CHEMISTRY ONLINE
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CHEMISTRY

MULTIPLE CHOICE - 3

ATOMS,MOLECULES & STOICHIOMETRY

Atoms, Molecules and Stoichiometry

1. A mixture of 10 cm^3 of oxygen and 50 cm^3 of hydrogen is sparked continuously.

What is the maximum theoretical decrease in volume?

[All gas volumes are recorded at 298 K and standard atmospheric pressure.]

(A) 10 cm^3 (B) 15 cm^3 (C) 20 cm^3 (D) 30 cm^3

2. Which of the following contains two moles of solute particles?

(A) 1.0 dm3 of 0.50 mol dm^{-3} $Na_2SO_4(aq)$

(B) 1.0 dm3 of 0.20 mol dm^{-3} $Al_2(SO_4)_3(aq)$

(C) 4.0 dm^3 of 0.25 mol dm^{-3} $CH_3CO_2Na(aq)$

(D) 8.0 dm^3 of 0.125 mol dm^{-3} $CH_3CO_2H(aq)$

3 The reaction of hydrogen sulfide with sulfur dioxide gives sulfur as one of the products.

$H_2S(aq)+4H+(aq)+4e- \rightleftharpoons S(s)+2H+(aq)+2e^-$

$SO2(aq)+4H+(aq)+4e- \rightleftharpoons S(s) +2H2O(\ell)$

How many moles of hydrogen sulfide are needed to react with sulfur dioxide to produce 1 mole of sulfur?

(A) $\frac{1}{3}$ mol (B) $\frac{2}{3}$ mol (C) $\frac{3}{2}$ mol (D) 2 mol

4. Group I and Group II ionic hydrides react with water:

$H^-(s)+H_2O(\ell) \rightarrow OH^-(aq)+H_2(g)$

In an experiment, 1 g samples of each of the following five ionic hydrides are treated with an excess of water. Which sample produces the greatest mass of hydrogen?

(A) CaH2 (B) LiH (C) MgH2 (D) NaH

5 *Use of the Data Booklet is relevant to this question.*

How many molecules are present in 1 cm^3 of oxygen gas under room conditions?

(A) $\frac{1\times24000}{6.02\times10^{23}}$ (B) $\frac{1\times6.02\times10^{23}}{24000}$

(C) $1 \times 6.02 \times 10^{23} \times 32$ (D) $\frac{6.02\times10^{23}\times24000}{1\times1000}$

6 Equimolar amounts of ClO_2 and OH^- ions react to produce three products; water, chlorate(III) ions ClO_2^- and another chloro-oxy anion Q.

What is the oxidation state of chlorine in the ion Q.?

(A) +1 (B) +2 (C) +5 (D) +7

7 Sodium azide, NaN_3, is made for use in car 'airbags'. When this compound is heated to 300 °C, it rapidly decomposes into its elements.

Which volume of gas, at room temperature and pressure, would be produced by the decomposition of one mole of sodium azide?

(A) 24 dm^3 (B) 36 dm^3 (C) 48 dm^3 (D) 72 dm^3

8 A mixture of 10 cm^3 of methane and 10 cm^3 of ethane was sparked with an excess of oxygen. After cooling to room temperature, the residual gas was passed through aqueous potassium hydroxide. What volume of gas was absorbed by the alkali?

(A) 15 cm^3 (B) 20 cm^3 (C) 25 cm^3 (D) 30 cm^3

I am Sorry !!!!

9 *Use of the Data Booklet is relevant to this question.* Most modern cars are fitted with airbags. These work by decomposing sodium azide to liberate nitrogen gas, which inflates the bag.

$2NaN_3 \rightarrow 3N, + 2Na$

A typical driver's airbag contains 50 g of sodium azide.

Calculate the volume of nitrogen this will produce at room temperature.

(A) 9.2 dm^3 (B) 13.9 dm^3 (C) 27.7 dm^3 (D) 72.0 dm^3

10 *Use of the Data Booklet is relevant to this question.*

Burning sodium reacts with carbon dioxide to produce sodium carbonate and carbon only,

$4Na + 3CO_2 \rightarrow 2Na_2CO_3 + C$

If all the 1.1 x 10^7 dm^3 carbon dioxide, measured at standard temperature and pressure, produced by each person in a year, could be reacted with sodium, what would be the mass in grams of sodium carbonate produced?

(A) 3.2 x 10^7 (B) 3.5 x 10^7 (C 7.3 x 10^7 (D) 7.8 x 10^7

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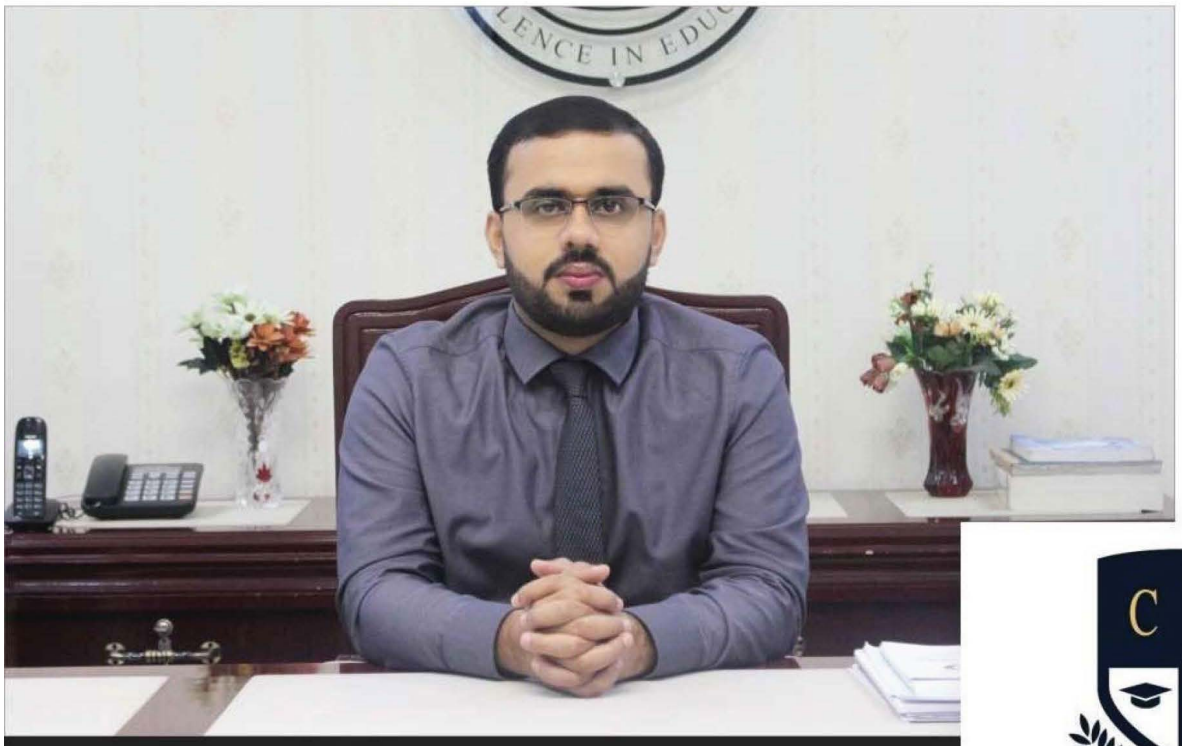

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