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# CHEMISTRY

## MULTIPLE CHOICE - 2

## ATOMS,MOLECULES & STOICHIOMETRY

# Atoms, Molecules and Stoichiometry

1.  What volume of 0.10 mol dm-3 aqueous silver nitrate reacts with 20 cm3 of 0.20 mol dm-3 barium chloride?

    (A)    10 cm$^3$          (B)    20 cm$^3$          (C)    40 cm$^3$          (D)    80 cm$^3$

2.  When 20 cm3 of a gaseous hydrocarbon were completely burnt in an excess of oxygen, 60 cm3 of carbon dioxide and 40 cm3 of water vapour were formed, all volumes being measured at the same temperature of pressure.
    What is the formula of the hydrocarbon?

    (A)    $C_2H_6$          (B)    $C_3H_4$          (C)    $C_3H_6$          (D)    $C_3H_8$

3.  Naturally occurring silicon is a mixture of three isotopes, $^{28}$Si and $^{30}$Si. The relative atomic mass of silicon is 28.109.
    What could be the relative abundance of each of the three isotopes?

    (A)    91.1% $^{28}$Si, 7.9% $^{29}$Si and 1.0% $^{30}$Si

    (B)    92.2% $^{28}$Si, 4.7% $^{29}$Si and 3.1% $^{30}$Si

    (C)    95.0% $^{28}$Si, 0.3% $^{29}$Si and 3.4% $^{30}$Si

    (D)    96.3% $^{28}$Si, 0.3% $^{29}$Si and 3.4% $^{30}$Si

4.  A 0.20 g sample of a monobasic acid requires 8.0 cm3 of 0.40 mol dm-3 sodium hydroxide for complete reaction.
    What is the relative molecular mass of the acid?

    (A)    62.5          (B)    250          (C)    625          (D)    640

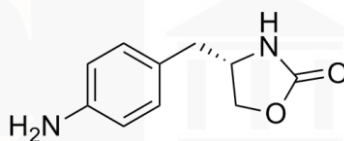5. On collision, airbags in cars inflate rapidly due to the production of nitrogen.

   The nitrogen is formed according to the following equation.

   2NaN3 → 2Na+3N2

   10Na+2KNO3 → K2O+5Na2O+N2
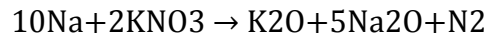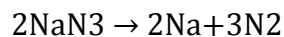
   How many moles of nitrogen gas are produced form 1 mol of sodium azide, NaN3?

   (A)    1.5           (B)    1.6           (C)    3.2           (D)    4.0

6. Compound G is a diesel fuel additive which reduces the amount of soot formed when the fuel burns.

   

   How many moles of oxygen gas are needed to completely burn 1 mole of compound G?

   (A)    8.5           (B)    9.0           (C)    9.5           (D)    10.0

7. Self-igniting flares contain $Mg_3P_2$. With water this produces diphosphane, $P_2H_4$, which is spontaneously flammable in air.

   Which equation that includes the formation of diphosphane is balanced?

   (A)     $Mg_3 P_2+6H_2O→ 3Mg(OH)_2 + P_2H_4$

   (B)     $Mg_3P_2+6H_2O → 3Mg(OH)_2 + P_2H_4+H_2$

   (C)     $2Mg_3P_2 +12H_2O → 6Mg(OH)_2 +P_2H_4+2PH_3$

   (D)     $2Mg_3P_2+12H_2O → 6Mg(OH)_2+ 3P_2H_4$

18. A gaseous organic compound, $X$ was burnt in an excess of oxygen. A 0.112 dm³ sample of $X$ measured at s.t.p., produced 0.88 g of carbon dioxide.

    How many carbon atoms are there in one molecule of $X$?

    (A)   1           (B)   2           (C)   3           (D)   4

**19.** Ethanediote ions, $C_2O_4^{2-}$, are oxidised by hot acidified, aqueous potassium manganite (VII) according to the following equation.

$2MnO_4^-(aq) + 5C_2O_4^{2-}(aq) + 16H^+(q$

$\rightarrow 2Mn^{2+}(aq) + 10CO_2(g) + 8H_2O(\ell)$
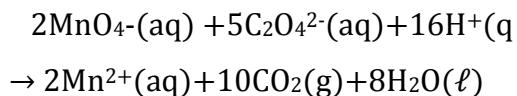
What volume of 0.020 mol dm$^{-3}$ potassium manganite (VII) is required to oxidise completely $1.0 \times 10^{-3}$ mol of salt $KHC_2O_4H_2C_2O_4$?

(A) 20 cm$^3$    (B) 40 cm$^3$    (C) 50 cm$^3$    (D) 125 cm$^3$

**20.** Nervous disorders resulting from mercury poisoning occur because mercury forms a 1:1 complex with lipoyl groups which are vital for glucose metabolism.

(A) $2.5 \times 10^{-9}$ g    (B) $4.0 \times 10^{-8}$ g    (C) $1.0 \times 10^{-7}$ g    (D) $1.0 \times 10^{-5}$ g
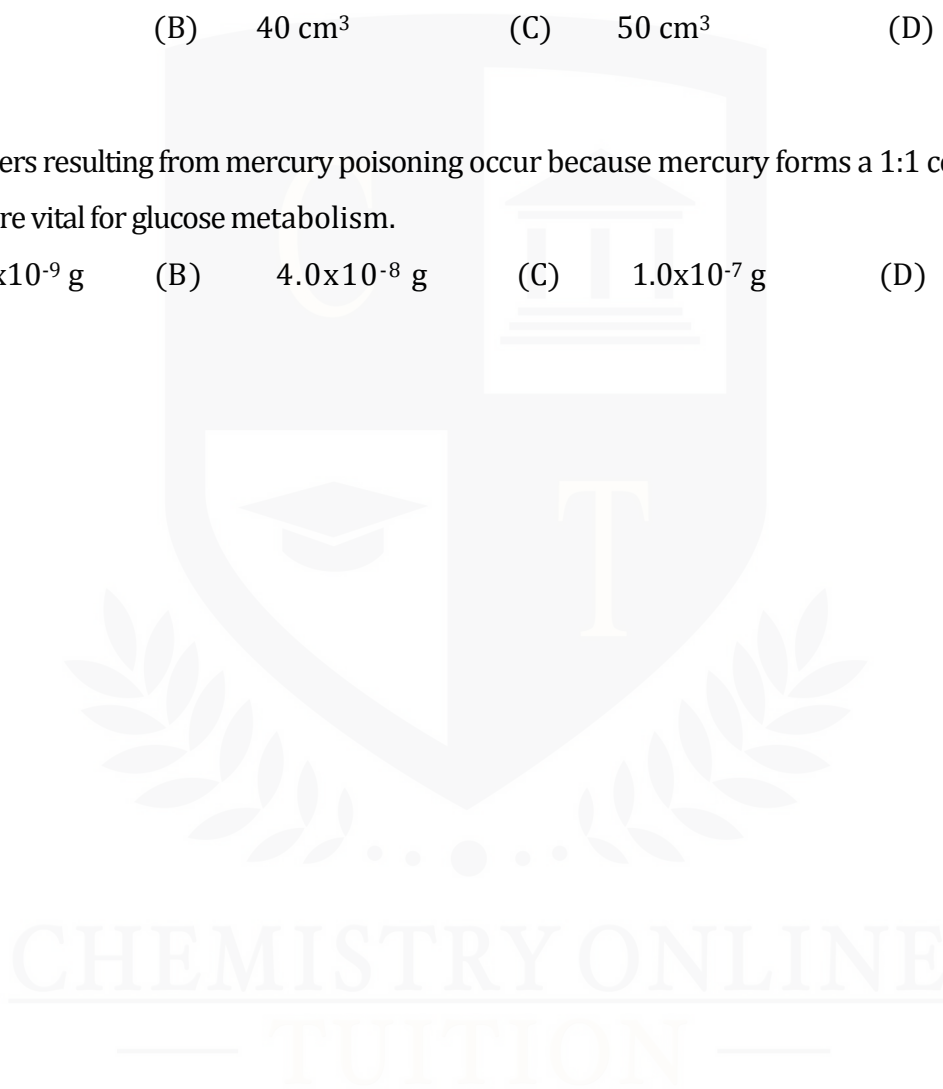
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