

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

Time: 3 hours

Full Marks: 70

[ Answer Question No. 1 and 2 Any Four ( 04 ) from the rest ]

1. Explain the metallurgical characteristics of L.D. process of steel making. (20)
2. 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 \_\_\_\_\_.
3. a) Discuss about the beneficial effects of continuous casting of steel . ( 3 + 3 + 4 = 10 )  
b) What are the advantages of using Tundish in the continuous casting of steel?  
c) Explain the term Negative Stripping in continuous casting and state its beneficial effects.
4. Write notes on the following : - ( 2  $\frac{1}{2}$  x 4 = 10 )
  - a) Dry slag and Wet slag.
  - b) Eccentric shape of L.D. converter .
  - c) Three-nozzle lance in L.D. process.
  - d) AOD and VOD.
5. a) How does O<sub>2</sub> 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? ( 4 + 3 + 3 = 12 )
6. Write notes on : a) Induction Furnace steel making process. ( 6 + 4 = 10 )  
b) Beneficial effect of using oxygen in place of iron oxide or air in steel making.
7. Discuss Austenitic Stainless Steel making using EAF with special emphasis on C-Cr-O equilibrium and temperature. (10)
8. Why selection of Steel Making Process depends on the composition of liquid Pig Iron?  
The Bessemer and Open Hearth Process of Steel Making are progressively become obsolete and the present world practice depends on Basic Oxygen Steel Making Processes – Explain. (10)
9. Explain the Principle of Operation of Basic Bessemer Process of Steel Making. (10)
10. Explain different types of Ingot Defects and their Remedies. (10)