

STEEL MAKING AND FERRO-ALLOY TECHNOLOGY
(MT-601)

Time: 3 hours

Full Marks: 70

[Answer Question No. 1 and Any Five (05) from the rest]

1. Complete the following sentences: - (10)
 - a) S and P removal are possible in basic EAF, because _____.
 - b) Use of gaseous oxygen in basic EAF steel making increases the _____.
 - c) Spiegel is used as _____ in steel making.
 - d) Viscosity of slag increases with _____ FeO content.
 - e) For alloying purpose, Fe-Ni can be added at any stage in steel making because _____.
 - f) Deep drawing is not suitable for steel made by _____ process.
 - g) _____ Law explains the solubility of Nitrogen in steel.
 - h) High Phosphorus in steel induces _____.
 - i) Phosphorus in steel is found as _____.
 - j) Objective of vacuum refining of liquid steel is to reduce the amount of _____.
2. Explain the metallurgical characteristics of L.D. process of steel making. (12)
3.
 - a) Discuss about the beneficial effects of continuous casting of steel. (3 + 2 + 3 + 4 = 12)
 - b) Explain primary and secondary cooling in continuous casting of steel.
 - c) What are the advantages of using Tundish in the continuous casting of steel?
 - d) Explain the term Negative Stripping in continuous casting and state its beneficial effects.
4. Write notes on the following : - (3 x 4 = 12)
 - a) Dry slag and Wet slag.
 - b) Eccentric shape of L.D. converter .
 - c) Three-nozzle lance in L.D. process.
 - d) Oxidising, Lime and Carbide slag.
5.
 - a) How does O₂ jet interact with molten bath in LD processes? Explain with diagram.
 - b) Explain JFN and its role on removal of impurities in LD process.
 - c) Explain why 20 to 25 % of the metal is charged as scrap in L.D. process?
 - d) Explain the role of different type of deoxidizers in steel making. (4 + 3 + 2 + 3 = 12)
6. Write notes on :
 - a) Induction Furnace steel making process. (7 + 5 = 12)
 - b) Beneficial effect of using oxygen in place of iron oxide or air in steel making.
7.
 - a) Mention the broad categories of process modeling activities in steel plant. (6 + 6 = 12)
Explain with the help of examples.
 - b) Explain the role of modern maintenance practice and operating parameters on lining life of BOF converter.
8. Write notes on the following : - (3 x 4 = 12)
 - a) Basic functions of refractories in steel plant.
 - b) Monolithic castables.
 - c) MgO-C bricks for converter lining.
 - d) Application of models in continuous casting.