

Registration No. :

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Total number of printed pages – 2

B. Tech
PCMT 4303

Sixth Semester (Special/Back) Examination – 2013

IRON MAKING

BRANCH : MME

QUESTION CODE : E 332

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

- B/F is a counter current reactor.
- The value of a flux is expressed in terms of available base.
- The depth of central V contour is maximum for pellets during charging in a B/F.
- ESP is based on the principle of “Zero velocity”.
- Direct reduction doesn't occur in side B/F.
- Stukofen is considered to be the progenitor of the modern B/F.
- In B/F hearth firebricks are used as facing lining.
- Silicon content of about 0.5% in pig iron is considered ideal for a basic process of steel making.
- B/F is best suited for phosphorous removal from metal.
- Basicity of bosh slag is higher than final slag.

2. (a) Compare and contrast Direct and Indirect reduction. State their importance in B/F iron making. 5

(b) What is the role of angle and size of the big bell on burden distribution in B/F ? 5

P.T.O.

3. (a) What do you mean by agglomeration ? Describe the objectives of sintering and mention its process variables. 5
- (b) What is scaffolding ? Mention its causes and remedies. 5
4. Briefly describe the three stage gas cleaning system in blast furnace plant with suitable sketches. 10
5. (a) Find out the bosh slag basicity of a blast furnace with following data assuming that 70% of the coke is burnt at the tuyeres with no silica reduction.
- (i) Iron ore: 64% Fe, 5.5% SiO₂
- (ii) Coke: 500kg/TMH, ash=10% with 45% SiO₂ in it
- (iii) Pig Iron: 92% Fe and Final slag basicity (CaO/SiO₂):1.2 5
- (b) Briefly describe the reactions taking place in the stack of a blast furnace. 5
6. (a) What is Boudouard equilibrium ? Draw the Fe-O-C equilibrium diagram including the Boudouard curve and comment on the iron ore reduction in side the blast furnace. 5
- (b) Draw a neat sketch for simplified material flow in and out of a modern B/F. Give the composition of a typical Indian pig iron. 5
7. (a) What is DRI ? Give the physico-chemical reactions of DR process. 5
- (b) With a neat sketch describe the MIDREX process in brief. 5
8. Write short notes on any **two** : 5 × 2
- (a) Ferro-coke
- (b) Nodulising
- (c) Coke reactivity test
- (d) High Top Pressure.

