

Roll No .....

**ES-220(AU/ME/MI) (CBCS)****B.E. III Semester**

Examination, December 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.

- Followings are the statements write whether it is true or false.
  - Fiber glass is a composite material.
  - A high impact value indicates poor ability to withstand shock than a low impact value.
  - NaCl contains 8 atoms per cell.
  - Cementite is an interstitial compound of iron containing 6.67% of carbon and having a chemical formula of  $Fe_3C$ .
  - A TTT curve is valid only when transformation of austenite takes place adiabatically.
  - The method of heat treatment by which carbon content increases at the surface of ferrous material is known carburizing.
- What are the three most common space lattices observed in metals? Explain each in brief.
  - Define a crystalline substance. How does it differ from an amorphous material?

- What do you mean by Crystal Imperfection? Explain the point and line defects in crystals.
  - Define strength, and explain in brief the strengthening mechanisms in metals.
- Draw an Iron carbon phase diagram and mentioned various phases of Iron-Carbon.
  - What are the polycrystalline metals? Draw the stress strain curve for polycrystalline materials.
- What is an Alloy Steel? Why is it so called? What is the range of composition of alloy steels?
  - Explain how to determine from the equilibrium diagram, the composition of two phases that are in equilibrium at any temperature.
- What are the engineering materials? Give the classification of engineering materials.
  - How does the heat treatment for hardening of Al and Cu alloy differ from that of steel?
- What do you mean by Powder Metallurgy? Discuss the property and application of powder metallurgy.
  - What is a Polymer? How does the structure of a polymer differ from that of metals?
- Write short notes on followings (any three)
  - FCC crystal
  - Hume-Rothery's rules
  - Smart material
  - TTT curves
  - Hot working of metals
  - Refractory materials

\*\*\*\*\*