagnetic material. **[6]**

b) Explain ferromagnetic and ferrimagnetic material and their application. **[6]**

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

Q5) a) Give the properties and application of

i) Copper

ii) Aluminium. **[6]**

b) What is thermal bimetal? Which materials are used for this, give any three application. **[6]**

c) Write a short note on thermocouple. **[5]**

OR

Q6) a) Describe properties and application of **[6]**

i) Nicrome

ii) Tungsten

b) Give the properties and application of Manganin. **[5]**

c) Explain Soft and hard solder. **[6]**

Q7) a) Explain energy bands with neat sketch. **[6]**

b) Give any three nano molecular machines **[6]**

c) Explain SET(Single Electron Transistor). **[6]**

OR

Q8) a) Explain **[6]**

i) Nano wires

ii) Nano carbon tubes

b) Explain Carbon cluster. **[6]**

c) Describe with neat diagram molecular machines. **[6]**