Total No. of Questions : 8]

SEAT No. :

PE4246

[Total No. of Pages : 2

[6582]-17
S.E. (Electrical Engineering)
MATERIAL SCIENCE
(2019 Pattern) (Semester - III) (203142)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve 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) ***Neat diagram must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) State the characteristics of good insulating materials. **[4]**

b) Give thermal classification of solid insulating materials with examples. **[6]**

c) State the properties and applications of **[8]**

i) transformer oil &

ii) air

OR

Q2) a) List out the insulating materials with their properties used in **[4]**

i) Power transformer

ii) Capacitors.

b) What is Ceramic? State its properties and applications. **[6]**

c) State the properties and applications of **[8]**

i) Paper &

ii) SF6 gas

Q3) a) State the following terms **[3]**

i) Magnetic dipole moment

ii) Magnetic flux density

iii) Magnetic susceptibility

b) Write a short note on ferrites. **[6]**

c) Explain the behaviour of Ferromagnetic materials below the curie temperature. **[8]**

OR

P.T.O.

Q4) a) Which material is used to make the transformer core? Why? **[3]**

b) State the difference between soft and hard magnetic materials. **[6]**

c) State the properties and applications of antiferromagnetic materials. **[8]**

Q5) a) State the properties of **[4]**

i) brass and

ii) bronze

b) State the properties and applications of **[6]**

i) Copper

ii) Aluminium.

c) Write a short note on thermal bimetal. **[8]**

OR

Q6) a) State the properties and applications of carbon material. **[4]**

b) Give the name and properties of conducting materials used for **[6]**

i) Making lamp filaments

ii) Solder

c) Write a short note on thermocouple. **[8]**

Q7) a) Draw neat diagram of energy bands in insulator, semiconductor and conductor. **[3]**

b) Explain with neat diagram carbon nano clusters. **[6]**

c) Define carbon nanotubes and explain types of carbon nanotubes. **[8]**

OR

Q8) a) State any three applications of nanomaterials in electrical engineering. **[3]**

b) Compare CNT and BNT. **[6]**

c) Write short note on **[8]**

i) Molecular machine

ii) SET