

Sample Paper – 2014

Class – XI

Subject – Chemistry

MM : 70

1. Calculate the Molality of a solution of 36 g of Glucose in 500 g of water. [1]
2. Write one species which is isoelectronic with Ca^{2+} and also write its electronic configuration. [1]
3. Give the name and symbol of the element with atomic no. 104. [1]
4. The boiling point of a liquid rises on increasing pressure. Why ? [1]
5. What are Buffer solutions ? [1]
6. Give two examples of compound containing polar covalent bonds. [1]
7. What are the products of Homolytic clea ? [1]
8. Write the Wurtz reaction. [1]
9. Calculate the Mass percentage of each element in CaSO_4 . [2]
10. Explain why orbits in Bohr's atomic model are also called energy levels ? [2]
11. i) Give the set of Quantum numbers that describe an electron in a 3p orbital. [2]
ii) What does the Hund's rule of maximum multiplicity state ?
12. Account for the following : [2]
 - a) Sodium and Potassium impart colour to the flame but Magnesium does not.
 - b) Li is the best reducing agent in aqueous solution.
13. Draw the structure and discuss the hybridization in PCl_5 molecule. [2]
14. Calculate the uncertainty in position of a dust particle with mass equal to 1 mg if the uncertainty [2]

in its velocity is $5.5 \times 10^{-20} \text{ m s}^{-1}$. (Given $h = 6.6 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}$)

15. Using the knowledge of periodic table to answer the following questions : [2]

i) Identify an element with Five electrons in the outer most shell.

ii) The only non-metal which exists in liquid state and its group.

16. Give reasons : [2]

a) Aluminium is above Hydrogen in the reactivity series yet it is stable in water.

b) Aluminium sulphide gives a foul odour when it becomes damp.

17. Write the Ozonolysis reaction of But-2-ene. [2]

18. Account for the following : [2]

i) The bond angle in water is 104.5° though it is tetrahedral and sp^3 hybridised.

ii) O-O single bond enthalpy is smaller than S-S single bond enthalpy.

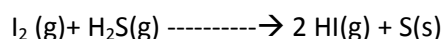
19. i) Explain the types of Covalent hydrides with example. [3]

ii) What are the reasons for permanent hardness of water ? What effect does it have on soap ?

20. i) Find out the Oxidation number of Chlorine in ClO_4^- . [3]

ii) Define the electronic concept of Oxidation and Reduction .

iii) Identify the Oxidising and reducing agents and the Oxidised and reduced species from the following :



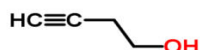
21. i) What happens when Limestone is heated strongly ? [3]

ii) List atleast 3 similarities between Beryllium and Aluminium.

22. Write notes on Smog and its types. [3]

OR

What is Global warming and Greenhouse effect ?



23. i) Write the IUPAC name of [3]

ii) Write the functional isomers of $\text{C}_3\text{H}_6\text{O}$.

iii) Derive the structure of 3,3-Dimethylbutan-1-oic acid.

24. i) An organic compound contains 69% Carbon & 4.8 % Hydrogen, the remainder being [2+1]

Oxygen. Calculate the masses of CO_2 and H_2O produced when 0.20 g of this substance is subjected to complete combustion.

ii) What is positive resonance effect (+R effect) ?

OR

i) An organic acid contains Carbon, Hydrogen and Oxygen. A 4.21 mg sample of acid is completely burned. It gives 6.21 mg of CO_2 & 2.54 mg of H_2O . What is the mass percentage of each element in the acid.

ii) Explain Inductive effect with example.

25. i) Use the standard enthalpies of formation given to calculate the enthalpy change accompanying [2+1]

the following reaction : $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$

$\Delta_f H^\ominus(\text{CH}_4) = -74.81$; $\Delta_f H^\ominus(\text{CO}_2) = -393.51$; $\Delta_f H^\ominus(\text{H}_2\text{O}) = -285.83$; $\Delta_f H^\ominus(\text{O}_2) = 0$

ii) State the First law of Thermodynamics.

26. Derive the Ideal gas equation and also state all the Laws associated with it. [3]

27. i) What are C_p and C_v ? Derive the relation between them. [2+1]

ii) Predict the sign of ΔG for the following processes :

a) Melting of ice below 0°C .

b) Flow of heat from high temperature to low temperature.

28. i) What are Silicones ? How are they formed ? Write all the reactions. [3+2]

ii) What happens when :

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- a) Ortho boric acid is heated strongly.
- b) Boron trifluoride is treated with Lithium aluminium hydride(LiAlH_4) in diethyl ether.

OR

- i) Borax gives a glassy bead when heated strongly. Write all the reactions involved in it. Where is it used ?
- ii) How is Carbon monoxide prepared in the lab ? Write some of its physical properties.

29. i) Write short notes on the following : [2+2+1]

- a) Hückel rule
- b) Friedel Crafts Alkylation reaction.
- ii) State Markovnikov's rule and show the products formed on addition of HBr to Propene.
- iii) How will you convert Ethanol to Ethene ?

OR

i) Write short notes on the following :

- a) Cyclic Polymerisation
- b) Decarboxylation reaction of Sodium salt of Benzoic acid.
- ii) How will you form Ethene from Calcium carbide starting from CaCO_3 .
- iii) How will you convert Propyne to Propene ?

30. At 473 K, equilibrium constant K_c for the decomposition of PCl_5 is 8.3×10^{-3} . If the decomposition [5]

is depicted as : $\text{PCl}_5(\text{g}) \leftrightarrow \text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g})$; $\Delta_r H = 124.0 \text{ kJ mol}^{-1}$

- a) Write an expression for K_c for the reaction.
- b) What is the value of K_c for the reverse reaction at the same temperature ?
- c) What would be the effect on K_c if- (i) More PCl_5 is added ?
 - (ii) The pressure is increased ?
 - (iii) The temperature is increased ?

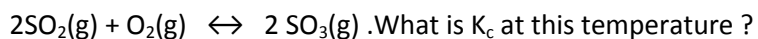
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a) At 450 K, $K_p = 2.0 \times 10^{10} \text{ bar}^{-1}$ for the given reaction at equilibrium :



b) Write a complete note on various factors which affect Equilibria.

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