

www.Padasalai.Net - Public Exam 2023 – Model Question Paper

CLASS : XI  
SUBJECT : CHEMISTRY

MARKS : 70  
TIME : 3.0 Hrs

I. CHOOSE THE BEST ANSWERS; (15 X 1 =15)

- Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant?  
(a) Carbon (b) oxygen (c) both carbon and oxygen (d) neither carbon nor oxygen
- Which of the following pairs of d-orbitals will have electron density along the axes ?  
a)  $dz^2, dxz$  b)  $dxz, dyz$  c)  $dz^2, dx^2-y^2$  d)  $dxy, dx^2-y^2$
- Which of the following elements will have the highest electronegativity?  
a) Chlorine b) Nitrogen c) Cesium d) Fluorine
- 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 and reason is 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
- Which of the following compounds will not evolve  $H_2$  gas on reaction with alkali metals ?  
a) ethanoic acid b) ethanol c) phenol d) none of these
- When an ideal gas undergoes unrestrained expansion, no cooling occurs because the molecules  
a) are above inversion temperature b) exert no attractive forces on each other  
c) do work equal to the loss in kinetic energy d) collide without loss of energy
- The intensive property among the quantities below is  
a) mass b) volume c) enthalpy d) mass/volume
- An equilibrium constant of  $3.2 \times 10^{-6}$  for a reaction means, the equilibrium is  
a) largely towards forward direction b) largely towards reverse direction  
c) never established d) none of these

9. Which of the following concentration terms is / are independent of temperature  
a) molality                      b) molarity                      c) mole fraction                      d) (a) and (c)
10. Which one of the following is diamagnetic?  
a)  $O_2$                       b)  $O_2^{2-}$                       c)  $O_2^+$                       d) None of these
11. A liquid which decomposes at its boiling point can be purified by  
b) distillation at atmospheric pressure                      b) distillation under reduced pressure  
c) c) fractional distillation                      d) steam distillation.
12. Homolytic fission of covalent bond leads to the formation of  
d) electrophile                      (b) nucleophile                      (c) Carbo cation                      (d) free radical
13. The most stable conformation of ethane is  
a) Eclipsed                      b) Skew                      c) Staggered                      d) All are equally stable
14. The order of reactivity of various alkyl halides toward  $SN_1$  reaction is  
a)  $3^\circ > 2^\circ > 1^\circ$                       b)  $1^\circ > 2^\circ > 3^\circ$                       c)  $3^\circ = 2^\circ = 1^\circ$                       d)  $1^\circ > 3^\circ > 2^\circ$
15. Which of the following metal is a water pollutant and causes sterility in human.  
being?  
a) As                      (b) Mn                      (c) Mg                      (d) Hg

**II. Answer Any six questions. (Question No. 24 is compulsory)                      (6 X 2 = 12)**

16. Define mole
17. For each of the following, give the sub level designation, the allowable m values and the number of orbitals i)  $n = 4, l = 2$ , ii)  $n = 5, l = 3$  iii)  $n = 7, l = 0$
18. First ionisation potential of C-atom is greater than that of B atom, where as the reverse is true is for second ionisation potential
19. Define specific heat capacity.
20. Write note on Raschig process
21. How does Huckel rule help to decide the aromatic character of a compound?
22. What happens when acetylene undergoes ozonolysis?
23. How is DDT prepared?
24. The depression in freezing point is 0.24K obtained by dissolving 1g NaCl in 200g water. Calculate van't-Hoff factor. The molal depression constant is  $1.86 \text{ K Kg mol}^{-1}$

**III. Answer Any six questions. (Question No. 33 is compulsory) (6 X 3 = 18)**

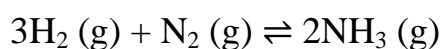
25. Postulates of Bohr atom model.
26. Give Kelvin statement of second law of thermodynamics.
27. Explain Determination of molar mass of solute from depression in freezing point
28. Derive the values of  $K_c$  and  $K_p$  for the synthesis of HI.
29. Explain the covalent character in ionic bond.
30. Write any three similarities between beryllium and aluminium.
31. Define : Charles law.
32. What are colligative properties?
33. Calculate the standard heat of formation of propane, if its heat of combustion is  $-2220.2 \text{ kJ mol}^{-1}$ . the heats of formation of  $\text{CO}_2(\text{g})$  and  $\text{H}_2\text{O}(\text{l})$  are  $-393.5$  and  $-285.8 \text{ kJ mol}^{-1}$  respectively.

**IV. Answer the following all questions. 5 X 5 = 25**

34. a) Balance the following equations by oxidation number method



- b) i) Calculate the de-Broglie wavelength of an electron that has been accelerated from rest through a potential difference of 1 keV.
- ii) Calculate the total number of angular nodes and radial nodes present in 3d and 4f orbitals.
35. a) Explain the Pauling method for the determination of ionic radius. (OR)
- b) i) What is water-gas shift reaction ? ii) Mention the uses of plaster of Paris
36. a) i) Distinguish between diffusion and effusion ii) List the characteristics of Gibbs free energy. (OR)
- b) Derive a general expression for the equilibrium constant  $K_p$  and  $K_c$  for the reaction



37. a) i) Draw the Lewis structures for the following species. i)  $\text{NO}_3^-$  ii)  $\text{HNO}_3$
- ii) Define : Bond order (OR)

b ) Give the structure for the following compound.

(i) 3- ethyl - 2 methyl -1-pentene

(ii) 1,3,5- Trimethyl cyclohex - 1 -ene

(iii) tertiary butyl iodide

(iv) 3 - Chlorobutanal

(v) 3 – Chlorobutanol

38. a ) i) What are electrophiles and nucleophiles? Give suitable examples for each.

ii) Explain electromeric effect. **(OR)**

b) i) Explain Markov nikoff 's rule with suitable example.

N. RAMACHANDRAN , M.Sc,B.Ed.

DEPARTMENT OF CHEMISTRY