Code No: R05220303 **R05** **Set No. 2**

II B.Tech II Semester Examinations,December 2010
METALLURGY AND MATERIALS 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) Whiskers are known for their exceptionally high strength. Explain the reasons.
   (b) Discuss the influence of fiber length, orientation and composition on fibre reinforced composites. [6+10]
2. (a) Bring out the differences between Crystal, dendrite, grain and grain boundary.
   (b) What do you mean by bonds in solids? What are the various types of bonds? Give examples for each of them. [8+8]
3. (a) What are cast Irons? Why are they named so? Give the importance of cast irons in the metallurgical curriculam.
   (b) Explain the microstructure, properties and applications of
      i. White Cast Iron
      ii. S.G. Cast Iron. [8+8]
4. (a) What is an invariant reaction? List and explain three reactions present in the $Fe - Fe_3C$ equilibrium diagram.
   (b) Distinguish between Terminal phases and Intermediate phases. [10+6]
5. (a) What are the two kinds of glazing process? Explain them.
   (b) Explain briefly the following kinds of glasses:
      i. Sodas-lime glass
      ii. Borosilicate glass. [8+8]
6. (a) Explain, what you understand by season cracking in brasses and how can it be prevented?
   (b) What characteristics of Aluminium make it resistant to corrosion ?
   (c) How does anodisation increases the corrosion resistance of Aluminium? Explain.
   (d) Do soldered Aluminium joints have good resistance to corrosion? Why? [$4 \times 4 = 16$]
7. Explain briefly the following:
   (a) The allotropy of iron
   (b) Interstitial solid solutions

(c) Intermetallic compounds. [4+6+6]

8. (a) Discuss the heat treatment process variables.

(b) All metals and alloys cannot be heat treated in order to enhance mechanical properties. Discuss.

(c) Discuss briefly the transformation of pearlite in to Austenite on heating the steels. [7+5+4]

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Code No: R05220303 **R05** **Set No. 4**

II B.Tech II Semester Examinations,December 2010
METALLURGY AND MATERIALS 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) What are the two kinds of glazing process? Explain them.
   (b) Explain briefly the following kinds of glasses:
      i. Sodas-lime glass
      ii. Borosilicate glass. [8+8]
2. (a) Bring out the differences between Crystal, dendrite, grain and grain boundary.
   (b) What do you mean by bonds in solids? What are the various types of bonds? Give examples for each of them. [8+8]
3. (a) Discuss the heat treatment process variables.
   (b) All metals and alloys cannot be heat treated in order to enhance mechanical properties. Discuss.
   (c) Discuss briefly the transformation of pearlite in to Austenite on heating the steels. [7+5+4]
4. (a) Whiskers are known for their exceptionally high strength. Explain the reasons.
   (b) Discuss the influence of fiber length, orientation and composition on fibre reinforced composites. [6+10]
5. Explain briefly the following:
   (a) The allotropy of iron
   (b) Interstitial solid solutions
   (c) Intermetallic compounds. [4+6+6]
6. (a) What is an invariant reaction? List and explain three reactions present in the $Fe - Fe_3$C equilibrium diagram.
   (b) Distinguish between Terminal phases and Intermediate phases. [10+6]
7. (a) Explain, what you understand by season cracking in brasses and how can it be prevented?
   (b) What characteristics of Aluminium make it resistant to corrosion ?
   (c) How does anodisation increases the corrosion resistance of Aluminium? Explain.

(d) Do soldered Aluminium joints have good resistance to corrosion? Why? [4 × 4 = 16]

8. (a) What are cast Irons? Why are they named so? Give the importance of cast irons in the metallurgical curriculam.

(b) Explain the microstructure, properties and applications of

i. White Cast Iron

ii. S.G. Cast Iron. [8+8]

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Code No: R05220303 **R05** **Set No. 1**

II B.Tech II Semester Examinations,December 2010
METALLURGY AND MATERIALS 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) What is an invariant reaction? List and explain three reactions present in the $Fe - Fe_3C$ equilibrium diagram.
   (b) Distinguish between Terminal phases and Intermediate phases. [10+6]
2. (a) Discuss the heat treatment process variables.
   (b) All metals and alloys cannot be heat treated in order to enhance mechanical properties. Discuss.
   (c) Discuss briefly the transformation of pearlite in to Austenite on heating the steels. [7+5+4]
3. Explain briefly the following:
   (a) The allotropy of iron
   (b) Interstitial solid solutions
   (c) Intermetallic compounds. [4+6+6]
4. (a) Bring out the differences between Crystal, dendrite, grain and grain boundary.
   (b) What do you mean by bonds in solids? What are the various types of bonds? Give examples for each of them. [8+8]
5. (a) What are cast Irons? Why are they named so? Give the importance of cast irons in the metallurgical curriculam.
   (b) Explain the microstructure, properties and applications of
      i. White Cast Iron
      ii. S.G. Cast Iron. [8+8]
6. (a) What are the two kinds of glazing process? Explain them.
   (b) Explain briefly the following kinds of glasses:
      i. Sodas-lime glass
      ii. Borosilicate glass. [8+8]
7. (a) Whiskers are known for their exceptionally high strength. Explain the reasons.
   (b) Discuss the influence of fiber length, orientation and composition on fibre reinforced composites. [6+10]

8. (a) Explain, what you understand by season cracking in brasses and how can it be prevented?
   (b) What characteristics of Aluminium make it resistant to corrosion ?
   (c) How does anodisation increases the corrosion resistance of Aluminium? Explain.
   (d) Do soldered Aluminium joints have good resistance to corrosion? Why?

[4 × 4 = 16]

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Code No: R05220303 **R05** **Set No. 3**

II B.Tech II Semester Examinations,December 2010
METALLURGY AND MATERIALS 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) Discuss the heat treatment process variables.
   (b) All metals and alloys cannot be heat treated in order to enhance mechanical properties. Discuss.
   (c) Discuss briefly the transformation of pearlite in to Austenite on heating the steels. [7+5+4]
2. (a) Explain, what you understand by season cracking in brasses and how can it be prevented?
   (b) What characteristics of Aluminium make it resistant to corrosion ?
   (c) How does anodisation increases the corrosion resistance of Aluminium? Explain.
   (d) Do soldered Aluminium joints have good resistance to corrosion? Why? [4 × 4 = 16]
3. (a) Whiskers are known for their exceptionally high strength. Explain the reasons.
   (b) Discuss the influence of fiber length, orientation and composition on fibre reinforced composites. [6+10]
4. (a) What are cast Irons? Why are they named so? Give the importance of cast irons in the metallurgical curriculam.
   (b) Explain the microstructure, properties and applications of
      i. White Cast Iron
      ii. S.G. Cast Iron. [8+8]
5. (a) What are the two kinds of glazing process? Explain them.
   (b) Explain briefly the following kinds of glasses:
      i. Sodas-lime glass
      ii. Borosilicate glass. [8+8]
6. (a) What is an invariant reaction? List and explain three reactions present in the $Fe - Fe_3C$ equilibrium diagram.
   (b) Distinguish between Terminal phases and Intermediate phases. [10+6]
7. (a) Bring out the differences between Crystal, dendrite, grain and grain boundary.

(b) What do you mean by bonds in solids? What are the various types of bonds? Give examples for each of them. [8+8]

8. Explain briefly the following:

(a) The allotropy of iron

(b) Interstitial solid solutions

(c) Intermetallic compounds. [4+6+6]

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