

College of Engineering, Pune-5
SY B. Tech- Mechanical Engineering
End Semester Examination

MT 213 - MATERIAL SCIENCE AND TECHNOLOGY

Year: 2011- 12, Sem - 2

Duration 3 hours

Marks: 50

Instructions: 1. All Questions are compulsory

2. Draw neat figures wherever required

3. Figures to the right indicate full marks

- Q1** **State true or false and justify. (Any Five)** **15**
1. Martensitic transformation is a diffusion involved process.
 2. Above equi-cohesive temperature of a metal; the creep fracture will be inter granular.
 3. During tensile test the ultimate tensile stress is observed in true stress-strain curve.
 4. Impact strength of sample can be increased by heating it.
 5. 100 % internal stress can be removed during stress relief annealing.
 6. Gas carburizing is used to prevent fatigue failure.
- Q2 (A)** Draw the following microstructures **6**
1. Hypo-eutectoid steel
 2. Hyper Eutectic alloy of White Cast Iron
 3. Chilled Cast iron
- (B)** For Iron-carbon alloy with eutectoid composition draw and explain the Isothermal or TTT diagrams to get 50 % Pearlite and % 50 Bainite in microstructure. **4**
- Q3 (A)** Describe complete gas carburizing heat treatment on the basis of process, application advantages and limitations. Draw typical microstructure after gas carburizing. **3**
- OR**
- Describe the effect or retained austenite. Describe the tempering stages and related microstructure in detail.
- (B)** Differentiate the following pairs (the basis of technical concepts/principles). **(Any Four)** **12**
1. Fatigue and Creep
 2. Ultrasonic and Eddy current test
 3. Slip Casting and Slurry casting
 4. Blow forming and Pultrusion
 5. Induction and flame hardening
- Q4 (A)** Draw schematic diagram for any manufacturing process of ceramics. **6**
- OR**
- Describe the classification of composites i.e. based upon structure of additive and type matrix material.
- (B)** Explain the manufacture, properties and application of nodular Cast iron **4**