

COLLEGE OF ENGINEERING, PUNE

ESE SEMESTER EXAMINATION

Iron Making (DE-09004)

Year: T.Y.B-Tech

Academic Year: 2014-15

Duration: 3 Hours

2 to 5 p.m

Branch: Metallurgy

Date: 01/12/2014

Max Marks: 60

Instruction to candidates:

1. All questions are compulsory.
2. Assume suitable data if necessary.

Q.1 State TRUE OR FALSE (No marks without proper justification)

A)

1. In Belly region, at 1200-1300 °C, first slag formation takes place. [6]
2. Direct reduction in blast furnace takes place only in bosh and lower stack region.
3. 100 % indirect reduction in blast furnace will give maximum furnace efficiency.

State TRUE OR FALSE (Justification is not needed.)

4. Highly basic slags have higher viscosity.
5. The reduction of FeO by CO is Exothermic, while that by H₂ is endothermic. [5]
6. The percentage of Si in metal increases with increase in RAFT.
7. CaO is much more powerful base and desulphuriser than MgO.
8. Iron oxide reduction by H₂ is 5-10 times faster than that by CO.

B) Give the strategy for production of low silicon Hot Metal. [6]

C) Give the composition (weight percent) of hot metal produced in blast furnace operating around the world. [3]

Q.2 A) Draw a diagram showing Temperature and Pressure profile in a Blast Furnace. [5]

B) What is a effect of high amount of alumina in hot metal. [3]

C) State the raw materials required for production of Ferro-silicon/Silico-manganese by electric smelting. [2]

Q.3 A) Explain the reaction of sulphur in Raceway and Bosh & reaction of Silicon in Hearth. [6]

B) Give details of alternative routes of Iron production by Low shaft furnace / Electro-Thermal Process [4]

Q.4 A) State three important irregularities that may take place in Blast furnace operation. Also state their common causes. [6]

B) Distinguish between the following pairs [6]

1. Direct Reduction and Indirect Reduction

2. Flux and Slag.

3. Pig iron and DRI

Q.5 Write short note on following. [8]

1. Reaction of Silicon in Raceway and Bosh

2. Corex/ Midrex Process
