

Short Answer Question

Q.1 Define concentration process, is it used in metallurgy of copper?

Ans. The process of removal of gangue from the ore is technically known as concentration and the purified ore is called the concentrate. Yes, concentration process used in metallurgy of copper.

Q.2 Why a small amount of coke is required in the smelting process?

Ans. Because smelting is carried out in blast furnace. The process in blast furnace is highly exothermic process. Therefore a small amount of coke is required in this process.

Q.3 Why lime is added in the smelting process?

Ans. Lime is added to remove excess of SiO_2 . Lime reacts with sand to form slag.



Q.4 How slag and matte are removed from the blast furnace?

Ans. Slag being lighter rise to the top and is removed from the upper hole of the blast furnace and matte is withdrawn from the lower hole of the blast furnace. It contains about 45% of copper.

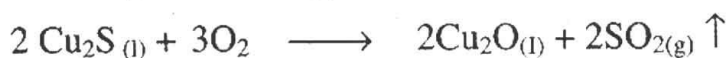
Q.5 What is the difference between slag and matte?

Ans.

Slag	Matte
When flux combine with gangue it will form slag which being lighter in weight and floats on the molten metal	In blast furnace cuprous sulphide and ferrous sulphide form a mixture (Cu_2S , FeS). This molten mixture is called matte.

Q.6 Mention the chemical reaction for the formation of metallic copper in the bessemerization process.

Ans. Following, chemical reactions for the formation of metallic copper in the bessemerization process



Q.7 Why anode is eaten up in electro – refining process?

Ans. Because on passing the electric current through the Copper sulphate solution, anode (Impure copper) dissolves to provide Cu^{2+} ions to the solution, these Cu^{2+} ions are discharged by gaining of electrons from the cathode thereby copper atoms deposit on the cathode, making it thick block of pure copper metal. The impurities like gold and silver settle down as anode mud.

Q.8 What do you mean by anode mud?

Ans. During the electro refining process of copper which carried out in an electrolytic tank. The impurities like gold and silver settle down as anode mud.

Q.9 Why only NaHCO_3 precipitates when CO_2 is passed through the ammonical brine ?

Ans. When CO_2 is passed through the ammonical brine, a mixture of NH_4Cl and NaHCO_3 is obtained. The temperature of the mixture is lowered to 15°C and precipitates of NaHCO_3 are formed. Because NaHCO_3 is insoluble in NH_4Cl at low temperature.

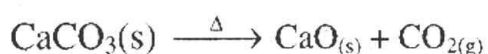
Q.10 Which raw materials are required for the formation of sodium carbonate?

Ans. The raw materials needed for the formation of sodium carbonates are

- i. Sodium chloride (NaCl) or brine
- ii. Lime stone (CaCO_3)
- iii. Ammonia gas (NH_3)

Q.11 How CO_2 is prepared in the Solvay's process?

Ans. CO_2 is prepared by heating lime stone in a lime kiln.



Q.12 Give the advantages of Solvay's process.

- Ans.**
- i. It is a cheap process as raw materials are available at very low prices.
 - ii. Carbondioxide and ammonia are recovered and reused.
 - iii. Process is pollution free, because the only waste is calcium chloride solution.
 - iv. Sodium carbonate of very high purity is obtained.
 - v. Consumption of fuel is very less since no solution is to be evaporated.

Q.13 What happens when ammonium carbonate is heated with steam?

Ans. When ammonium carbamate is evaporated with the help of steam, it dehydrate, to form urea.



Q.14 How many stages are involved in the formation of urea?

Ans. There are three stages are involved in the formation of urea.

- i. Reaction of ammonia and carbondioxide.
- ii. Urea formation
- iii. Granulation of urea.

Q.15 What role is played by pine oil in the froth flotation process?

Ans. Pine oil is played an important role in froth flotation process because Pine oil coated ore particles being lighter come to the surface in the form of froth that can be skimmed easily.

Q.16 Name the various metallurgical operation.

Ans. The process involved in metallurgy for extraction of a metal in the pure state from its ore are.

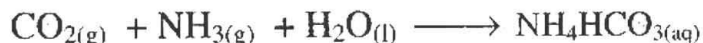
- i. Concentration of the ores
- ii. Extraction the metal
- iii. Refining of metal

Q.17 How roasting is carried out?

Ans. Roasting process is carried out in a special furnace which is called Reverberatory furnace.

Q.18 What happens when ammonical brine is carbonated??

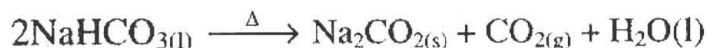
Ans. Ammonical brine is fed into carbonating tower and carbondioxide is passed through following reaction take place in carbonating tower.



The temperature of the mixture is lowered to 15°C and precipitates of NaHCO₃ are obtained.

Q.19 How NaHCO₃ is converted in to Na₂CO₃?

Ans. Sodium hydrogen carbonate is heated to get sodium carbonate.



CO₂ is again used in tower. It is about half of CO₂ needed in the process.

Q.20 How ammonia is recovered in solvay's process?

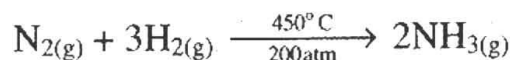
Ans. Ammonia is recovered in this tower from ammonium chloride solution produced in the carbonated tower and calcium hydroxide formed in lime kiln.



In fact all ammonia is recovered in this tower and is reused in the process.

Q.21 How ammonia is prepared for synthesis is Urea?

Ans. Ammonia is prepared by the Haber's process". One volume of nitrogen (from air) and three volumes of hydrogen (obtained by passing methane and steam over heated nickel catalyst) is passed over iron catalyst at 450°C and 200 atm pressure.



Q.22 Describe the formation of petroleum?

Ans. Petroleum was formed by the decomposition of dead plants and animal buried under earth's crust millions of years ago.

Q.23 What is refining of petroleum and how it is carried out?

Ans. Refining process is the separation of crude oil mixture into various useful products (fractions). It is carried out by a process called fractional distillation.

Q.24 Give uses of kerosene oil.

Ans: It is used as domestic fuel, a special grade of it is used as jet fuel.

Q.25 Describe the difference between diesel oil and fuel oil.

Ans:

Diesel oil	Fuel oil
i. It contains number of carbon atoms, 13 to 15.	i. It contains number of carbon atoms, 5 to 18.
ii. It is used as fuel for buses, trucks, railway engines, tubewell engines and other heavy vehicles.	ii. It is used in ships and industries to heat boilers and furnace.

Q.26 Write down the names of four fractions obtained by the fractional distillation, of residual oil.

Ans: The four fractions of residual oil are.

- i. lubricants ii. wax iii. Paraffin iv. Asphalt

Q.27 What is the difference between crude oil and residual oil?

Ans:

Crude oil	Residual oil
1. It is dark brownish viscous liquid which is formed of dead plants and animals	1. After the fractional distillation of petroleum, the oil is left behind called residual oil.

Q.28 Which petroleum fraction is used in dry cleaning?

Ans: Gasoline or petrol is used in dry cleaning

Q.29 Define Metallurgy.

Ans. Metallurgy is the science of extracting metals from ores.

Q.30 Define Minerals.

Ans. The solid natural materials found beneath the earth surface, which contains compound of metals in the combined state along with earthly impurities are called minerals.

Q.31 Define ores.

Ans. The minerals from which the metals are extracted commercially at a comparatively low cost with minimum effort are called ores of the metals. For example ores of copper are copper glance (Cu_2S) and chalcopyrite (CuFeS_2)

Q.32 Why the colour of hairs different from different people?

Ans. The colour of hairs caused by the presence of transition metal compound in the hair. Brown hair contains iron or copper compounds blonde hair contains compounds of titanium and redhead hair is because of the presence of molybdenum compounds

Q.33 Define Gangue.

Ans. Impurities associated with the ore known as gangue.

Q.34 Write down the names of steps used in metallurgy.

Ans. The process involved in metallurgy for extraction of a metal in the pure state from its ore are

- (i) Concentration of the ore
- (ii) Extraction of the metals
- (iii) Refining of the metal

Q.35 What is concentration of the ore?

Ans. The process of removed of gangue from the ore is technically known as concentration and the purified ore is called concentrate

Q.36 What is gravity separation?

Ans. Gravity separation is based on the difference in densities of the metallic ore and gangue particles.

Q.37 Define Froth flotation process.

Ans. Froth flotation process is based on the wetting characteristics of the ore and the gangue particles with oil and water respectively.

Q.38 Define electromagnetic separation.

Ans. Electromagnetic separation is based on the separation of magnetic ores from the non-magnetic impurities by means of electromagnetic or magnetic separators.

Q.39 Define Roasting.

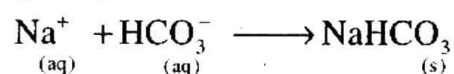
Ans. It is the process of heating the concentrated ore to a high temperature in excess of air.

Q.40 What is blister copper?

Ans. The dissolved gases escape out forming blisters on the surface of the solid copper. Therefore of the solid copper it is called blister copper. It is about 98% pure copper.

Q.41 Describe the principle of Solvay's process.

Ans. Principle of Solvay's process lies in the low solubility of sodium bicarbonate at low temperature i.e at 15°C. When CO₂ is passed through an ammoniacal solution of NaCl called ammoniacal brine only NaHCO₃ precipitates.



Q.42 Write down advantages of Solvay's process.

Ans. It is a cheap process as raw materials are available at very low prices

- (ii) Carbondioxide and ammonia are recovered and reused
- (iii) Process is pollution free because the only waste is calcium chloride solution
- (iv) Consumption of fuel is very less since no solution is to be evaporated

Q.43 What do you know about Urea?

Ans. Urea is nitrogenous fertilizers. It consists of 46.6% nitrogen. It is white crystalline compound, highly soluble in water. It is used for the manufacturing of important chemical, but its major (about 90%) use is as a fertilizer.

Q.44 Define petroleum.

Ans. Petroleum means rock oil. It is a complex mixture of several gaseous, liquid and solid hydrocarbons having water, salts and earth particles with it. It is lighter than water and is insoluble in it.

Q.45 Define refining.

Ans. Refining process is the separation of crude oil mixture into various useful products (fractions). It is carried out by a process called fractional distillation

Q.46 Describe the difference between diesel oil and fuel oil.

Ans.

Diesel oil	Fuel oil
i. It contains number of carbon, 13 to 15.	i. It contains number of carbon, 15 to 18.
ii. It is used fuel for buses, trucks, railway engines, tubewell. Engines and other heavy vehicles.	ii. It is used in ships and industries to heat boilers and furnace.

Q.47 Write down the name, of our fractions obtained by the fractional distillation of residual oil.

Ans. The four fractions of residual oil are

- i. lubricants iii. wax
- ii. paraffin iv. asphalt

Q.48 What is the difference between crude oil and residual oil?

Ans.

Crude oil	Oil
It is dark brownish viscous liquid which is formed of dead plant, and animals, where converted into a dark brownish viscous liquid.	After the fractional distillation of petroleum, the oil is left behind called residual oil

Q.49 Which petroleum fraction is used in dry cleaning?

Ans. Gasoline or petrol is used in dry cleaning.

Multiple Choice Questions

1. Extraction of metals from its ores is called

- (a) Metallurgy (b) Mining
- (c) Grinding (d) All

2. At the time of partition, How many industries were present in Pakistan

- (a) 30 (b) 32
- (c) 34 (d) 40