

**GUJARAT TECHNOLOGICAL UNIVERSITY**

B. E. Sem. - V - Examination – June- 2011

Subject code: 152101

Subject Name: Iron Making

Date: 20/06/2011

Time: 10:30 am – 01:00 pm

Total Marks: 70

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Which fuel is used and what is its “role in Blast furnace Iron Making”? How it depends on fuel quality? **07**
- (b) Classify the principle Iron minerals and explain where Indian Iron ore deposits are available. What are the drawbacks of Indian raw materials for Blast furnace Iron Making? **07**
- Q.2** (a) What is the principle of sintering? Explain Dewight-Lloyed sintering machine. **07**
- (b) Write a short note on followings: **07**  
Disc and Drum pelletizer
- OR**
- (b) Write a note on Desulphurization. **07**
- Q.3** (a) Calculate the equilibrium CO/CO<sub>2</sub> ratio for the reduction of FeO at 900 °C according to following reaction: **07**
- $$\text{FeO} + \text{CO} = \text{Fe} + \text{CO}_2$$
- (i)  $\text{C} + \text{O}_2 = \text{CO}_2$   $\Delta G^\circ = (-94200 - 0.2T) \text{ cal}$
- (ii)  $2\text{C} + \text{O}_2 = 2\text{CO}$   $\Delta G^\circ = (-53400 - 41.9T) \text{ cal}$
- (iii)  $2\text{Fe} + \text{O}_2 = 2\text{FeO}$   $\Delta G^\circ = (-125700 + 30.69T) \text{ cal}$
- (b) In Blast furnace iron smelting, which is better reducing agent “CO” or “H<sub>2</sub>” gas? Justify your above choice with the schematic representation of Fish-tail diagrams. **07**
- OR**
- Q.3** (a) Explain the kinetics of Iron oxide reduction in the stack region in Blast furnace. **07**
- (b) What do you understand by Blast furnace control? How it is achieved in practice? **07**
- Q.4** (a) The volume of blast by tone of hot metal was found 2868 m<sup>3</sup>. The coke used per tone was 900 Kg. The coke contains 30 % C. Calculate the % of C of coke i.e. burnt at the tuyeres and heat produced by burning of coke. **07**
- (b) Compare the silent features of the Mini and conventional Blast furnace systematically. **07**
- OR**
- Q.4** (a) Write in detail two of the most widely used Agglomeration processes for Iron ores. **07**
- (b) What do you mean by RAFT? Discuss in detail. **07**
- Q.5** (a) Write short note on Hot blast stoves. **07**
- (b) Explain most common irregularities of blast furnace. **07**
- OR**
- Q.5** (a) Explain Electrothermal process. **07**
- (b) Write a short note on Fuel injection through tuyeres. **07**

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