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Momna Habib

10th (A)

Assignment of:-
Chemistry

Submitted to:

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Chapter Wise

Chapter No. 16

Chemical Industries

Objective Part

Question No. 1; Multiple choice questions:

- (i) Concentration is a:
- (a) mixing technique (b) Separating technique
(c) Boiling technique (d) Cooling technique
- (ii) Froth floatation process is used to concentrate the ore on:
- (a) Density basis (b) Concentration basis
(c) Wetting basis (d) Magnetic basis
- (iii) Concentration of copper ore is carried out by:

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- (a) Calcination (b) Roasting
 (c) Froth floatation (d) Distillation

(iv) Matte is a mixture of:

- (a) FeS and CuS (b) Cu_2S and FeS
 (c) Cu_2O and FeO (d) CuS and FeO

(v) When NaHCO_3 is heated it forms:

- (a) CO_2 (b) CaCO_3
 (c) $\text{Ca}(\text{OH})_2$ (d) CaO

(vi) When CO_2 is passed through ammonical brine the only salts that precipitate is:

- (a) NaHCO_3 (b) NH_4HCO_3
 (c) Na_2CO_3 (d) CaO

(vii) In Solvay's process, slaked lime is used to

- (a) Prepare CO_2 (b) Prepare Quick Lime

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(c) Recover ammonia (d) From Na_2CO_3

(vii) Formula of urea is:

- (a) $\text{NH}_2\text{COONH}_4$ (b) NH_2CONH_2
 (c) $\text{NH}_2\text{COONH}_2$ (d) NH_2CONH_2

(ix) Percentage of nitrogen in urea is:

- (a) 36.6% (b) 46.6%
 (c) 56.6% (d) 66.6%

(x) Crude oil is heated in fractionating furnace upto.

- (a) 300°C (b) 350°C
 (c) 400°C (d) 450°C

(xi) Which of following is used as jet fuel?

- (a) Kerosine oil (b) Lubricating oil
 (c) fuel oil (d) diesel oil

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(xii) Which organic compound is found in gasoline?

(a) C_2H_4

(b) C_3H_8

(c) C_8H_{18}

(d) $C_{12}H_{26}$

Subjective Part

Part - I

Question No. 02

Short Answer

————— (i) —————

What is the role of pine oil in froth floatation?

• Role of pine oil:

In froth floatation process, the ore particles are wetted by oil. Hence, oil coated oil particles being lighter come to

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the surface and ore is separated from mineral.

————— (ii) —————

Name the various metallurgical operations.

• Various metallurgical operations:

(i) Concentration of ore

(ii) Extraction of metal

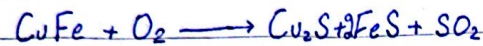
(iii) Refining of metal

————— (iii) —————

How is roasting carried out?

Roasting:

The process of heating concentrated ore to a temperature in the excess of air.

Reaction:(iv)

Define gangue and metallurgy.

- Gangue:

The earthly and other impurities associated with the minerals are known as gangue.

- Metallurgy:

The process of extraction of metal in a pure state on a large scale from its physical or chemical means is called metallurgy.

(v)

What is Electromagnetic separation?

Electromagnetic separation:

Electromagnetic separation is based on the separation of magnetic ores from non-magnetic separations by the means of electromagnets or magnetic separation.

Explanation:

The powdered ore is dropped over a leather belt. The non-magnetic impurities drop first and then magnetic ore drop.

(vi)

Write the names and formulas of two ores of copper:

• Two Ores of copper:

- * Copper Glance (Cu_2S)
- * Chalcopyrite (CuFeS_2)

(vii)

What is gravity separation?

• Gravity separation:

Gravity separation is based upon the densities of metallic ore and non-metallic gangue.

Explanation:

In the process, the

powdered heavy metal bearing ore settles (ore) down on agitation in a stream of water, while lighter gangue particles are carried away by water.

(viii)

Define ore and give two examples:

• Ore:

The minerals from which the metals are extracted commercially at a comparatively low cost with minimum effort is called ores of metals.

Example:

- Copper glance (Cu_2S)
- Chalcopyrite (CuFeS_2)

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Answer No. 3:

(i)

What is the difference between minerals and ore?

| Minerals | Ore |
|--|---|
| <ul style="list-style-type: none">The solid natural materials found beneath the Earth's surface, which contain compounds of metals in combined state along with earthy impurities. | <ul style="list-style-type: none">Those minerals from which metals are extracted commercially at a comparatively low price with minimum effort is called ore. |

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(ii)

Define gangue. Also write formula of copper glance.

Gangue:

The earthy and other impurities associated with the minerals are called gangue.

Formula of copper glance

• Copper glance (Cu_2S)

(iii)

Define metallurgy.

• Metallurgy:

The process of extraction of metal in pure state on a large scale from its ore by physical or chemical

means is called metallurgy.

Process involve in metallurgy

- Concentration of ore
- Extraction of metal
- Refining of metal

(iv)

What is difference between slag and matte?

| Slag | Matte |
|---|---|
| <ul style="list-style-type: none"> • During extraction of metal from concentrated ore, the impurities floats on the surface of metal which is called slag. | <ul style="list-style-type: none"> • The mixture of cuprous sulphide and ferrous sulphide is called matte. |

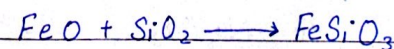
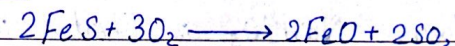
(v)

How slag is formed during smelting?

Answer:

Ferrous sulphide reacts with oxygen to form cuprous oxide and sulphur dioxide gas. Ferrous oxide further reacts with sand and form slag.

Reaction:



(vi)

What is blister copper?

Blister copper:

The molten matte

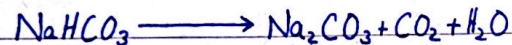
is shifted from a converter to sand moulds and is allowed to cool. The dissolved gases escape out forming blisters on the surface of solid copper. Therefore, it is called blister copper.

————— (vii) —————

How NaHCO_3 is converted to Na_2CO_3 ?

When NaHCO_3 is heated, it is converted to Na_2CO_3

Reaction:



————— (viii) —————

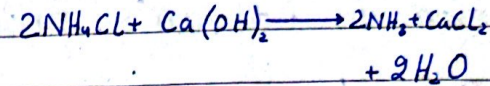
How is Ammonia recovered in Solvay's process?

• Recovery of ammonia:

When ammonium

chloride reacted with slaked lime, ammonia is produced.

Reaction:



————— Answer No. 04: —————

————— (i) —————

What is the raw material needed for Solvay's process?

• Raw materials for Solvay's process:

i- Sodium chloride

ii- Limestone

iii- Ammonia gas

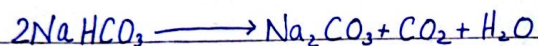
(ii)

Give the process of calcination in Solvay's process.

• Calcination:

Sodium carbonate is heated to get sodium carbonate which is called calcination.

Reaction:



(iii)

How carbonation of ammoniacal brine is carried out in Solvay's process? Write equation.

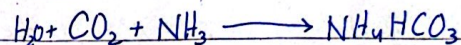
Carbonation of ammoniacal brine:

Ammoniacal brine is fed

into carbonating tower and carbon dioxide is passed through it.

Reaction:

Following reaction takes place in carbonating tower:



(iv)

What are the advantages of Solvay's process?

Advantages:

- i. Sodium carbonate of very high purity is obtained.
- ii. Consumption of fuel is very less since no solution is to be evaporated.

(v)

What is the principal of Solvay's process:

• Principal of Solvay's process:

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

(vi)

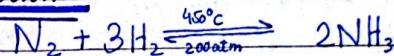
How is ammonia prepared for synthesis of urea?

• Haber's process:

Ammonia is prepared by Haber's process. One volume of

nitrogen and three volumes of hydrogen is passed over iron catalyst at 450°C and 200 atm pressure.

Reaction:



(vii)

Write raw materials for manufacturing urea.

• Raw materials:

The raw material of urea are:

i. Ammonia (NH₃)

ii. Carbon dioxide (CO₂)

(viii)

Write a note on granulation of urea.

Granulation of urea:

At this stage, liquid urea is sprayed from top of tower under pressure and a hot current of air is introduced from base it evaporates to form granules.

Part-II

Answer No. 5

(a)

Describe any four advantages of Solvay's process.

• Advantages of solvay's

process:

• Cheap process:

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

• Recovery of gases:

Carbon dioxide and ammonia are recovered and reused.

- Pure product: Pollution is pollution free because the only waste is calcium chloride solution.

- less fuel consumption: Consumption of fuel is very less since no solution is to be evaporated.

—————(b)—————

How urea is manufactured?

Manufacturing of urea:

Manufacturing of urea involves three stages:

- Reaction of ammonia and carbon dioxide:

Carbon dioxide is passed through liquid ammonia under high pressure

to form ammonium carbamate.

Reaction:



- Urea formation:

When ammonium carbamate is evaporated with the help of steam, it forms urea.

Reaction:



- Granulation of urea:

At this stage, liquid urea is evaporated to form granules. When liquid urea is sprayed from top of tower under pressure and hot air currents are introduced from base, it evaporates to form granules.

Answer No. 6:

(a)

Write the importance of urea.

Importance:

- It is used as fertilizer (About 90%).
- It is used as raw material for manufacture of many important chemicals.
- It is used to make explosives.
- It is used in automobile systems to reduce NO_x pollutants in exhaust gases.

(b)

Write a note on fractional distillation of crude petroleum.

Fractional distillation:

Fractional distillation is based upon separation of substances depending upon their boiling points.

Explanation:

- Crude oil is heated in furnace at 400°C . Most of the components boil at this temperature.
- Those components of crude oil having low molecular mass condense at top of fractionating tower and collected at top.
- Components of crude oil having low molecular mass condense

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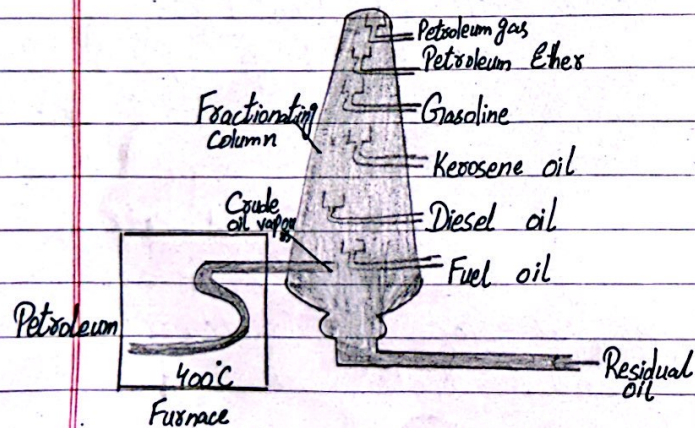
at bottom of fractionating tower.

Fractions of crude oil

Following are fractions of crude oil:

- Petroleum gas
- Petroleum ether
- Gasoline
- Kerosene oil
- Diesel oil
- Fuel oil

Diagram:



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