Code No: 07A51803 **R07** **Set No. 2**

III B.Tech I Semester Examinations,November 2010
IRON PRODUCTION
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the differences in production principles of wrought iron making and pig iron making.
   (b) Explain the applications of wrought iron. [8+8]
2. (a) Describe the constructional details of stack.
   (b) What is the importance of slag notch and tap hole and comment on their construction? [8+8]
3. (a) List out the various integrated steel plants in India & mention the sources of raw materials and production capacity of each plant.
   (b) What constitute the burden of a blast furnace? What are their functions? [8+8]
4. (a) Explain the applications of sponge iron.
   (b) Briefly discuss about sponge iron production in India. [8+8]
5. (a) What are the sources of sulphur in blast furnace iron production? Explain.
   (b) Explain the chemistry of sulfur reactions in blast furnace. [8+8]
6. (a) Explain the effect of various process variables on the quality of sinter.
   (b) Give a schematic arrangement of a sintering plant and explain the details. [8+8]
7. Write short notes on the following:
   (a) Hanging, types of hanging and its control.
   (b) Slip formation, its effect and its control. [8+8]
8. (a) Describe in detail the equilibrium of CO/CO_2 ratio in contact with C and oxides of iron at various temperatures in blast furnace.
   (b) What are the impurities that are associated with molten metal in blast furnace? What is the % weight of all these impurities before refining? How are they reduced to required minimum level in pig iron? [10+6]

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Code No: 07A51803 **R07** **Set No. 4**

III B.Tech I Semester Examinations,November 2010
IRON PRODUCTION
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What are the factors which results in low silicon iron in Blast furnace route? Explain.
   (b) Discuss the effect of alkali metals and their compounds in iron making. [8+8]
2. Explain the following:
   (a) Scabs formation and its control .
   (b) Hanging and its control. [8+8]
3. (a) Compare and contrast between wrought iron and pig iron.
   (b) How wrought iron is made? Explain any one process of wrought iron production. [8+8]
4. (a) Explain about the various types of blast furnace cooling arrangements.
   (b) Describe how the blast furnace gas is utilized in steel plants. [8+8]
5. Explain about the following type of iron ores.
   (a) Sedimentary ores.
   (b) Igneous ores.
   (c) Lateritic ores.
   (d) Replacement ores. [16]
6. Explain the following two type of bands formed during sintering process.
   (a) Diffusion band.
   (b) Slag or glass band. [16]
7. (a) Differentiate between Direct reduction and Indirect reduction of iron making.
   (b) Discuss with a neat sketch the sponge iron making by Midrex process. [8+8]
8. (a) Describe neatly the downward moment of coal/coke, percolation and flow of liquid metal and slag, upward movement of hot gases during blast furnace operation.
   (b) Explain the partial reductions of oxides of P, S, Si & Mn in blast furnace. [10+6]

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Code No: 07A51803 **R07** **Set No. 1**

III B.Tech I Semester Examinations,November 2010
IRON PRODUCTION
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. What do you mean by quality of a flux.How do you find out the value of flux?Explain the procedure to find out quality of a flux? expalin about dolomite and limestone.Which are used as fluxes in iron making process. [16]
2. What are the alternate routes of iron making? Explain any two methods in detail. [16]
3. (a) What is wrought iron? How is it different from pig iron?
   (b) What are the various methods of making wrought iron? Discuss any one method. [8+8]
4. (a) Explain about the various chemical reactions & physical changes that occur in stack &hearth region of blast furnace.
   (b) Explain about tap hole & cinder notch in a blast furnace. [10+6]
5. (a) Explain the effect of various factors on the formation of primary and bosh slags.
   (b) Explain the importance of bosh slag on Blast furnace productivity and metal quality. [8+8]
6. Explain briefly the following with respect to Blast furnace operation:
   (a) Blowing-in.
   (b) Blowing-out.
   (c) Draughting. [16]
7. Explain the following:
   (a) Dust catcher.
   (b) Down comer.
   (c) Scrubber. [16]
8. (a) List out the various methods of agglomeration of iron ore mines. Discuss the relative advantages and disadvantages.
   (b) Discuss the various pellet bands. [10+6]

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Code No: 07A51803 **R07** **Set No. 3**

III B.Tech I Semester Examinations,November 2010
IRON PRODUCTION
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the effect of CaO, Al_2O_3&MgO contents of iron ore on the fluidity of slags.
   (b) What are the maximum temperature levels at the following regions during blast furnace operation and explain the necessary reactions.
      i. Tuyer level .
      ii. Hearth level .
      iii. Stack level. [8+8]
2. (a) What are the raw materials used in Puddling process?
   (b) Explain its advantages and disadvantages. [8+8]
3. Explain about the classification of iron ores based on geological origin. Also discuss each one of them in detail. [16]
4. (a) Define raceway. Explain its significance in the blast furnace.
   (b) Explain the factors which affect the raceway in a blast furnace. [8+8]
5. Write a brief note on various steps in starting up of a newly lined blast furnace. [16]
6. Explain the following:
   (a) Tap hole.
   (b) Slag notch.
   (c) Tuyer assembly
   (d) Cup and cone arrangement . [16]
7. (a) Compare sinters and pellets as blast furnace burden material.
   (b) What are the advantages and disadvantages of pellets? [8+8]
8. (a) What is the effect of sulphur load, slag volume and slag basicity on the final sulphur in blast furnace pig iron?
   (b) What is external desulphurization? Explain the process of external desulphurization. [8+8]

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