B.E. (Met.) Part - III 6 th Semester Final Examination, 2012

# *STEEL MAKING AND FERRO–ALLOY TECHNOLOGY*

**(MT-601)**

**Time: 3 hours** **Full Marks: 70**

**[ Answer Any Five ( 05 ) ]**

1. a) Outline briefly the process of making stainless steel in a converter. (7 + 7 = 14)
   b) Explain the basic process and capabilities of any one of the vacuum refining processes.

2. Write short notes on the following :- ( $3\frac{1}{2}$ x 4 = 14 )
   a) The major advantages of secondary refining processes that made them popular.
   b) The most common secondary refining process where vacuum treatment is not required.
   c) The interventions taken by the steel industry to minimize damage to environment.
   d) Properties / Characteristics of refractories which dictate the service performance.

3. a) What are the approaches to be taken to improve basic oxygen converter lining life? (7 + 7 = 14)
   b) The effect of operating parameters on the lining life of basic oxygen converter.

4. Explain the characteristics of L.D. process of steel making. (14)

5. a) Discuss about the advantages & limitations of continuous casting of steel over conventional ingot casting methods. (3 + 4 + 3 + 4 = 14)
   b) What are the advantages of using Tundish in the continuous casting of steel?
   c) What is primary and secondary cooling in continuous casting of steel– Explain?
   d) Explain the term Negative Stripping in continuous casting and state its beneficial effects.

6. a) Explain the Principle of Operation of EAF Process of Steel Making. (6 + 8 = 14)
   b) Discuss about Austenitic Stainless Steel making using EAF with special emphasis on C-Cr-O equilibrium and temperature.

7. Write notes on : a) Induction Furnace steel making process. (8 + 6 = 14)
   b) Beneficial effect of using oxygen in place of iron oxide or air in steel making.

8. Distinguish the following : - ( $3\frac{1}{2}$ x 4 = 14 )
   a) Dry slag and Wet slag.
   b) Eccentric shape of L.D. converter over Concentric one.
   c) Three-nozzle lance and Single- nozzle lance in L.D. process.
   d) Oxidising, Lime and Carbidic slag.

9. a) How does $O_2$ jet interact with molten bath in LD processes? Explain with diagram.
   b) Explain JFN and its role on removal of impurities in LD process. (5 + 4 + 2 + 3 = 14)
   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.