

Registration No. :

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Total number of printed pages – 2

B. Tech
PCMT 4303

Sixth Semester Back Examination – 2015

IRON MAKING

BRANCH : MME

QUESTION CODE : M 137

Full Marks – 70

Time : 3 Hours

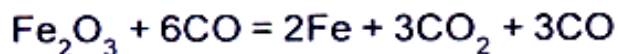
*Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.*



1. Answer the following questions : 2 × 10
 - (a) Iron making is necessarily a reduction process.
 - (b) Blast furnace is a counter current process.
 - (c) The hearth of a blast furnace is lined with carbon blocks.
 - (d) Limestone is used as flux in blast furnace.
 - (e) RAFT increases with oxygen enrichment of blast.
 - (f) Angle of the big bell is maintained at about 50-53° from the horizontal.
 - (g) It is important to maintain stock line at optimum level.
 - (h) Naumann's reversion reaction decreases bed permeability of blast f/c stack.
 - (i) An increase in basicity decreases slag viscosity.
 - (j) Slag is tapped more frequently than metal.
2. Draw a neat sketch of blast furnace with adequate labeling. Show different zone reactions taking place inside the blast furnace. 10
3. Describe in brief different blast furnace operations. 10

P.T.O.

4. In a furnace, iron ore is reduced according to the following reaction :



Coke of composition 94% C is used to produce CO by combustion with air at the bottom of the furnace. Of the coke charged, 3.5% C is absorbed by iron and 90.5% C burns to CO only. No CO₂ is produced by combustion of coke.

Calculate :

10

- (a) Volume of CO to produce 1000 kg iron
 - (b) Weight of coke required to produce 1000 kg iron
 - (c) Volume of air to burn the coke amount determined in
 - (d) Volume and % composition of gases formed in combustion
 - (e) Volume and % composition of gases resulting in combustion and reduction.
5. (a) Briefly describe the three stage gas cleaning system in blast furnace plant with suitable sketches. 5
- (b) Describe the two bell charging system with suitable sketches. 5
6. (a) Describe the change in basicity of slag in blast furnace during its passage from stack to hearth. 5
- (b) What is "hanging"? Mention its causes and remedies. 5
7. (a) With a neat sketch describe the SL/RN process in brief. 5
- (b) Differentiate between Coal based and Gas based DR process. 5
8. Write short notes any **two** of the following : 5×2
- (a) Topo-chemical reduction of iron ore
 - (b) The Rist diagram
 - (c) COREX Process
 - (d) Water particle systems in pelletization.