

# ALLEN CAREER INSTITUTE

# PRELIMINARY EXAM : 2019-20

Paper Set : SET-I(HT)

## **SUBJECT : Chemistry**

**ICSE Board - Sample Paper - 1 Solutions** 

## **SECTION – 1**

## Answer 1

- (a) 1. 0
  - 3. Salts
  - 5. 14
- (b) 1. (A) Nitrogen dioxide
  - 3. (C) Low ionisation potential
  - 6. (B) Calcium nitrate

- 2. oxidised
- 4. concentrated sulphuric acid
- 2. (B)  $C_n H_{2n+1}$

2. Cathode

5. (D) Turns red litmus blue

4. Ethyne or Acetylene

## (c) Identify the substance underlined, in each of the following cases :

- 1. Na<sub>2</sub>O
- 3. SiO<sub>2</sub>
- 5. CO<sub>2</sub>
- (d) 1.  $NaNO_3 + H_2SO_4$  (conc.)  $\rightarrow NaHSO_4 + HNO_3$ 
  - 2. NaHSO<sub>3</sub> + HCl (dilute)  $\rightarrow$  NaCl + H<sub>2</sub>O + SO<sub>2</sub>
  - 3.  $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$
  - 4.  $C_2H_5OH + H_2SO_4$  (conc.)  $\rightarrow C_2H_4 + [H_2O.H_2SO_4]$
  - 5.  $NH_3 + 3Cl_2 \rightarrow NCl_3 + 3HCl$
- (e) 1. Ethyne burns with brilliant white flame when the supply of air is in excess.
  - 2. A colourless gas having rotten egg smell is evolved.
  - 3. White precipitate appears which remains insoluble in excess of ammonium hydroxide.
  - 4. Reddish brown precipitate appears which is insoluble in excess of ammonium hydroxide.
  - 5. A white precipitate is formed appears which is insoluble in excess of sodium hydroxide solution.
- (f) 1. i. An isomer of n-butane : 2 methylpropane





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## $H_{3}C - C \equiv C - CH_{3}$



- 2. i. Aluminium
- (g) 1. Whenever the gases combine chemically, they do so in volume which bears a simple ratio to each other as well as to the product of gases, under the same conditions of temperature and pressure.

ii.

Iron

2. Empirical formula =  $Na_2SiO_3$ .

Element	Percentage Composition by mass	Atomic Mass	Relative number of atoms	Simples ratio
Sodium	37.6	23	1.6	2
Silicon	23.1	28	0.8	1
Oxygen	39.3	16	2.4	3

- (**h**) 1. Sodium.
  - 2. 1.
  - 3. Reducing agent.
  - 4. 1.

#### **SECTION-II**

#### Answer 2

- (a) 1. Li < Na < K < Rb < Cs.
  - 2. Alkali metals have one electron in their valence shell and hence they easily lose or donate electron. So, they are good reducing agents.
  - 3. Ionisation potential increases across a period.
  - 4. All metals of Group 2 have 2 valence electrons.
- (b) i. Oxygen

(c) Calcium carbonate dissolves in dilute nitric acid. To the clear solution, when ammonium hydroxide is added, no visible reaction occurs.

Lead carbonate dissolves in dilute nitric acid. To the clear solution, when ammonium hydroxide is added, a white precipitate is formed which is insoluble in excess.

Zinc carbonate dissolves in dilute nitric acid. To the clear solution, when ammonium hydroxide is added, a white precipitate is formed which is soluble in excess.

#### Answer 3

- (a) 1. The force of attraction between the constituent particles is weak. Hence, covalent compounds exists as gases, liquids or soft solids.
  - 2. Type of bond in hydrogen chloride is polar covalent compound. Chlorine is more electronegative than hydrogen. Hence the shared pair of electrons lies closer to chlorine and the bond becomes polar.

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ii. Hydronium ion.





- (b) i. Acidified nickel sulphate solution.
  - iii. Pure nickel.

 $\text{v.} \quad \text{Ni} - 2e^{\scriptscriptstyle -} \to \text{Ni}^{\scriptscriptstyle 2+}.$ 

- ii. The article to be electroplated.
- iv. Ni<sup>2+</sup> + 2e<sup>-</sup>  $\rightarrow$  Ni

#### Answer 4

- (a) 1. i. Colourless and odourless gas evolves which turns lime water milky.
  - ii. The starch iodide paper turns blue black.
  - 2. i. Nitrogen and hydrogen are the reactants which are taken in the ratio of 1:3 by volume.
    - ii.  $N_2 + 3H_2 \rightarrow 2NH_3 + heat$
    - iii. Catalyst-Finely divided iron Promoter-Molybdenum.
- **(b)** i.  $CuSO_4.5H_2O + H_2SO_4(conc.) \rightarrow CuSO_4 + [5H_2O.H_2SO_4]$ 
  - ii.  $C + 2H_2SO_4(conc.) \rightarrow CO_2 + 2H_2O + 2SO_2$
  - iii.  $2H_2S + SO_2 \rightarrow 2H_2O + 3S$
- (c) i. Non-volatile acid
  - ii. Dilute acid (Typical acid properties)

#### Answer 5

(a)	Element	Percentage Composition by mass	Atomic Mass	Relative number of atoms	Simples ratio
	Carbon	12.67	12	1.05	1
	Hydrogen	2.13	1	2.13	2
	Bromine	85.11	80	1.06	1

i. Empirical formula – CH<sub>2</sub>Br

ii. Vapour density = 94 Molecular weight = 2 × Vapour density = 2 × 94 = 188 Empirical weight = (1 × 12 + 2 × 1 + 80) = 94 n  $\frac{\text{Molecular weight}}{\text{Empirical weight}}$ = 2

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Molecular formula =  $(Empirical formula)_n$ 

$$= (CH_2Br)_2$$
$$= C_2H_4Br_2$$

Mass of the compound

**(b)** 1. Number of moles of sulphur =  $\frac{1}{\text{Molecular weight of the compound}}$ 

$$=\frac{3.2}{32} = 0.1$$
 mole

0.1 mole of calcium will contain the same number of atoms So, 0.1 mole of Ca =  $0.1 \times 40 = 4$  g of calcium

50, 0.1 mole of  $Ca = 0.1 \times 40 = 4 g C$ 

2.  $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O_3$ 

Molecular mass of propane =  $(12 \times 3) + (1 \times 8)$ 

As per the reaction,

Volume of oxygen produced by complete burning of 44 g propane

= 
$$5 imes 22.4$$
 litres of oxygen

Volume of oxygen produced by complete burning of 8.8 g propane

$$= 5 \times 22.4 \times \frac{8.8}{44}$$
 litres of oxygen

- (c) 1. Barium chloride solution
  - 2. Hydrogen

#### Answer 6

- (a) 1.  $KNO_3 + H_2SO_4(conc.) \rightarrow KHSO_4 + HNO_3$  (below 200°C)
  - 2.  $4NO_2 + 2H_2O + O_2 \rightarrow 4HNO_3$ .
  - 3. Dilute nitric acid acts as on oxidising agent when it reacts with metals to produce oxides of nitrogen and not hydrogen.
  - 4. It turns brown in colour.

**(b)** 1. 
$$C_2H_5COONa + NaOH(aq) \rightarrow C_2H_6 + Na_2CO_3$$

- 2.  $C_2H_5Cl + KOH (aq) \rightarrow C_2H_5OH + KCl$
- 3.  $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$
- 4.  $C_2H_4 + H_2O \rightarrow C_2H_5OH$
- (c) 1. Ethene decolourises bromine solution.
  - 2. A white precipitate is formed.

#### Answer 7

- (a) 1. Haemetite,  $Fe_2O_3$ 
  - 2. i.  $Fe_2O_3 + xH_2O \rightarrow Fe_2O_3.xH_2O$ :: 2Fa + 4U O  $\rightarrow$  Fa O + 4U
    - ii.  $3Fe + 4H_2O \rightarrow Fe_3O_4 + 4H_2$
    - iii. Iron is used in the manufacture of shutters, raining grills etc.
- **(b)** 1. Cathode-Hydrogen.

Anode-Oxygen.

2. Cathode-Sodium metal Anode-Chlorine gas

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