Code: ME3T4

II B.Tech - I Semester – Regular Examinations - December 2014

METALLURGY AND MATERIALS SCIENCE
(MECHANICAL ENGINEERING)

Duration: 3 hours   Marks: 5x14=70

Answer any FIVE questions.   All questions carry equal marks

1. a) What are the different types of Bravi's lattices? Explain with neat diagrams.   7 M

   b) Explain the concept of Slip and twinning.   7 M

2. a) Explain in detail the effect of grain Boundaries on properties of materials.   7 M

   b) What are the different types of solid solutions? Explain them with suitable examples.   7 M

3. a) Explain binary phase diagram which shows eutectic reaction with neat diagram. Give at least two examples.
                                                         8 M

   b) What is phase rule? Explain the importance of phase rule while constructing phase diagram.   6 M

4. a) Draw the micro structure of spheroidal graphite cast iron and explain the application and properties of white cast iron.   7 M

    b) How steels are classified? Explain them in detail.   7 M

5. a) What is heat treatment? Explain, how hardenability of material is determined?   7 M

    b) What is TTT diagram? Explain how pearlite is transformed to martensite?   7 M

6. a) Explain about work-hardened materials and factors affecting the increase in strength this case.   7 M

    b) Explain the various types of copper alloys giving their composition, properties and uses.   7 M

7. a) What are the important porous parts produced by powder metallurgy? Describe in detail the production of bearings.   7 M

    b) Compare and contrast powder forging and extrusion techniques used to produce structural parts.   7 M

8. a) Discuss the fabrication of ceramic fibers by Polymer
      Pyrolysis method.   7 M

   b) What are the three main types of synthetic Fibers used to
      produce Fiber reinforced plastic composite materials?
                                                           7 M