

Registration No:

--	--	--	--	--	--	--	--	--	--

Total Number of Pages: 02

B.TECH
BSMS1213

3rd Semester Regular / Back Examination 2015-2016

MATERIAL SCIENCE AND ENGINEERING

BRANCH: AEIE,EC,EEE,EIE,ELECTRICAL,ETC,IEE

Time: 3 Hours

Max Marks: 70

Q.Code: T387

**Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.**

- Q1 Answer the following questions: (2 x 10)
- Define critical magnetic field.
 - What is Cooper pair?
 - Write down the relationship between polarization and dielectric constant.
 - Define dielectric susceptibility.
 - Write unit of polarizability?
 - What is the cause of superconductivity in a superconductor?
 - Write down the expression for Lorentz number?
 - Define conducting polymer?
 - What do you mean by the Degree of polymerization?
 - What do you mean by Polymer matrix composite?
- Q2 a) What do you mean by the Meissner effect? Explain BCS theory. (6)
- b) Explain how failure analysis of material selection helps the manufacturer to manufacture a better product. (4)
- Q3 a) Prove that superconductors are perfect diamagnetic. Plot the variation of resistance versus temp. of a superconductor and normal conductor. (5)
- b) How is hardness of a material measured? A copper wire originally 405 mm long is pulled in tension with stress of 376 MPa. Calculate the elongation by assuming purely elastic deformation. Given modulus of elasticity for Cu is 110,000 MPa. (5)
- Q4 a) Using Langevin's classical theory of paramagnetism, derive an expression for the average value of paramagnetic dipole moment. (6)
- b) Define critical magnetic field? Plot the variation of critical magnetic field with temp. of a superconducting material. (4)

- Q5 a) Define polymer and explain polymerization with example. (4)
b) Write preparation and uses of i)PMMA ii)Bakelite iii)Nylon 6,6 (6)
iv)PTFE
- Q6 a) What are ferroelectric materials? Discuss about various types of (5)
ferroelectric materials.
b) What do you mean by the soft glass ?Discuss its properties and (5)
application
- Q7 a) What do you mean by corrosion? How is corrosion controlled by (6)
the use of protective coating
b) The polarisability of Argon gas is $1.8 \times 10^{-40} \text{ Cm}^2/\text{V}$.Calculate the (4)
dielectric constant and dielectric susceptibility of argon at NTP.
- Q8 Write short notes on any two: (5 x 2)
a) classical free electron theory
b) Metal matrix composite and Laminated composite
c) Stress corrosion and pitting corrosion
d) Type-I and Type-II superconductor.