Code No: 07A60605 **R07** **Set No. 2**

III B.Tech II Semester Examinations,December 2010
STEEL MAKING
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Discuss about the different cross-section and shapes of molds used for casting of steel? [16]
2. Describe in detail the production of steel by WORCRA and IRSID processes. Explain their relative merits and demerits. [16]
3. What is slag? What are the various types of slags? Explain about them. Also explain the important properties of slags, in detail. [16]
4. Discuss about synthetic slag refining. [16]
5. (a) Compare and contrast ancient processes of steel making with modern processes with reference to process and equipment.
   (b) Explain how the following factors affect the efficiency of steel making operation:
      i. Energy consumption
      ii. Cost of raw-materials used. [10+6]
6. (a) With the help of neat figures explain different parts of Electric Arc Furnace.
   (b) With the help of neat figures explain various types of roof lifting and swing arrangements in Electric Arc Furnace. [8+8]
7. (a) What is the principle of ESR process ?
   (b) What are the advantages of ESR process ?
   (c) Describe the ESR process. [4+4+8]
8. (a) Explain the nitrogen problem in Bessemer steel making practice giving reasons and methods to minimise/eliminate such problems.
   (b) How the use of liquid fuels, in place of gaseous fuels, simplifies design and construction of open hearth furnace. [8+8]

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Code No: 07A60605 **R07** **Set No. 4**

III B.Tech II Semester Examinations,December 2010
STEEL MAKING
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) Compare and contrast Electric Arc Furnace and Induction furnace.
   (b) Compare basic roof and acidic roof in Electric Arc Furnace. [16]
2. (a) Describe capped steels.
   (b) Depending upon the extent of deoxidation explain various ingots. [4+12]
3. (a) What are the advantages of producing blooms, slabs etc by primary mills ?
   (b) What are the advantages of continuous casting of steel ?
   (c) What is the principle of continuous casting of steel ? What are the equipment used for continuous casting of steel ? [4+4+8]
4. (a) Mention any five steel making processes and briefly explain their working principle.
   (b) Explain the various sources of sulphur and phosporus entering steel during steel making in a furnace. [10+6]
5. (a) What is tundish teeming ?
   (b) What are the advantages and disadvantages of tundish teeming ?
   (c) Describe tundish teeming parctice. [4+6+6]
6. (a) Explain the decarburization and desiliconization during manufacture of steel.
   (b) Explain, the vacuum degassing of steels. What are its advantages over other methods of degassing. [10+6]
7. (a) Write equations to show how calcium oxide would react with the oxide of phosphorus, P_20_3. Explain various factors that affect these reactions.
   (b) Support or contradict the following with proper reasoning:
      i. The oxidising power of a slag is decided by its iron oxide contents.
      ii. In the conventional open hearth process, the refining operation can't be autogeneous. [8+4+4]
8. (a) Define and explain the term JFN and give its significance in LD converter operation.
   (b) What do you mean by ladle metallurgy? What are its main objectives?
   (c) Explain the advantages of using multinozzle lance over single nozzle lance in the operation of L-D convertor. [4+5+7]

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Code No: 07A60605 **R07** **Set No. 1**

III B.Tech II Semester Examinations,December 2010
STEEL MAKING
Metallurgy And Material Technology

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

Answer any FIVE Questions
All Questions carry equal marks

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1. Compare and contrast acid bessemer process of steel making and basic besser process of steel making giving the details of composition of pig iron used, refractories used, composition of slags produced. advantages and limitations of the process etc. (Also give the sketches of the converters) [16]

2. (a) Name the various major steel plants in India and give their locations. Discuss the important activities in these steel plants.
   (b) Discuss briefly about the triplex steel making practice. [10+6]

3. (a) What are the raw materials used in electric arc furnace for steel making?
   (b) Describe meltdown and blocking periods in electric arc furnace. [8+8]

4. (a) What is secondary steel making ? Classify the various processes.
   (b) What are the aims of secondary steel making ?
   (c) Discuss stirring treatments in secondary steel making processes. [5+5+6]

5. 'LD process is unique in many ways'. Explain the different ways why the process is unique? [16]

6. Explain the salient features of the following
   (a) Vaccum degassing of steel
   (b) Metal treatment by synthetic slag
   (c) Blowing of metal with powdered material. [5+5+6]

7. Write short notes on :
   (a) Deoxidation practice
   (b) Casting pit design [8+8]

8. Explain the process of producing low alloy steels for casting. [16]

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Code No: 07A60605 **R07** **Set No. 3**

III B.Tech II Semester Examinations,December 2010
STEEL MAKING
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 solidification of semi - killed steels.
   (b) What are the uses of semi - killed steels.
   (c) Compare killed steel and semi - killed steels. [8+4+4]
2. Discuss about the sequence of removal of impurities during steel making in electric arc furnace. [16]
3. (a) Give the typical composition of hot metal used in basic Bessemer process and discuss the sequence of reactions in basic Bessemer process.
   (b) Discuss the modern developments in the open-hearth steel making practice. [9+7]
4. (a) What is teeming of steel ?
   (b) What factors affect teeming temperature of steel ?
   (c) What are the functions of a teeming ladle ? [4+6+6]
5. (a) What is the principle of VAR process ?
   (b) What are the advantages of VAR process ?
   (c) Describe the VAR process. [4+4+8]
6. (a) Explain the various methods of degassing.
   (b) Write short notes on duplex process of steel making. [10+6]
7. (a) Why the steel produced by cementation process is called blister steel? Explain.
   (b) Distinguish between single-shear steel and double-shear steel.
   (c) Describe the traditional steel making process which was in practice untill the end of Nineteenth century. What are the limitations of the process. [5+4+7]
8. (a) Enumerate a simplified scheme for process control through computer for top blown basic oxygen process of steel making.
   (b) What is rocking? Explain why it is done in LD process.
   (c) Explain about synthetic slag refining process. [7+5+4]

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