



# CHEMISTRY

## BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

### SAMPLE PAPER - 10 (SOLVED)

#### Part I

1. The equivalent mass of ferrous oxalate is .....

A.  $\frac{\text{molar mass of ferrous oxalate}}{1}$

B.  $\frac{\text{molar mass of ferrous oxalate}}{2}$

C.  $\frac{\text{molar mass of ferrous oxalate}}{3}$

D. none of these

**Answer:**



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2. Assertion : Permanent hardness of water is removed by treatment with washing soda.

Reason : Washing soda reacts with soluble calcium and magnesium chlorides and sulphates in hard water to form insoluble carbonates

- A. Both assertion and reason are true but reason is not the correct explanation of assertion.
- B. Both assertion and reason are true but reason is not the correct explanation of assertion
- C. Assertion is true but reason is false
- D. Both assertion and reason are false

**Answer:**



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3. Compressibility factor for  $CO_2$  at 400 K and 71.00 bar is 0.8697. The molar volume of  $CO_2$  under these

conditions is .....

A. 22.04 dm<sup>3</sup>

B. 2.24 dm<sup>3</sup>

C. 0.41 dm<sup>3</sup>

D. 19.5 dm<sup>3</sup>

**Answer:**



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4. In the reaction

$Fe(OH)_3(s) \rightleftharpoons Fe^{3+}(aq) + 3OH^-(aq)$ , if the

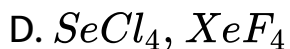
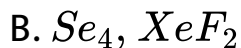
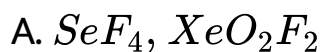
concentration of  $OH^-$  ions is decreased by  $\frac{1}{4}$  times,  
then the equilibrium concentration of  $Fe^{3+}$  will

- A. not changed
- B. also decreased by  $1/4$  time
- C. increase by 4 times
- D. increase by 64 times

**Answer:**

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5. The molecules having same hybridisation, shape and number of lone pairs of electrons are .....



**Answer:**



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**Part ii**

1. First ionization potential of C-atom is greater than that of B-atom, whereas the reverse is true for second ionization potential.



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2. Why  $H_2O_2$  is used as mild antiseptic ?



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3. An alkali metal (s) forms a hydrated sulphate,  $X_2SO_4 \cdot 10H_2O$ . Is the metal more likely to be sodium (or) potassium.



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4. Define Zeroth law of thermodynamics (or Law of thermal equilibrium).

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5. 2.82 g of glucose is dissolved in 30 g of water. Calculate the mole fraction of glucose and water.

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6. Considering x-axis as molecular axis, which out of the following will form a sigma bond.



(i)  $1s$  and  $2p_y$  (ii)  $2p_x$  and  $2p_x$  (iii)  $2p_x$  and  $2p_y$  (iv)  $1s$  and  $2p_z$

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7. What happens when nitrile undergoes acid hydrolysis ?

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8. How does ozone react with 2-methyl propene ?

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9. What are Freons ? Discuss their uses and environmental effects.

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## Part Iii

1. The first ionisation energy ( $IE_1$ ) and second ionisation energy  $I(E_2)$  of elements X,Y and Z are given below.

Element	$IE_1 (kJ \text{ mol}^{-1})$	$IE_2 (kJ \text{ mol}^{-1})$
X	2370	5250
Y	522	7298
Z	1680	3381

Which one of the above elements is the most reactive metal, the least reactive metal and a noble gas ?



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2. An isotope of hydrogen (A) reacts with diatomic molecule of element which occupies group number 16 and period number 2 to give compound (B) is used as a modulator in nuclear reaction. (A) adds on to a compound (C), which has the molecular formula  $C_3H_6$  to give (D) Identify A,B,C and D.



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3. Give the uses of gypsum.

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4. Define inversion temperature.

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5. The vapour pressure of pure benzene ( $C_6H_6$ ) at a given temperature is 640 mm Hg. 2.2g of non - volatile solute is added to 40 g benzene. The vapour pressure of the solution is 600 mm Hg. Calculate the molar mass of the solute ?

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6. In  $CH_4$ ,  $NH_3$  and  $H_2O$ , the central atom undergoes  $sp^3$  hybridisation - yet their bond angles are different.

Why ?

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7. How does hyper conjugation effect explain the stability of alkenes ?

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8. What is BHC ? How will you prepare BHC ? Mention its uses.

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9. Write a chemical reaction useful to prepare the following :

(i) Freon -12 from carbon tetrachloride.

(ii) Carbon tetrachloride from carbon disulphide.

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1. (i) What is the difference between molecular mass and molar mass ? Calculate the molecular mass and molar mass for carbon monoxide.

(ii) What are competitive electron transfer reaction ?

Give example.

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2. (i) State the trends in the variation of electronegativity in period and group.

(ii) The electron gain enthalpy of chlorine is  $348 \text{ kJ mol}^{-1}$ . How much energy in kJ is released when 17.5 g of chlorine is completely converted into  $Cl^{-}$  ions in the gaseous state ?

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3. (i) Discuss the three types of Covalent hydrides.

(ii) Write the chemical reactions to show the amphoteric nature of water.

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4. (i) Lithium forms monoxide with oxygen whereas sodium forms peroxide with oxygen why ?

(ii) Write about the uses of strontium.

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5. (i) When the driver of an automobile applies brake, the passengers are pushed toward the front of the car but a helium balloon is pushed toward back of the car. Upon forward acceleration the passengers are pushed toward the front of the car. Why ?

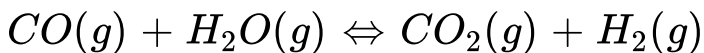
(ii) Critical temperature of  $H_2O$ ,  $NH_3$  and  $CO_2$  are 647.4, 405.5 and 3.4.2 K respectively. When we start cooling from a temperature of 700 K which will liquefy first and which will liquefy finally ?



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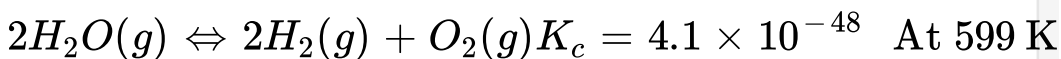
6. (i) The following water gas shift reaction is an important industrial process for the production of

hydrogen gas.



At a given temperature  $K_p = 2.7$ . If 0.13 mol of CO, 0.56 mol of water, 0.78 mol of  $CO_2$  and 0.28 mol of  $H_2$  are introduced into a 2L flask, find out in which direction must the reaction proceed to reach equilibrium.

(ii)



Predict the extent of the above two reactions.



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7. (i)  $CuCl$  is more covalent than  $NaCl$ . Give reason.

(ii) Draw and explain the molecular orbital diagram of

Boron molecule.

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8. 0.30 g of a substance gives 0.88 g of carbon dioxide and 0.54 g of water. Calculate the percentage of carbon and hydrogen in it

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9. An organic compound (A) of a molecular formula  $C_6H_6$  which simple aromatic hydrocarbon. A undergoes hydrogenation to give a cyclic compound (B). A reacts with chlorine in the presence of UV-light to give C which

is used insecticide Identify A,B and C. Explain the reactions with equation.



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10. An organic compound A of molecular formula  $CH_2O$  reacts with methyl magnesium iodide followed by acid hydrolysis to give B of molecular formula  $C_2H_6O$ . B on reaction with  $PCl_5$  gives C. C on reaction with alcoholic KOH gives D an alkene as the product. Identify A,B,C,D and explain the reactions involved.



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