

CDS II Exam 2018: 18th November 2018  
General Knowledge Q1-10 with Solutions

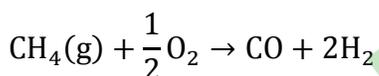
**Q1. Two reactants in a flask at room temperature are producing bubbles of a gas that turn lime water milky. The reactants could be**

- (a) Zinc and hydrochloric acid
- (b) Magnesium carbonate and hydrochloric acid
- (c) Methane and oxygen
- (d) Copper and dilute hydrochloric acid

**S1. Ans. (b)**

Sol. When Magnesium carbonate ( $MgCO_3$ ) reacts with Hydrochloric acid ( $HCl$ ), the products will be Magnesium Chloride ( $MgCl_2$ ) and Carbonic acid ( $H_2CO_3$ ). Since  $H_2CO_3$  is unstable in the troposphere (the lowest part of atmosphere where we are living right now) and lower stratosphere in gas-phase, it will decompose into  $H_2O$  and  $CO_2$ . When this reaction occurred, you can see some gas bubble ( $CO_2$ ) formed in it.

**Q2. How many moles of CO can be obtained by reacting 2.0 mole of  $CH_4$  with 2.0 mole of  $O_2$  according to the question given below?**



- (a) 2.0
- (b) 0.5
- (c) 2.5
- (d) 4.0

**S2. Ans. (a)**

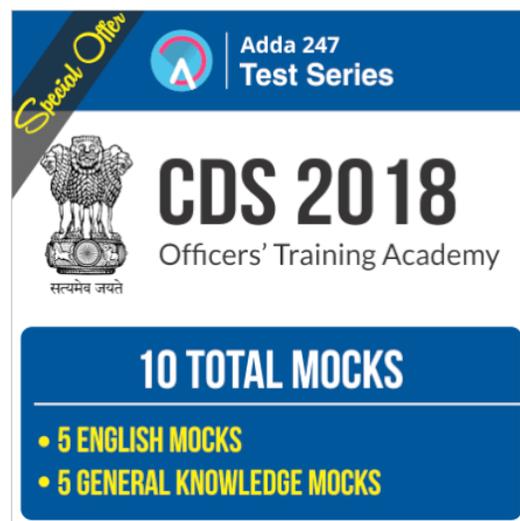
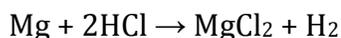
**Q3. Reaction between which of the following two reactants will produce hydrogen gas?**

- (a) Magnesium and hydrochloric acid
- (b) Copper and dilute nitric acid
- (c) Calcium carbonate and hydrochloric acid
- (d) Zinc and nitric acid

**S3. Ans.(a)**

Sol. General Word equation: **Metal + acid  $\rightarrow$  Salt + hydrogen**

Magnesium + hydrochloric acid  $\rightarrow$  magnesium chloride + hydrogen



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**Q4. Which of the following characteristics is common to hydrogen, nitrogen, oxygen and carbon dioxide?**

- (a) They are all diatomic.
- (b) They are all gases at room temperature.
- (c) They are all coloured.
- (d) They all have same reactivity.

**S4. Ans.(b)**

Sol. Elemental hydrogen (H, element 1), nitrogen (N, element 7), oxygen (O, element 8), fluorine (F, element 9), chlorine (Cl, element 17) and CO<sub>2</sub> are all gases at room temperature, and are found as diatomic molecules (H<sub>2</sub>, N<sub>2</sub>, O<sub>2</sub>, F<sub>2</sub>, Cl<sub>2</sub>, CO<sub>2</sub>).

**Q5. The compound C<sub>7</sub>H<sub>7</sub>NO<sub>2</sub> has**

- (a) 17 atoms in a molecule of the compound
- (b) Equal molecules of C and H by mass
- (c) Twice the mass of oxygen atoms compared to nitrogen atoms
- (d) Twice the mass of nitrogen atoms compared to hydrogen atoms

**S5. Ans.(d)**

Sol. A white crystalline organic compound (C<sub>7</sub>H<sub>7</sub>NO<sub>2</sub>) composed of a benzene ring with an amino group and a carboxyl group attached to the carbon atoms 1 and 4, respectively and having Twice the mass of nitrogen atoms compared to hydrogen atoms.

**Q6. Which of the following is the general formula for saturated hydrocarbons?**

- (a) C<sub>n</sub>H<sub>2n + 2</sub>
- (b) C<sub>n</sub>H<sub>2n - 2</sub>
- (c) C<sub>n</sub>H<sub>2n + 1</sub>
- (d) C<sub>n</sub>H<sub>2n - 1</sub>

**S6. Ans.(a)**

Sol. Alkanes are saturated hydrocarbons. This means that contain only carbon and hydrogen atoms bonded by single bonds only. The general formula for an alkane is C<sub>n</sub>H<sub>2n + 2</sub>. In this formula, n, is the number of carbon atoms in the molecule.

**Q7. A particle moves with uniform acceleration along a straight line from rest. The percentage increase in displacement during sixth second compared to that in fifth second is about**

- (a) 11%
- (b) 22%
- (c) 33%
- (d) 44%

**S7. Ans.(b)**

Sol. We know that  $S_{nth} = u + \frac{1}{2}a(2n - 1)$

$$u = 0$$

$$S_6 = 0 + \frac{1}{2}a(2 \times 6 - 1) = \frac{11}{2}a$$

$$S_5 = 0 + \frac{1}{2}a(2 \times 5 - 1) = \frac{9}{2}a$$

So, the percent increase =  $\frac{S_{6th} - S_{5th}}{S_{5th}} \times 100$   
 $= \frac{\left(\frac{11}{2}a - \frac{9}{2}a\right)}{\frac{9}{2} \times a} \times 100 \Rightarrow \frac{2}{9} \times 100$   
 $\Rightarrow 22\%$

**Q8. If two miscible liquids of same volume but different densities  $P_1$  and  $P_2$  are mixed, then the density of the mixture is given by**

- (a)  $\frac{P_1 + P_2}{2}$
- (b)  $\frac{2P_1P_2}{P_1 + P_2}$
- (c)  $\frac{2P_1P_2}{P_1 - P_2}$
- (d)  $\frac{P_1P_2}{P_1 + P_2}$

**S8. Ans.(b)**

Sol. If equal of two liquid of the same volume but densities  $P_1$  and  $P_2$  are mixed together, then the density  $P$  of the resultant mixture is  $P = \frac{P_1 + P_2}{2}$

**Q9. The position vector of a particle is  $\vec{r} = 2t^2\hat{x} + 3t\hat{y} + 4\hat{z}$ . Then the instantaneous velocity  $\vec{v}$  and acceleration  $\vec{a}$  respectively lie.**

- (a) On xy-plane and along z-direction
- (b) On yz-plane and along x-direction
- (c) On yz-plane and along y-direction
- (d) On xy-plane and along x-direction

**S9. Ans.(d)**

**Q10. Two persons are holding a rope of negligible mass horizontally. A 20 kg mass is attached to the rope at the midpoint; as a result the rope deviates from the horizontal direction. The tension required to completely straighten the rope is ( $g = 10 \text{ m/s}^2$ )**

- (a) 200 N
- (b) 20 N
- (c) 10 N
- (d) Infinitely large

**S10. Ans.(d)**

Sol. Let  $T$  be the tension in the rope:  $2T\cos\theta = mg$

Where  $\theta = 90^\circ$ ,  $T = \frac{mg}{2\cos 90^\circ}$ ,  $\cos 90^\circ = 0$

So  $= \frac{mg}{0} = \infty$ ,  $T = \infty$

Hence tension will be infinite.

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