CHEMISTRY ONLINE
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CHEMISTRY

MULTIPLE CHOICE - 4

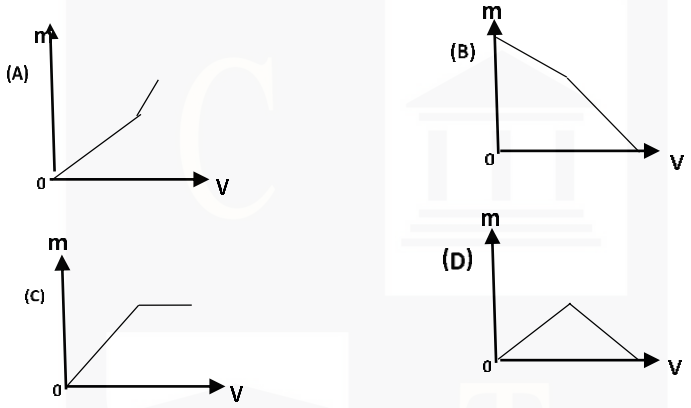
ATOMS,MOLECULES & STOICHIOMETRY

Atoms, Molecules and Stoichiometry

1) When an excess of aqueous potassium iodide is gradually added to aqueous mercury(II) chloride, the following reaction occur:

$$HgC1_2(aq) + 2KI(aq) \rightarrow HgI_2(s) + 2KC1(aq)$$
$$HgI_2(s) + 2KI(aq) \rightarrow K_2HgI_4(aq)$$

Which diagram shows how the mass *m* of the precipitate varies with the volume *V* of aqueous potassium iodide added?



2) When Fe is reacted with $Fe^{3+}(aq)$ ions, $Fe^{2+}(aq)$ ions are formed.

Assuming the reaction goes to completion, how many moles of Fe and $Fe^{3+}(aq)$ would result in a mixture containing equal numbers of moles of $Fe^{3+}(aq)$ and $Fe^{2+}(aq)$ once the reaction had taken place?

	moles of Fe	moles of Fe^{+} (aq)
A	1	2
B	1	3
C	1	5
D	2	3

3) In 1892, Lord Rayleigh made 'atmospheric nitrogen' by removing carbon dioxide, water vapour and oxygen from a sample of air. He found the density of this nitrogen to be 1.2572 g dm^{-3} at s.t.p. Chemically pure nitrogen has a density of 1.2505 g dm^{-3} at s.t.p.

Which gas present in 'atmospheric nitrogen' caused this discrepancy?

(A) argon (B) helium (C) methane (D) neon

4) Since 1850, most books have been printed on acidic paper, which eventually becomes brittle and disintegrates. These books can be preserved by treatment with diethylzinc vapors, $Zn(C_2H_5)_2$, which reacts both with acid residues and also with small amounts of water retained in the paper.

Diethylzinc reacts with an acid to give ethane.

$Zn(C_2H_5)_2 + 2HX \rightarrow ZnX_2 + 2C_2H_6$

Which products are likely to result from the reaction of diethylzinc with water?

A $ZnH_2 + C_2H_6$ B $ZnH_2 + C_2H_5OH$

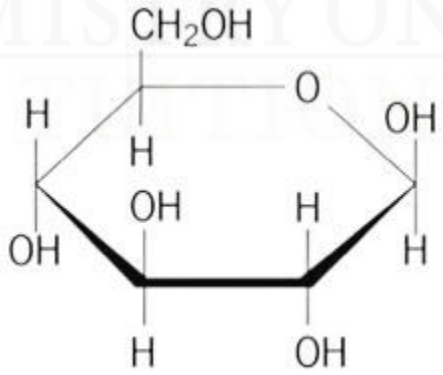
C $Zn(OH)_2 + C_2H_6$ D $Zn(OH)_2 + C_2H_5OH$

5) A sample of 0.025 mol of the chloride of an element *Z* was dissolved in distilled water and the solution made up to 500 cm^3. 12.5 cm^3 of this solution reacted with 25 cm^3 of 0.1 mol dm^{-3} silver nitrate solution. What is the most likely formula of the chloride?

(A) Z_2CI (B) ZCI (C) ZCI_2 (D) ZCI_4

6) In the body, cellular respiration produces energy from the oxidation of glucose.

The diagram shows the structure of glucose.



A new artificial sweetener has been produced by replacing all of the hydroyl groups attached directly to the ring carbon atoms in glucose with chlorine atoms.

What is the empirical formula of this chlorinated glucose?

(A) CHClO (B) CH_2Cl (C) $C_3H_4Cl_2$ (D) $C_6H_7Cl_5O$

7) A sample of 10 dm^3 of polluted air is passed through lime water so that all the carbon dioxide present is precipitated as calcium carbonate. The mass of calcium carbonate formed is 0.05 g. What is the percentage, by volume, of carbon dioxide in the air sample?

[Relative atomic masses: C, 12; 0, 16; Ca, 40; 1 mol of gas under experimental conditions has a volume of 24 dm^3.J

(A) 0.03% (B) 0.05% (C) 0.12% (D) 0.3%

In a pathology laboratory, a sample of urine containing 0.120 g of urea, NH_2CONH_2, (M_r = 60) was treated with an excess of nitrous acid. The urea reacted according to the following equation.

$$NH,CONH_2 + 2HNO_2 \rightarrow CO_2 + 2N_2 + 3H_2O$$

8) The gas produced was passed through aqueous sodium hydroxide and the final volume measured. What was this volume at room temperature and pressure?

[Molar volume of a gas at r.t.p. is 24000 cm^3 mold.]

(A) 9.6 cm^3 (B) 14.4 cm^3 (C) 48.0 cm^3 (D) 96.0 cm^3

9) A pure hydrocarbon is used in bottled gas for cooking and heating.

When 10 cm^3 of the hydrocarbon is burned in 70 cm^3 of oxygen (an excess), the final gaseous mixture contains 30 cm^3 of carbon dioxide and 20 cm^3 of unreated oxygen. All gaseous volumes were measured under identical conditions.

What is the formula of the hydrocarbon?

(A) C_2H_6 (B) C_3H_6 (C) C_3H_8 (D) C_4H_{10}

I am Sorry !!!!

10) A condensation reaction involves eliminatinga molecule of water between two molecules.

Two molecules of phosphoric acid, H_3PO_4, can undergo a condensation reaction producing diphosphoric acid, $H_4P_2O_7$.

When three molecules of phosphoric acid undergo a similar condensation reaction, triphosphoric acid is produced.

What is the molecular formula of triphosphoric acid?

(A) $H_5P_3O_8$ (B) $H_5P_3O_{10}$ (C) $H_7P_3O_{10}$ (D) $H_7P_3O_{11}$

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