

B.Tech. SEM -IV Electrical 2014 Course (CBCS) : WINTER - 2018

SUBJECT: ELECTRICAL ENGINEERING MATERIALS

Day : Saturday
Date : 17/11/2018

W-2018-2346

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

N. B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data, if necessary.

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- Q.1 a)** State Properties & Applications of 1) Copper alloys and 2) Carbon (04)
b) What are thermal bimetals? Name some Thermal bimetals & their applications. (06)

OR

- Q.1 a)** Name the materials used in the followings with reason (06)
1) Element in filament lamp 2) Element in fuses 3) Material used for rheostat
b) Explain the factors which affect the resistivity of conducting materials. Give examples in support of your answer. (04)

- Q.2 a)** Differentiate between (04)
1) Cold rolled and hot rolled grain oriented Silicon steel
2) Ferromagnetism & Antiferromagnetism.
b) In a material an application of magnetic field of 1.75×10^5 A/m causes a magnetic flux density of 218.2 mwb/m². Calculate its permeability and susceptibility. Also find magnetization. (06)

OR

- Q.2 a)** Explain the terms 1) Dipole moment 2) Permeability (05)
3) Magnetization 4) Flux density
b) Explain magnetic materials used for Electric machines. (05)

- Q.3 a)** State the electrical applications of the following materials. Explain why these materials are suitable for given applications. 1) Mica 2) Transformer oil (05)
b) Give the thermal classification of insulators with limiting temperature range and materials used. (05)

OR

- Q.3 a)** What are ceramics? Give their properties and applications. What is the effect of temperature and moisture on ceramics? (05)
b) Discuss insulating materials used for power transformers and wires. (05)

- Q.4 a)** Describe the electronic polarization with atomic model without field and when the electric field is applied. (06)
b) What are photo resistors? Write the applications. (04)

OR

- Q.4 a)** Describe how ionic separation of ions occurred when subject to an electric field. (05)
b) Two parallel plates 0.15×0.30 m² in area are separated by dielectric of thickness 0.06 m, dielectric constant $\epsilon_r = 5.4$. Capacitor so formed is connected to a 400 V DC supply. Calculate 1) induced polarization in dielectric (05)
2) electric field intensity in the dielectric

- Q.5** Explain with structure working of carbon clusters, carbon nanotubes. Write their applications. (10)

OR

- Q.5** Explain the working of molecular machines and BN nanotubes with application. (10)

- Q.6** Describe how the capacitors stores charge. Explain the construction and working of any two types of capacitors. (10)

OR

- Q.6 a)** Describe capacitor loss tangent, electric strength and operating stress. (05)
b) Describe any one type of resistor with construction and material used. (05)

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