Total No. of Questions : 8]

SEAT No. :

PB3612

[Total No. of Pages : 2

[6261]-17
S.E. (Electrical Engineering)
MATERIAL SCIENCE
(2019 Pattern) (Semester-III) (203142)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Attempt Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data if necessary.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) State the properties of SF6 gas. **[4]**

b) Explain properties of insulating materials which are used In Transformer & Capacitor. **[6]**

c) Write down properties of Paper & Pressboard. **[8]**

OR

Q2) a) Give the applications of Ceramics. **[4]**

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

c) Discuss insulating materials used for line insulators. **[8]**

Q3) a) Define Permeability, Magnetization, Magnetic Susceptibility **[3]**

b) Explain in detail BH curve (hysteresis loop) for ferromagnetic materials. **[6]**

c) Explain Ferromagnetic & Ferrimagnetic materials and their applications. **[8]**

OR

Q4) a) Explain Spontaneous Magnetization. **[3]**

b) Write short note on Ferrites with their properties and application. **[6]**

c) Write short note on Compact Disc & LASER. **[8]**

P.T.O.

Q5) a) Give the properties and application of Copper. **[4]**

b) Write short note on thermocouples. **[6]**

c) A filament of a 200V, 100W lamp is to be manufactured. If filament temperature is 2500° at 100W dissipation & resistivity of the filament material at 20°C is 4.3×10^{-6} ohm-cm and $\alpha_{20} = 0.005/°C$. Calculate the length of the filament at 20°C if its diameter at 20°C is 0.022mm. **[8]**

OR

Q6) a) Give with reasons the material used for making the Filament of lamp. **[4]**

b) Describe properties & applications of Canthal & Bronze. **[6]**

c) Enlist materials with high resistivity. Describe properties and applications of any two materials. **[8]**

Q7) a) Write short note on molecular machine **[3]**

b) With neat diagram, explain energy bands in insulators. **[6]**

c) Explain with neat diagram - BN nanotubes. **[8]**

OR

Q8) a) Write a short note on Single Electron Transistor. **[3]**

b) Write down applications of carbon nano tubes and BN nano tubes. **[6]**

c) Explain nano wires with uses. **[8]**