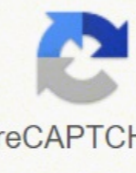


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1. Describe the working principle of a blast furnace. In a blast furnace, iron ore is reduced to iron. The reaction is exothermic. The heat generated is used to pre-heat the iron ore and the gas. The gas is then used to pre-heat the water. The water is then used to generate steam. The steam is used to drive a turbine. The turbine is used to generate electricity. The electricity is used to power the blast furnace.

2. Describe the working principle of a blast furnace. In a blast furnace, iron ore is reduced to iron. The reaction is exothermic. The heat generated is used to pre-heat the iron ore and the gas. The gas is then used to pre-heat the water. The water is then used to generate steam. The steam is used to drive a turbine. The turbine is used to generate electricity. The electricity is used to power the blast furnace.

**Unit Test #3 Metallurgy**

**METALLURGY**

Time: 90 minutes Full Marks: 35

1. Very short answer type questions *1x5=5*
- (a) Give name and formula of an important ore of Copper.
  - (b) What is the role of graphite rods in electrometallurgy of aluminium?
  - (c) Give the name of one acidic flux and one basic flux.
  - (d) Why froth floatation process is used for concentration sulphide ores?
  - (e) Give two requirements for vapour phase refining.

2. Short answer type questions *2x5=10*
- (a) Name the Principle ore of Aluminium. Explain the significance of leaching in the extraction of Aluminium.
  - (b) Differentiate between the terms "minerals" and "ores".
  - (c) What are fluxes? How are they used?
  - (d) Describe the method of refining of nickel.
  - (e) Describe the method of refining of Zirconium and Titanium.

3. Short answer type questions *3x5=15*
- (a) (i) What are the roles of cryolite in electrometallurgy of aluminium?  
(ii) What is slag?
  - (b) (i) Name the chief ore of silver. Describe with chemical equations the extraction of silver from this ore.  
(ii) Which is better reducing agent at 983K, carbon or CO during the extraction of iron?
  - (c) (i) Copper can be extracted by Hydrometallurgy but not zinc. Comment.  
(ii) Write the principle involved in zone refining.
  - (d) What is leaching? "The extraction of Au by leaching with NaCN involves both oxidation and reduction." Justify giving equations.
  - (e) Write down the reactions taking place in blast furnace related to the metallurgy of iron in the temperature range 500- 800 K.

3. Long answer type question *5*
- (a) What is Ellingham diagram? Give its use.
  - (b) Write the principle of electro-refining.
  - (c) What is Zone Refining? Explain with example.
- OR**

4. Long answer type question *5*
- (a) Give two requirements for the vapour phase refining.

*Naimur Rahman*



- Q. 7. How many parallel paths are used in a wave connected armature winding ?**  
**Ans.** Two parallel paths.
- Q. 8. How many parallel paths are used in a lap connected armature winding ?**  
**Ans.** Parallel paths are equal to the number of poles used in the lap winding.
- Q . 9. What will happen to the speed of shunt motor, if the polarity of d.c. supply to its terminals is changed ?**  
**Ans.** The speed will remain the same in r.p.m. and direction. The change of polarity of D.C shunt motor does not affect the speed direction.
- Q. 10. What will happen to the speed of a series motor when the number of turns in its field winding is decreased ?**



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