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CHEMISTRY

TEN GOVERNMENT PUBLIC EXAM
QUESTIONS & ANSWERS UNITWISE

(2019 - 2024)

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CHEMISTRY

11th standard

**TEN PUBLIC EXAM QUESTION AND
ANSWERS UNITWISE (2019 to 2024)**

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CONTENTS		
S.NO	PUBLIC QUESTION PAPERS	PAGE NUMBER
1	Preface	3
2	March-2019	4
3	June-2019	8
4	September-2020	12
5	September -2021	16
6	May-2022	20
7	July-2022	24
8	March-2023	28
9	June-2023	32
10	March-2024	36
11	June-2024	40
10	All compulsory 2 & 3 marks questions & answers	44
11	Unit wise public questions	54
1	Basic concepts of chemistry and chemical calculation	55
2	Quantum mechanical model of atom	62
3	Periodic classification of elements	70
4	Hydrogen	77
5	Alkali and Alkaline earth metals	82
6	Gaseous state	88
7	Thermodynamics	97
8	Physical and chemical equilibrium	107
9	Solutions	116
10	Chemical bonding	123
11	Fundamentals of organic chemistry	135
12	Basic concepts of organic reactions	150
13	Hydrocarbons	156
14	Haloalkanes and Haloarenes	172
15	Environmental chemistry	184
16	Your Hints	188

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

QUESTION PAPER : 1

March-2019 Maximum marks : 70

Time allowed : 2.30hours

PART-I

Note : i) Answer all the questions.

15 X 1 = 15

ii) choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer

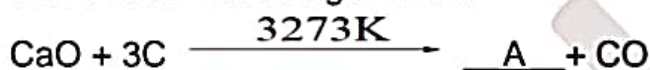
1. many of the organic compounds are inflammable because of its :

- a) vander waal's force
 b) co-ordinate nature
 c) covalent nature
 d) ionic nature

2. When ΔG is negative in chemical equilibrium reaction then :

- a) $K_p < K_c$
 b) $K_p = 1/K_c$
 c) $K_p = K_c(RT)^{-ve}$
 d) $K_p > K_c$

3. Find A in the following reaction



- a) CaC_2 b) CO_2 c) Ca d) Ca_2O

4. Splitting of spectral lines in an electric field is called :

- a) Compton effect
 b) stark effect
 c) Zeeman effect
 d) shielding effect

5. Which of the following species does not exert a resonance effect ?

- a) $\text{C}_6\text{H}_5\text{NH}_2$ b) $\text{C}_6\text{H}_5\text{NH}_3^+$ c) $\text{C}_6\text{H}_5\text{OH}$ d) $\text{C}_6\text{H}_5\text{Cl}$

6. Match the following :

Compound**uses**

- 1) Chloro picrin i) detection of primary amine
 2) Methyl isocyanide ii) DDT
 3) Chloro benzene iii) paint remover
 4) Methylene chloride iv) soil sterilizer

- a) (1)- (iv), (2)-(iii) , (3)-(ii), (4)-(i) b) (1)- (iii), (2)-(iv) , (3)-(ii), (4)-(i)
 c) (1)- (i), (2)-(ii) , (3)-(iv), (4)-(iii) d) (1)- (iv), (2)-(i) , (3)-(ii), (4)-(iii)

7. use of hot air ballone in meteorological observatory is an application of :

- a) Kelvin's Law b) Brown's Law
 c) Boyle's Law d) Newton's Law

8. what is the pH of rain water ?

- a) 5.6 b) 4.6 c) 6.5 d) 7.5

9. which compound is named as "blue john" among the following compounds?

- a) $\text{Ca}_3(\text{PO}_4)_2$ b) CaO c) CaH_2 d) CaF_2

10. The element with positive electron gain enthalpy is _____

- a) Argon b) Fluorine c) Hydrogen d) sodium

11. which of the following molecule does not contain π bond ?

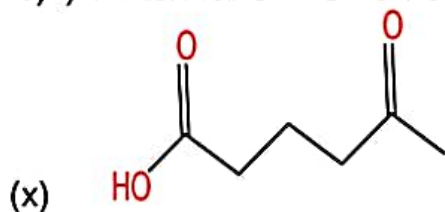
- a) CO_2 b) H_2O c) SO_2 d) NO_2

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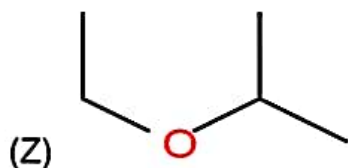
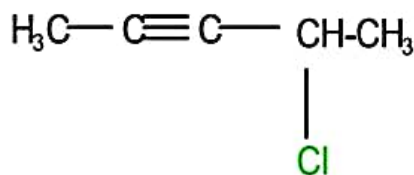
- ii) Draw and explain the graph obtained by plotting solubility versus temperature for calcium chloride .

(OR)

- b) i) Write the IUPAC names for the following compounds :



(Y)



- ii) Calculate the formal charge on carbon and oxygen for the following



- 37.a) i) explain about inductive effect .

- ii) What do you mean by conformation ? Explain about staggered conformation in ethane .

(OR)

- b) i) Among the following compounds ,o-dichloro benzene and p-dichloro benzene , which has higher melting point ? explain with reason .

- ii) Write notes on the adverse effect caused by ozone depletion.

- 38.a) i) calculate the uncertainty in the position of an electron, if the uncertainty in it velocity is $5.7 \times 10^5 \text{ ms}^{-1}$

- ii) What is the mass of glucose ($\text{C}_6\text{H}_{12}\text{O}_6$) in it one litre solution which is isotonic with 6 g l^{-1} of urea (NH_2CONH_2) ?

(OR)

- b) i) An organic compound (A) of molecular formula $\text{C}_2\text{H}_6\text{O}$, on heating with conc. H_2SO_4 gives compound (B) . (B) on treating with cold dilute alkaline KMnO_4 gives compound (C) . Identify (A), (B) and (C) and explain the reactions.

- ii) A simple aromatic hydrocarbon (A) reacts with chlorine to give compound (B) . compound (B) reacts with ammonia to give compound (C) which undergoes carbylamines reaction. Identify (A), (B) and (C) and explain the reactions.

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36.a) How will you determine the molar mass of solute from elevation of boiling point ?

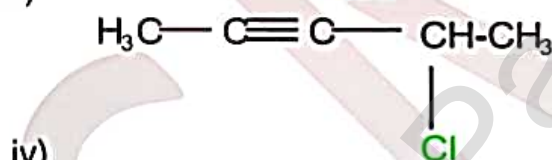
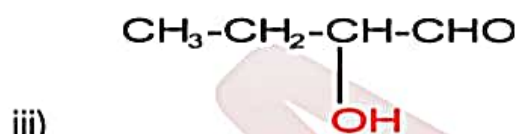
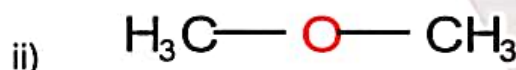
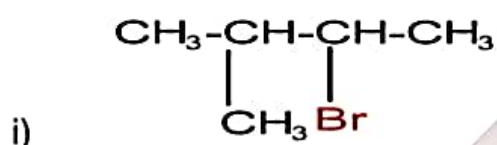
(OR)

b) Define i) Bond length ii) Bond angle iii) Bond enthalpy

37.a) How will you determine the ionic character in covalent bond using electronegativity values ?

(OR)

c) Give the IUPAC names of the following compounds .



38.a) How will you prepare the following compounds from benzene ?

i) nitrobenzene ii) benzene sulphonic acid iii) BHC

(OR)

b) Simplest alkene (A) reacts with HCl to form compound (B). compound (B) reacts with ammonia to form compound (C) of molecular formula $\text{C}_2\text{H}_7\text{N}$. compound (C) undergoes carbylamine test. Identify (A), (B) and (C)

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

QUESTION PAPER : 10

june-2024

Time allowed : 3.00hours

Maximum marks : 70

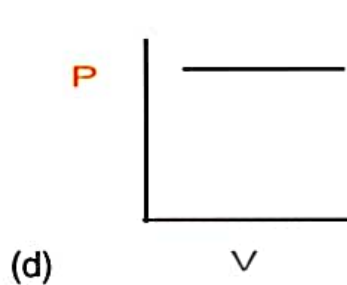
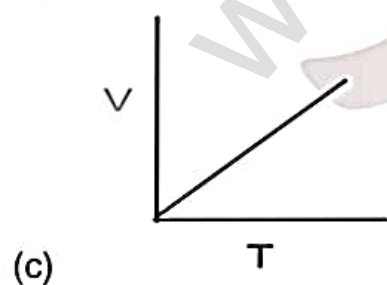
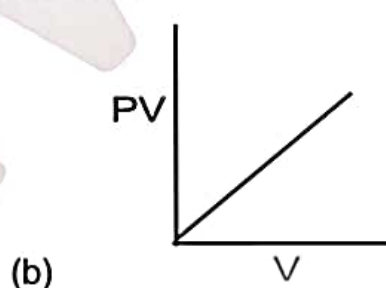
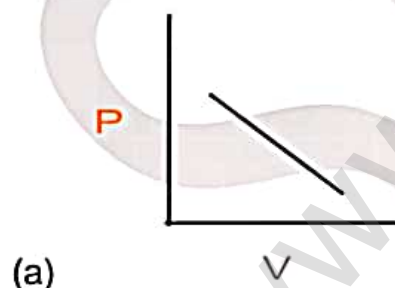
PART-I

Note : i) Answer all the questions.

15 X 1 = 15

ii) choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer .

- Which one of the following is used as a standard for atomic mass.
(a) ${}_6\text{C}^{12}$ (b) ${}_7\text{C}^{12}$ (c) ${}_6\text{C}^{13}$ (d) ${}_6\text{C}^{14}$
- Time independent Schrodinger wave equation is :
(a) $\hat{H} \Psi = E \Psi$
(b) $\nabla^2 \Psi + \frac{8\pi^2m}{h^2} (E+V)\Psi=0$
(c) $\frac{\partial^2\Psi}{\partial x^2} + \frac{\partial^2\Psi}{\partial y^2} + \frac{\partial^2\Psi}{\partial z^2} + \frac{2m}{h^2} (E-V)\Psi=0$
(d) $\frac{\partial^2\Psi}{\partial x^2} + \frac{\partial^2\Psi}{\partial y^2} + \frac{\partial^2\Psi}{\partial z^2} - \frac{2m}{h^2} (E-V)\Psi=0$
- Which of the following is the least electronegative element?
(a) Bromine (b) Chlorine (c) Iodine (d) Hydrogen
- Tritium nucleus contains
(a) $1p + 0n$ (b) $2p + 1n$ (c) $1p + 2n$ (d) $2p+0n$
- Among the following the least thermally stable is :
(a) K_2CO_3 (b) Na_2CO_3 (c) BaCO_3 (d) Li_2CO_3
- Which of the following diagrams correctly describes the behavior of a fixed mass of an ideal gas ? (T is measured in K)



- In an adiabatic process, which of the following is true ?

(a) $q = w$ (b) $q = 0$ (c) $\Delta E = q$ (d) $P \Delta V = 0$

ALL COMPULSORY QUESTIONS & ANSWER

2MARKS

1. Which is the suitable method for detection of nitrogen present in food and fertilizers? (March 19) (Lesson no : 11)

Kjeldahl's method

2. Calculate the orbital angular momentum for d and f orbital. (June 19) (Lesson no : 2)

$$\text{Angular momentum} = \sqrt{l(l+1)} \frac{h}{2\pi}$$

orbital angular momentum for d

$$\begin{aligned} l &= 2 \\ &= \sqrt{2(2+1)} \frac{h}{2\pi} \\ &= \sqrt{6} \frac{h}{2\pi} \end{aligned}$$

orbital angular momentum for f $l=3$

$$\begin{aligned} &= \sqrt{3(3+1)} \frac{h}{2\pi} \\ &= \sqrt{12} \frac{h}{2\pi} \\ &= \sqrt{4 \times 3} \frac{h}{2\pi} \\ &= 2 \sqrt{3} \frac{h}{2\pi} \end{aligned}$$

3. In degenerate orbitals, why do the completely filled and half filled configurations are more stable than the partially filled configurations? (Sep 20) (Lesson no : 2)

The stability of exactly half-filled orbitals in degenerate orbitals is stronger than that of other partially filled configurations. This can be explained using symmetry and the concept of exchange energy. Half and completely-filled subshells become more stable because of the symmetrical distribution of electron.

Reason :-

- i) Symmetrical distribution of electron in orbital
- ii) Exchange energy

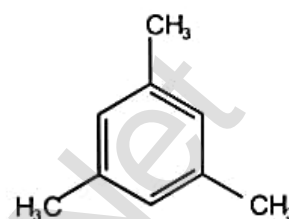
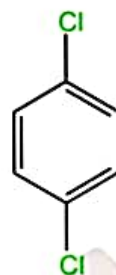
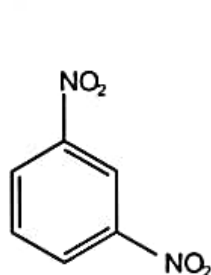
11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE**3MARKS**

1. Give the structural formula for the following compounds. (Lesson no: 11)

a) m-dinitrobenzene b) p-dichlorobenzene c) 1,3,5-Tri-methyl Benzene

solution :-

a) m-dinitrobenzene b) p-dichlorobenzene c) 1,3,5-Tri-methyl Benzene

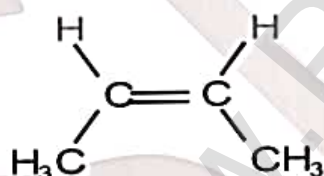


2. The bond length between all the four carbon atoms is same in 1,3-butadiene. Explain with reason (June 19) (Lesson no : 12)

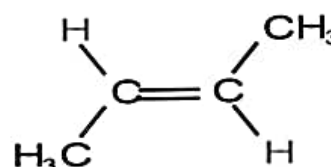


1,3-butadiene is a conjugated molecule with four overlapping p-orbital on adjacent atoms, and a electrons are delocalised over four atoms. This shortens the bond length of central c bond thus, the bond length between all the four-c- atoms are same in 1,3-butadiene

3. Explain geometrical isomerism in 2-butene. (sep20) (Lesson no : 11)



Cis-2-butene



Trans-2-butene

- These two compounds are termed as geometrical isomers and are distinguished from each other by the terms cis and trans.
- The cis isomer is one in which two similar groups are on the same side of the double bond.
- The trans isomers is that in which the two similar groups are on the opposite side of the double bond, hence this type of isomerism is often called cis-trans isomerism.
- The cis-isomer can be converted to trans isomer or vice versa is only if either isomer is heated to a high temperature or absorbs light.

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

1. Basic Concepts Of Chemistry And Chemical Calculations

ONE MARKS :-

1. Which of the following compound has same percentage of carbon as that of ethylene (C₂H₄) ? (mar 19)
 - a) benzene
 - b) ethane
 - c) propene
 - d) ethyne
2. The oxidation number of carbon in CH₂F₂ is _____ (jun19)
 - a) +4
 - b) -4
 - c) 0
 - d) +2
3. The relative molecular mass of ethanol is ____ (sep20)
 - a) 0.46g
 - b) 4.6 g
 - c) 460g
 - d) 46g
4. Which one of the following represents 180g of water ? (sep21)
 - a) $\frac{6.022 \times 10^{24}}{180}$ moles of water
 - b) 5 moles of water
 - c) 6.022×10^{24} moles of water
 - d) 90 moles of water
5. Which of the following compound(s) has/have percentage of carbon same as that in ethylene (C₂H₄) ? (sep21)
 - a) benzene
 - b) propene
 - c) ethane
 - d) ethyne
6. Total number of electrons present in 1.7 g of ammonia is : (jul22)
 - a) 6.022×10^{23}
 - b) $\frac{6.022 \times 10^{22}}{1.7}$
 - c) $\frac{6.022 \times 10^{24}}{1.7}$
 - d) $\frac{6.022 \times 10^{23}}{1.7}$
7. Which of the following compound has percentage of Carbon same as that in Ethylene (C₂H₄) ? (mar23)
 - (a) benzene
 - (b) Propene
 - (c) Ethane
 - (d) Ethyne
8. The number of water molecules in a drop of water weighing 0.018 g is (june23)
 - (a) 6.022×10^{26}
 - (b) 6.022×10^{23}
 - (c) 6.022×10^{20}
 - (d) 9.9×10^{22}
9. The number of water molecules in a drop of water weighing 0.018 g is _____ (Mar24)
 - (a) 6.022×10^{20}
 - (b) 6.022×10^{26}
 - (c) 9.9×10^{22}
 - (d) 6.022×10^{23}
10. Which one of the following is used as a standard for atomic mass. (jun24)
 - (a) ${}_6\text{C}^{12}$
 - (b) ${}_7\text{C}^{12}$
 - (c) ${}_6\text{C}^{13}$
 - (d) ${}_6\text{C}^{14}$

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE**2&3&5 MARKS :-****1. Calculate the equivalent mass of H₂SO₄ (mar 19)**

$$E = \frac{\text{Molar mass of the acid}}{\text{Basity of the acid}}$$

$$\begin{aligned} \text{H}_2\text{SO}_4 \text{ basicity} &= 2 \text{ eq mol}^{-1} \\ \text{Molar mass of H}_2\text{SO}_4 &= (2 \times 1) + (1 \times 32) + (4 \times 16) \\ &= 98 \text{ g mol}^{-1} \\ \text{Gram equivalent of H}_2\text{SO}_4 &= \frac{98}{2} \\ &= 49 \text{ g eq}^{-1} \end{aligned}$$

2. calculate oxidation number of oxygen in H₂O₂ (mar 19)

$$\begin{aligned} \text{H}_2\text{O}_2 \quad 2(+1) + 2X &= 0 \\ 2X &= -2 \\ X &= -1 \\ \text{oxidation number of oxygen in H}_2\text{O}_2 &= -1 \end{aligned}$$

3. A compound having the empirical formula C₆H₆O has the vapour density 47. Find its molecular formula. (mar 19).

Molecular formula = n x empirical formula

$$n = \frac{2 \times \text{vapour density}}{\text{empirical formula mass}}$$

vapour density = 47, Empirical formula mass = 94

empirical formula = C₆H₆O

$$= \frac{2 \times 47}{94}$$

$$= \frac{94}{94} = 1$$

$$n = 1$$

Molecular formula = n x empirical formula

$$= 1 \times \text{C}_6\text{H}_6\text{O}$$

$$= \text{C}_6\text{H}_6\text{O}$$

Empirical formula mass = C₆H₆O

C	6 x 12 = 72
H	6 x 1 = 6
O	1 x 16 = 16
	—————
	94
	—————

4. What do you understand by the term mole ? (jun19) (june23) (jun24)

One mole is the amount of substance of a system, which contains as many elementary particles as there are atoms in 12 g of carbon-12 isotope. The elementary particles can be molecules, atoms, ions, electrons or any other specified particles. 1 mole = 6.022 x 10²³

5. What are auto redox reactions ? give an example. (jun19)

In some redox reactions, the same compound can undergo both oxidation and reduction. In such reactions, the oxidation state of one and the same

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$$= \sqrt{4 \times 3} \frac{h}{2\pi}$$

$$= 2 \sqrt{3} \frac{h}{2\pi}$$

6. In degenerate orbitals, why do the completely filled and half filled configurations are more stable than the partially filled configurations? (sep20) (compulsory 2 mark)

The stability of exactly half-filled orbitals in degenerate orbitals is stronger than that of other partially filled configurations. This can be explained using symmetry and the concept of exchange energy. Half and completely-filled subshells become more stable because of the symmetrical distribution of electron.

Reason :-

- iii) Symmetrical distribution of electron in orbital
- iv) Exchange energy

7. State Heisenber's Uncertainty Principle . (sep20) (mar23) (jul22)

It is impossible to accurately determine both the position as well as the momentum of a microscopic particle simultaneously'. The product of uncertainty (error) in the measurement is expressed as follows.

$$\Delta x \cdot \Delta p \geq h / 4\pi$$

where, Δx and Δp are uncertainties in determining the position and momentum, respectively

8. Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals. (sep20)

Orbital	n	l	Radial nodes n-l-1	Angular nodes L
3d	3	2	0	2
4f	4	3	0	3

9. What is exchange energy ? (sep21)

If two or more electrons with the same spin are present in degenerate orbitals, there is a possibility for exchanging their positions. During exchange process the energy is released and the released energy is called exchange energy

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

5. Atomic hydrogen and oxy-hydrogen torches are used for cutting and welding.
6. Liquid hydrogen is used as a rocket fuel.
7. Hydrogen is also used in fuel cells for generating electrical energy. The reversible uptake of hydrogen in metals is also attractive for rechargeable metal hydride battery.

14. What are Interstitial hydrides ? Given an example. (Mar24)

Metallic hydrides are usually obtained by hydrogenation of metals and alloys in which hydrogen occupies the interstitial sites (voids). Hence, they are called interstitial hydrides; $TiH_{1.5-1.8}$ and $PdH_{0.6-0.8}$, MH_2 (M = Ti, Zr, Hf, V, Zn)

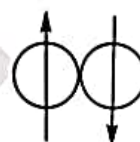
15. What is ortho and para hydrogen ? How do you convert para hydrogen into ortho hydrogen ? (jun24)

ortho and para hydrogen :-

In the hydrogen atom, the nucleus has a spin. When molecular hydrogen is formed, the spins of two hydrogen nuclei can be in the same direction or in the opposite direction as shown in the figure. These two forms of hydrogen molecules are called *ortho* and *para* hydrogens respectively.



Ortho-hydrogen



Para-hydrogen

convert para hydrogen into ortho hydrogen :-

The para-form can be catalytically transformed into ortho-form using platinum or iron.

it can also be converted by passing an electric discharge, heating above $800^{\circ}C$ and mixing with paramagnetic molecules such as O_2 , NO , NO_2 or with nascent/atomic hydrogen.

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

10. Give any two characteristics of gibbs free energy ? (sep21)

List any three characteristics of gibbs free energy. (jul22)

1. Gibbs free energy is defined as $G = H - TS$. G is a state function.
2. G is an extensive property .But ΔG is the intensive property When mass remains constant between initial and final states.
3. G has a single value for the thermodynamics state of the system.
4. G and ΔG values correspond to the system only
5. There are three cases of ΔG predicting the nature of process .

Process	Spontaneous	Equilibrium	Non-Spontaneous
ΔG	(-) ve	0	(+) ve

6. Gibbs free energy and the net work done by the system:

For any system at constant pressure and temperature

$$\Delta G = \Delta H - T \Delta S$$

We know that,

$$\Delta H = \Delta U + P\Delta V$$

$$\therefore \Delta G = \Delta U + P\Delta V - T\Delta S$$

from first law of thermodynamics if work is done by the system

$$\Delta U = q - w$$

from second law of thermodynamics

$$\Delta S = \frac{q}{T}$$

$$\Delta G = q - w + P\Delta V - T\left(\frac{q}{T}\right)$$

$$\Delta G = -w + P\Delta V$$

$$-\Delta G = w - P\Delta V$$

11. State the first law of thermodynamics (sep21)

Whenever an energy of a particular type disappears, an equivalent amount of another type must be produced.

$$\Delta U = q + w$$

(OR)

"Energy can neither be created nor destroyed, but may be converted from one form to another".

$$\Delta U = q + w$$

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

4. What is the mass of glucose ($C_6H_{12}O_6$) in one litre solution which is isotonic with 6g l^{-1} of urea (NH_2CONH_2) ? (jun19)

Osmotic pressure of urea solution (π_1) = CRT

$$= \frac{W_2}{M_2 V} RT$$

$$= \frac{6}{60 \times 1} X RT$$

Osmotic pressure of glucose solution (π_2) = $\frac{W_2}{180 \times 1} X RT$

For isotonic solution,

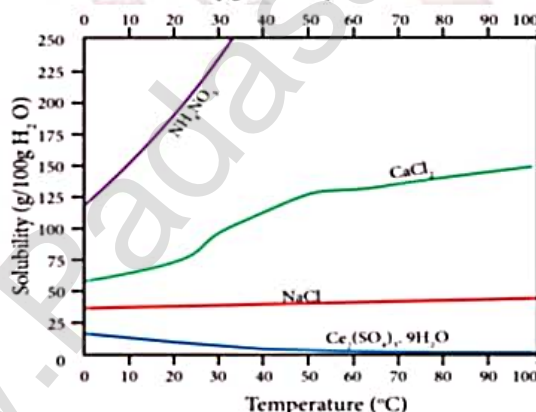
$$\pi_1 = \pi_2$$

$$\frac{6}{60} RT = \frac{W_2}{180} RT$$

$$W_2 = \frac{6}{60} \times 180$$

$$W_2 = 18 \text{ g}$$

5. Draw and explain the graph obtained by plotting solubility versus temperature for calcium chloride. (jun19)



Even though the dissolution of calcium chloride is exothermic, the solubility increases moderately with increase in temperature. Here, the entropy factor also plays a significant role in deciding the position of the equilibrium.

6. Calculate the mole fraction of methanol and water when 0.5 mole of methanol is mixed with 1.5 moles of water. (SEP20)

$$\text{mole fraction} = \frac{\text{Number of moles of the component}}{\text{Total number of moles of all the components present in solution}}$$

0.5 mole of ethanol is mixed with 1.5 moles of water.

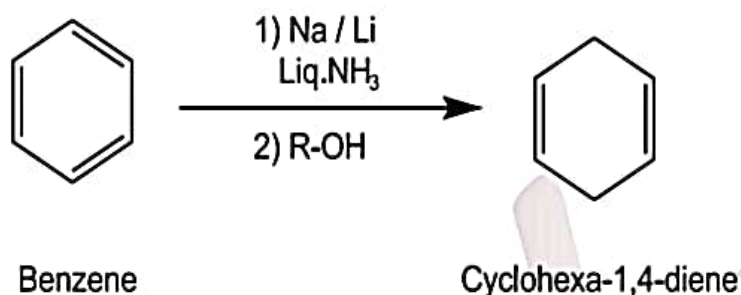
The mole fraction of ethanol in the above solution is

11th CHEMISTRY PUBLIC EXAM QUESTIONS AND ANSWERS UNITWISE

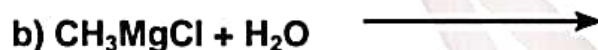
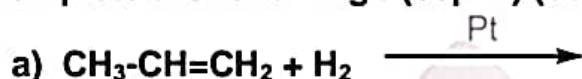
8. write Birch reduction . (sep20)

Explain Birch reduction (jul22)

Benzene can be reduced to 1, 4-cyclohexadiene by treatment with Na or Li in a mixture of liquid ammonia and alcohol. It is the convenient method to prepare cyclic dienes.



9. Complete the following : (sep21) (compulsory 2 mark)



10. Suggest a simple chemical test to distinguish propane and propene (sep21)

Bromine in water is reddish brown colour.

S.NO	Compound	Bromine water
1	Propane	Does not decolourise .because it is saturated hydrocarbon
2	Propene	Solution decolourised as it forms dibromo compound because it is unsaturated hydrocarbon