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Total Number of Pages: 02

B.Tech.
PCMT4402

7th Semester Regular/Back Examination 2017-18

Steel Making

BRANCH : METTA, MME

Time: 3 Hours

Max Marks: 70

Q.CODE : B296

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

Q1 Answer the following questions: (2 x 10)

- a) What are the activities in steel melting shop?
- b) What is mechanism of refining?
- c) Distinguish between Killed steel and Semi-Killed steel? In which case shrinkage is more and why?
- d) Briefly explain the significance of "complex deoxidizer"?
- e) What are the different types of electric arc furnaces?
- f) Explain the principle of continuous casting in detail
- g) Justify the statement.
"The rate of desulphurization begins to increased only when the content of oxygen in the metal is less than 0.02%."
- h) What are the main sources of heat for steel making processes?
- i) What is Sievert's law?
- j) What is mechanism of refining?

Q2 a) Discuss Ladle refining process with its uses (5)
b) Describe, briefly, how solidification of liquid steel takes place in the continuous casting mould? (5)

Q3 a) How many types of converter steel making process are there, to justify draw a sketch of them and what are the different means of bath stirring. (5)
b) How tundish work in continuous casting process and what are the advantages of it? (5)

Q4 a) Suppose the initial weight % of Sulphur in steel is 0.01% and it is to be brought down to 0.002% by the synthetic slag treatment. Calculate the final Ls (Partition coefficient of Sulphur). Let the mass of steel be 150 tonne and that of slag be 2 tonne. (5)
b) What is twin heat furnace of steel making and write it advantageous over old BOHF furnace. (5)

Q5 a) With the help of a schematic diagram, describe the evolution of slag composition during a LD blow. (5)
b) With the help of a schematic diagram, describe sequence of elimination of impurities in LD process. (5)

Q6 a) Critically compare between deoxidation in the bulk and diffusion deoxidation. (5)
b) List the various sources of dissolved gases in steel. Enumerate the different remedial measures which can be helpful in minimizing the concentration of hydrogen and nitrogen in steel. (5)

Q7 With the help of a schematic diagram, enumerate the effect of following parameters on dephosphorizing ability of slag: **(10)**
(i) Slag basicity (ii) Quantity of slag and (iii) Feo content in slag

Q8 Write short answer on any TWO : **(5 x 2)**

- a) Effect of Phosphorous on steel quality
- b) Nucleation and growth of CO bubble
- c) EAF operations
- d) Application of Ellingham diagram