**Registration No :** | | | | | | | | | | |

**Total Number of Pages : 02** **B.Tech.**
**BSMS1213**

**4th Semester Back Examination 2017-18**
**MATERIAL SCIENCE AND ENGINEERING**
**BRANCH : AEIE, ECE, EEE, EIE, ELECTRICAL, ETC, IEE**
**Time : 3 Hours**
**Max Marks : 70**
**Q.CODE : C1133**

**Answer Question No.1 which is compulsory and any five from the rest.**
**The figures in the right hand margin indicate marks.**
**Answer all parts of a question at a place.**

**Q1** **Answer the following questions:** **(2 x 10)**

**a)** Draw stress-strain curve for ductile material.
**b)** While selecting material for impact loading which property is important?
**c)** What is hardness?
**d)** What is cermet?
**e)** What is shape memory alloy?
**f)** What is degree of polymerisation?
**g)** What is the basic cause of superconductivity in a material?
**h)** Write down the factors on which the polarization of a dielectric material depends?
**i)** What is the basic difference between soft and hard magnetic materials?
**j)** Graphically shows the frequency and temperature dependence of dielectric constant?

**Q2** **a)** What is creep? **(2)**
**b)** Explain about different impact testing with neat sketch. **(8)**

**Q3** **a)** Explain about condensation polymerisation. **(5)**
**b)** A cylindrical specimen of steel having an original diameter of 12.8mm is tensile tested to fracture and found to have an engineering fracture strength of 460MPa. If its cross-sectional diameter at fracture is 10.7mm, determine **(5)**
(i) The ductility in terms of percent reduction in area.
(ii) The true stress at fracture.

**Q4** **a)** Draw and explain about Perovskite structure. **(5)**
**b)** A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 69 GPa and 60 vol% of a polyester resin that, when hardened, displays a modulus of 3.4 GPa **(5)**
(i) Compute the modulus of elasticity of this composite in the longitudinal direction.
(ii) If the cross-section area is 250 $mm^2$and a stress of 50 MPa is applied in this longitudinal direction, compute the magnitude of the load carried by each of the fiber and matrix phases.

**Q5** **a)** Distinguish between conductor, semiconductor and insulator on the basis of band gap. **(3)**

**b)** With a suitable theory describe the concept of free electron and derive an expression for electrical conductivity of a material. **(7)**

**Q6** **a)** What do you mean by dielectric breakdown and dielectric constant of a dielectric material? Establish the relation between them. **(5)**

**b)** Distinguish between Type-I and Type-II superconductivity. **(5)**

**Q7** What do you mean by optical fibres? Discuss the principle of propagation of signals through it. Write down its few applications. **(10)**

**Q8** **Write short note on any TWO :** **(5 x 2)**

**a)** Laser

**b)** Fracture

**c)** SMART materials

**d)** Microcomposites and Macrocomposites