Roll No. | | | | | | | | | | |

B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, April / May 2014

Material Science & Engineering

Semester IV

ML 9252- Primary processing of Iron & Steel

(Regulation R 2008.)

Time: 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define ore and metal. State the names and places of the availability of Iron ores in India
2. State the various stages of Steel Making.
3. What are the sources of Oxygen in Steel Making Processes?
4. What are the uses of sponge iron?
5. Write short notes on the Utilization of blast furnace slags.
6. What are the advantages of sintering?
7. How Metallurgical Coke is produced?
8. What are the salient features of Ellingham diagram?
9. State out the reasons of creation of Surface cracks on Steel ingot?
10. Write Schematic Representation of AISI/SAE Steel Designation System. Illustrate with some examples

Part – B (5 x 16 = 80 marks)

11. Discuss, in detail, the process of steel making in the blast furnace at various locations and illustrate the temperature, pressure and gas composition profiles in the blast furnace with a neat sketch. (16)

12. (a) (i) What is meant by beneficiation of iron ores? Also, give a detailed account on the methods of beneficiation.
(ii). Compare A).Direct reduction and Indirect reduction
B).Electric Arc Furnace and Basic Oxygen Furnace (16)

OR

12. (b) Define coke. List down the properties that determine the Quality of coke as a blast fuel. Also explain them in detail. (16)

13. (a) Define Rist Diagram? Explain the methodology in drawing Rist Diagram. Write down salient features of Rist Diagram? (16)

OR

13. .b) Escribe, in detail, Blast Furnace Instrumentation and the cleaning of blast furnace gas.

14. a) For a BOF heat the following data are given .
i). Hot metal contains 1.2 % Si,0.15% P,0.22%Mn and 3.5% C.
ii).Weight of scrap is 10% of hot metal.
iii).Steel at tap contains 0.2%C
iv).Slag has 54% Cao,18% FeO,2.5% MgO,2.5% MnO,and CaO/SiO2 ratio=3.8

Calculate the following per Tonne (i.e. 1000Kg) of Steel.
a).Weight of hot metal Charge
b). Weight of slag produced
c).Quantity of Lime required (16)

OR

14. b) i).What are the various losses involved in the stainless steel making process?
ii). How to resolve the defect of Pin holes/Blow holes during Steel Making Process?
iii).Define basicity of a slag. How does Slag play important role in steel making?
iv). Why Sulfur is to be Controlled in Steel making?

15 a) Define i). Killed Steel ii). Semi Killed Steel, iii). Rimmed Steel iv). Stainless Steel

OR (16)

15 b). Define a). Desulfurization. b). Dephophorisation
c). De Oxidation. d).De Carburization