



**Note: Answer five questions only.**

**Q1: Fill in the blanks with the suitable answers: (Answer 20 blanks) (20 marks)**

1. Pyrometallurgical processes generally include ..... , ..... and.....
2. Electrometallurgy is .....
3. The main three methods for metal extraction are ..... , ..... and .....
4. Most important zinc ore is .....
5. Smelting of zinc produce two layers first zinc contains ..... , while other lead contain .....
6. Magnesium is difficult to deform due to its structure which is .....
7. In Electrolysis of Magnesium, it is formed at the cathode, floats up because of .....
8. Rare earth metals include the Metals with atomic number range (.....), In addition to .....and scandium metals.
9. One of the applications of rare earth metals is .....
10. High gold grade 99.999% purity get using .....method.
11. Aim of Recovery are.....and .....
12. Recycling advantages are .....and..... , while the problem of recycling is .....

**Q2: A) Put (✓) or (×), and then correct the false if it's found.**

1. Smelting temperature done at a temperature greater than material melting point.
2. Copper and zinc are the main metals extracted by Electro winning from aqueous solutions.
3. Gold occurs principally as a Native metal, or alloyed with Aluminum or iron.
4. Material Recovery Facility (MRF) job is separate metals only from other components.
5. Froth flotation is used to clean ores.
6. Metals ores usually contain gangue, which means waste.
7. Roasting is done to convert metal oxide ores to its sulphide.
8. The major ore for aluminium production is called Alumina.
9. Magnesium alloys used mainly as cast conditions.
10. Increasing recycling rate nowadays mean virgin metals uses increase.

**B) What is the difference between gyratory crusher and cone crusher? (20 marks)**

**Q3: A) Describe briefly the electrolysis refining of copper with aid of chemical reactions and sketch.**

**B) Differentiate between Mineral and ore; give an example for each one. (20 marks)**

**Q4: A) Describe briefly the production of zinc from zinc oxide ores with the aid of sketch and chemical reactions.**

**B) Explain the difference between primary and secondary crushers, what types of crusher used for each one? (20 marks)**

**Q5: A) Draw a sketch show the terms: Reuse, Recycle, Recover and their interactions, then define each term briefly?**

**B) What are the floatation additions, explain briefly? (20 marks)**

**Q6: A) Explain the causes for the following:**

1. Twenty aluminum recycled cans can be made with the energy needed to produce one can using virgin ore.
2. Mixed color glass "cullet" is used for glassphalt (a glass/asphalt mixture).

**B) Explain briefly one of the Thorium extraction methods with aid of sketches? (20 marks)**

.....GOOD LUCK.....