Total No. of Questions : 8]

SEAT No. :

PC2793

[Total No. of Pages :2

[6352]-17

S.E. (Electrical Engineering)

MATERIAL SCIENCE

(2019 Pattern) (Semester- III) (203142)

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) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary.***
5) ***Use on non-programmable calculator is allowed.***

Q1) a) Explain the properties of ceramic material. **[4]**

b) Classify insulating materials and hence write properties and application of any two materials from Class F type. **[6]**

c) Explain properties of insulating materials which are used in Cables and transformers. **[8]**

OR

Q2) a) State the requirement of material used for rotating machines. **[4]**

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

i) Sulphur Hexa Fluoride

ii) Transformer oil

c) Explain the properties & applications of solid insulating material. **[8]**

Q3) a) State the properties of Magnetic material used for transformer core. **[3]**

b) Differentiate Soft Magnetic Materials and Hard Magnetic Materials. **[6]**

c) Explain the terms diamagnetism, Para magnetism, ferromagnetism and Anti-ferromagnetism with the reference to magnetic dipoles of the atom. **[8]**

OR

Q4) a) Draw and explain magnetization curve for a ferromagnetic material. **[3]**

b) What is Curie temperature? Explain Ferro-magnetic behaviour below critical temperature. **[6]**

c) Define: **[8]**

i) Permeability

ii) Magnetic susceptibility

iii) Magnetic Moment

iv) Magnetization

Q5) a) State properties of electrical solders materials. **[4]**

b) Write down properties and application of Copper and its alloys. **[6]**

c) What do you mean by an alloy, hence write property of Nichrome and constant. **[8]**

OR

Q6) a) State the properties & applications of Electrical Carbon material. **[4]**

b) Describe properties and applications of Tungsten & Kanthal. **[6]**

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

i) Thermocouple

ii) Thermal Bimetal

Q7) a) State application of BN nano tubes. **[3]**

b) Describe with neat diagram-Nano wires. **[6]**

c) Explain Nano materials used in Batteries and Photovoltaic Cells. **[8]**

OR

Q8) a) State application of carbon nano tubes. **[3]**

b) Describe with neat diagrams-Carbon clusters. **[6]**

c) Describe single electron transist or with neat diagram. **[8]**