

*BE (Third Semester)*  
*Mechanical Engineering*  
*Material Science & Metallurgy - 337353(37)*  
*2014 - Winter Session , New Scheme*

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*Chapter 1*

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|---|--|----------|
| 1 | Describe the various stages of volume shrinkage or volume contraction during the solidification of metals. | <b>2</b> |
| 2 | Define 'nucleation'. Give five differences between homogeneous and heterogeneous nucleation.               | <b>7</b> |
| 3 | Describe the transformation process in multicomponent system.  | <b>7</b> |
| 4 | Explain the effects of grain size on properties of metals.   | <b>7</b> |

*Chapter 2*

- |   |   |          |
|---|---|----------|
| 1 | Explain the difference between hardness and brittleness.  | <b>2</b> |
| 2 | Describe the following terms :<br><br>1. Elasticity<br>2. Plasticity<br>3. Ductility<br>4. Toughness<br>5. Resilience<br>6. Fatigue<br>7. Creep | <b>7</b> |
| 3 | Explain line defects in metal crystals. Describe edge dislocation and screw dislocation in detail.  | <b>7</b> |
| 4 | Differentiate between slip and twinning.  | <b>7</b> |

*Chapter 3*

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|---|----------------------------|----------|
| 1 | Explain Gibb's phase rule. | <b>2</b> |
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- 2 What is phase rule? Apply the phase rule to the solidification of pure metal and explain how solidification of pure metal takes place on constant temperature. **7**
- 3 Explain the Eutectoid transformation. **7**
- 4 Differentiate between 'Peritectic' and 'Peritectoid' system. **7**

### *Chapter 4*

- 1 Define heat treatment. **2**  
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- 2 What is T.T.T. curve and state its importance? **7**
- 3 Explain the necessity of various types of surface hardening methods. **7**
- 4 What are different microscopic constituents of iron and steel. Write characteristics of any three constituents. **7**

### *Chapter 5*

- 1 What is meant by term 'high carbon steel'? **2**
- 2 What is Cast Iron? Classify it with applications. **7**
- 3 What are the requirements for bearing materials? Write composition and specific advantages of Babbitt metal. **7**
- 4 Give composition, properties and applications (any two) : **7**
  1. Modular cast iron
  2. High speed steel
  3. Gun metal**CSVTUonline.com**