Code No: 07A3EC09 **R07** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
METALLURGY AND MATERIAL SCIENCE
Common to Mechanical Engineering, Mechatronics, Production Engineering, Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain why electrical conductivity of the metals decreases with increase in temperature?
   (b) Explain why metals are opaque and lustrous?
   (c) Grain boundaries cause creep failure of metals. Why?
   (d) Why aluminum has silvery white luster where as copper has reddish brown? [4+4+4+4]

2. (a) Write short notes on:
      i. Austenite
      ii. Alpha ferrite
      iii. Delta ferrite
      iv. Cementite
   (b) Write the allotropy nature of iron with temperature and also explain the effect of pressure on allotropy of iron? [8+8]

3. (a) One of the biggest applications of nanomaterials is carbon nanotubes. Describe the preparation, structure and properties of carbon nanotubes.
   (b) List the advantages and disadvantages of use of nano materials. [11+5]

4. (a) Explain in detail metal matrix composites, their physical and mechanical properties. Mention their applications.
   (b) Write briefly on metal ceramic mixtures. [10+6]

5. (a) Why normalized steels are stronger than annealed steels of same carbon content?
   (b) What is a spheroidized steel? How is it done? Draw the resulting microstructure and properties of a spheroidized 0.8%C steel. [6+10]

6. Suggest suitable materials for any two of the following applications, giving composition, heat treatment, structure and properties. Justify your selection.
   (a) Skin material for supersonic aircraft
   (b) Pressure tight hydraulic castings
   (c) High strength non-sparking tools. [16]

7. Discuss in detail about the following:
   (a) Tetrahedral voids
   (b) Octahedral voids. [8+8]

8. (a) Give the classification of stainless steels?
   (b) Explain each type of steel with chemical composition, microstructure, properties and applications? [4+12]

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Code No: 07A3EC09 **R07** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
METALLURGY AND MATERIAL SCIENCE
Common to Mechanical Engineering, Mechatronics, Production Engineering, Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain why electrical conductivity of the metals decreases with increase in temperature?
   (b) Explain why metals are opaque and lustrous?
   (c) Grain boundaries cause creep failure of metals. Why?
   (d) Why aluminum has silvery white luster where as copper has reddish brown? [4+4+4+4]

2. (a) Write short notes on:
      i. Austenite
      ii. Alpha ferrite
      iii. Delta ferrite
      iv. Cementite
   (b) Write the allotropy nature of iron with temperature and also explain the effect of pressure on allotropy of iron? [8+8]

3. Suggest suitable materials for any two of the following applications, giving composition, heat treatment, structure and properties. Justify your selection.
   (a) Skin material for supersonic aircraft
   (b) Pressure tight hydraulic castings
   (c) High strength non-sparking tools. [16]

4. (a) Why normalized steels are stronger than annealed steels of same carbon content?
   (b) What is a spheroidized steel? How is it done? Draw the resulting microstructure and properties of a spheroidized 0.8%C steel. [6+10]

5. (a) Explain in detail metal matrix composites, their physical and mechanical properties. Mention their applications.
   (b) Write briefly on metal ceramic mixtures. [10+6]

6. Discuss in detail about the following:
   (a) Tetrahedral voids
   (b) Octahedral voids. [8+8]

7. (a) Give the classification of stainless steels?
   (b) Explain each type of steel with chemical composition, microstructure, properties and applications? [4+12]

8. (a) One of the biggest applications of nanomaterials is carbon nanotubes. Describe the preparation, structure and properties of carbon nanotubes.
   (b) List the advantages and disadvantages of use of nano materials. [11+5]

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Code No: 07A3EC09 **R07** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
METALLURGY AND MATERIAL SCIENCE
Common to Mechanical Engineering, Mechatronics, Production Engineering, Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Give the classification of stainless steels?
   (b) Explain each type of steel with chemical composition, microstructure, properties and applications? [4+12]
2. (a) Explain why electrical conductivity of the metals decreases with increase in temperature?
   (b) Explain why metals are opaque and lustrous?
   (c) Grain boundaries cause creep failure of metals. Why?
   (d) Why aluminum has silvery white luster where as copper has reddish brown? [4+4+4+4]
3. (a) Explain in detail metal matrix composites, their physical and mechanical properties. Mention their applications.
   (b) Write briefly on metal ceramic mixtures. [10+6]
4. (a) Write short notes on:
      i. Austenite
      ii. Alpha ferrite
      iii. Delta ferrite
      iv. Cementite
   (b) Write the allotropy nature of iron with temperature and also explain the effect of pressure on allotropy of iron? [8+8]
5. (a) Why normalized steels are stronger than annealed steels of same carbon content?
   (b) What is a spheroidized steel? How is it done? Draw the resulting microstructure and properties of a spheroidized 0.8%C steel. [6+10]
6. Suggest suitable materials for any two of the following applications, giving composition, heat treatment, structure and properties. Justify your selection.
   (a) Skin material for supersonic aircraft
   (b) Pressure tight hydraulic castings
   (c) High strength non-sparking tools. [16]

7. Discuss in detail about the following:
   (a) Tetrahedral voids
   (b) Octahedral voids. [8+8]

8. (a) One of the biggest applications of nanomaterials is carbon nanotubes. Describe the preparation, structure and properties of carbon nanotubes.
   (b) List the advantages and disadvantages of use of nano materials. [11+5]

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Code No: 07A3EC09 **R07** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
METALLURGY AND MATERIAL SCIENCE
Common to Mechanical Engineering, Mechatronics, Production Engineering, Automobile Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss in detail about the following:
   (a) Tetrahedral voids
   (b) Octahedral voids. [8+8]
2. (a) Explain why electrical conductivity of the metals decreases with increase in temperature?
   (b) Explain why metals are opaque and lustrous?
   (c) Grain boundaries cause creep failure of metals. Why?
   (d) Why aluminum has silvery white luster where as copper has reddish brown? [4+4+4+4]
3. (a) Explain in detail metal matrix composites, their physical and mechanical properties. Mention their applications.
   (b) Write briefly on metal ceramic mixtures. [10+6]
4. Suggest suitable materials for any two of the following applications, giving composition, heat treatment, structure and properties. Justify your selection.
   (a) Skin material for supersonic aircraft
   (b) Pressure tight hydraulic castings
   (c) High strength non-sparking tools. [16]
5. (a) Why normalized steels are stronger than annealed steels of same carbon content?
   (b) What is a spheroidized steel? How is it done? Draw the resulting microstructure and properties of a spheroidized 0.8%C steel. [6+10]
6. (a) Write short notes on:
      i. Austenite
      ii. Alpha ferrite
      iii. Delta ferrite
      iv. Cementite
   (b) Write the allotropy nature of iron with temperature and also explain the effect of pressure on allotropy of iron? [8+8]

7. (a) One of the biggest applications of nanomaterials is carbon nanotubes. Describe the preparation, structure and properties of carbon nanotubes.
   (b) List the advantages and disadvantages of use of nano materials. [11+5]

8. (a) Give the classification of stainless steels?
   (b) Explain each type of steel with chemical composition, microstructure, properties and applications? [4+12]

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