

www.FirstRanker.com www.FirstRanker.com
GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020

Subject Code:3152111

Date:01/02/2021

Subject Name:Iron Making & Steel Making Technology

Time:10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

| | | Marks |
|------------|--|-----------|
| Q.1 | (a) What is the reducing agent in the blast furnace? State the role | 03 |
| | (b) Justify- Ironmaking and Steelmaking are totally opposite process. | 04 |
| | (c) Describe evaluation of the iron ore. | 07 |
| Q.2 | (a) Explain limitation of Corex process. | 03 |
| | (b) Justify- The agglomeration of iron ore is necessary for iron making process. in Blast furnace | 04 |
| | (c) What is palletization? Explain disc pelletizer in detail with its parameters affecting palletization process. | 07 |
| Q.3 | (a) Draw schematic diagram of L.D converter. | 03 |
| | (b) Explain importance of slag formation during Iron reduction. | 04 |
| | (c) Illustrate with figure Dead man's zone & coke slit in blast furnace and explains it. | 07 |
| Q.4 | (a) State the importance of RAFT. | 03 |
| | (b) Differentiate between direct reduction & Indirect reduction in iron making process | 04 |
| | (c) Explain AOD process. | 07 |
| Q.5 | (a) What is the main hazardous thing in Steel Plant? | 03 |
| | (b) A slag of CaO , SiO_2 and Al_2O_3 , having mole fraction of alumina as 0.095, has $\text{Si}_2\text{O}_7^{6-}$, AlO_4^{5-} anions. Calculate the slag composition. | 04 |
| | (c) Explain the advantages and disadvantages of top and bottom blown processes. | 07 |
| Q.6 | (a) Calculate the activation energy for viscosity for a liquid slag, whose viscosities are 11 and 3 $\text{kg.m}^{-1}.\text{s}^{-1}$ at 1490 and 1590°C respectively. | 03 |
| | (b) Explain DC Electric Arc Furnace. | 04 |
| | (c) Justify-Phosphorus and sulphur can be lower down at same condition | 07 |
| Q.7 | (a) Why lime used instead of limestone. | 03 |
| | (b) A liquid slag has 55 wt. % CaO , 10 wt. % MgO , 20 wt. % SiO_2 , and 15 wt. % Al_2O_3 . Calculate its sulphide capacity at 1910 K with the help of the following equation: $\log C_s$ | 04 |

$$= 3.44 (X_{CaO} + 0.1 X_{MgO} - 0.8 X_{Al_2O_3} - X_{SiO_2}) - 9894/T + 2.04.$$

www.FirstRanker.com

www.FirstRanker.com

Given atomic masses of Ca, Mg, Si, Al and O are 40, 24, 28, 27 & 16.

(c) With a neat sketch explain Ladle furnace operation. **07**

Q.8 (a) What do you mean by inclusion? What are the sources of inclusions? **03**

(b) Compare EAF with oxygen steel making. **04**

(c) Explain Reactions at Slag-metal interface. **07**

www.FirstRanker.com