Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

 Roll No .....

ES-220 (CS)

B.E. IV Semester

Examination, June 2017

Choice Based Credit System (CBCS)

Material Science

Time : Three Hours

Maximum Marks : 60

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) What are the mechanical properties of metals? Discuss the concept of stress and strain in detail.
   b) What do you understand by crystallographic directions and planes? Explain the structure of crystalline solids.

2. a) What are the materials used for optical fibres? Discuss optical materials in LED.
   b) Explain the concept of Electronic and ionic conduction.

3. Calculate the drift velocities of holes and electrons in
   a) Silicon and
   b) Germanium at 300k when applied electric field is 50Volt/cm.

   Take $\mu_p = 500cm^2/volt\text{-}sec$ and $\mu_n = 1500cm^2/volt\text{-}sec$ for silicon and $\mu_p = 3700cm^2/volt\text{-}sec$ and $\mu_n = 3600cm^2/volt\text{-}sec$ for germanium.

4. a) What is Hall effect? Derive the relation between hall coefficient and carrier density. Assume the presence of only one type of charge carrier.
   b) Discuss the phenomena of electrothermal breakdown of solid dielectrics.

5. a) Explain the term magnetosfriction as applied to ferromagnetic materials.
   b) What do you mean by 'Allotropy of metals'? Explain.

6. Calculate the loss per kg in a specimen of alloy steel for a maximum flux density of $1.1wb/m^2$ and a frequency of 50Hz; using 0.5mm thick sheets. The resistivity of alloy steel is $30 \times 10^{-8}\Omega m$. The density is $7800kg/m^3$ hysteresis loss in each cycle is $380W\text{-}s/m^3$.

7. a) What are ferrites? Discuss Antiferromagnetism.
   b) What are the materials, suitable for the construction of fuses? Define the term fusing current.

8. Write short notes on any two of the following:
   a) Electronic spin
   b) Grid work construction of plates
   c) Magnetic anisotropy

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