## KENDRIYA VIDYALAYA SANGATHAN

## Sample Question Paper-3

Class: XI                          Sub: Chemistry                          Time: 3 Hours
                                                                            Max. Marks: 70

General Instructions :

**All questions are compulsory.**

**Marks for each question are indicated against it.**

**Question numbers 1 to 5 are very short answer questions of one mark each. Answer them in about one sentence each.**

**Question numbers 6 to 12 are short answer questions of two marks each. Answer them in about 30 words each.**

**Question numbers 13 to 24 are also short answer questions of three marks each. Answer them in about 40 words each.**

**Question numbers 25 to 27 are long answer questions of five marks each. Answer them in about 70 words each.**

**Use log tables, if necessary. Calculator's are not permitted.**

1. State Charle's law.

2. Write the IUPAC name and symbol of an element having atomic number 123.

3. Which one of the following is not extensive state function:

   Enthalpy change, internal energy change and pressure?

4. Write the expression for the equilibrium constant $K_c$ for the reaction:

   $CH_3COOC_2H_5$ (aq) + $H_2O$ (l) → $CH_3COOH$(aq) + $C_2H_5OH$ (aq)

5. Carbon shows the property of catenation remarkably. Assign a reason for this statement.

6. Calculate the number of moles of ammonia gas formed from 4.6 g of N2.

7. How many sigma and pi bonds are there in the following molecule.

   $$CH2 = C(Br)\text{-}CH2\text{-}CH=CH2$$

8. Calculate the pressure exerted by 2 moles of $SO_2$ gas contained in vessel of 200 ml at 27°C.

9. Why do real gases deviate from the ideal behaviour? What are the conditions under which real gases show ideal behaviour?

10. What happens when:

    (a) Mg is burnt in air.

    (b) $Cl_2$ (g) reacts with slaked lime.

  Write chemical equations for the reactions involved.

11. (a) Define -nucleophiles ?

  (b) Draw the resonating structures of aniline.

12. Write the IUPAC names of the following compounds.

    (a) CH3-CH2-CH(NH2)- COOH    (b) OHC-CH2-CH=CH-CH3

13. What are the frequency and wavelength of a photon during a transition from n = 5 state to n = 2 state in the $He^+$ ion.

14. (a) State Heisenberg's uncertainty principle.

  (b) List the quantum numbers (m and l) for 3d orbitals.

  (c) Write the electronic configuration ofCu$^{2+}$ ion. (Z = 29)

15. Assign a reason for each of the following statements.

    (a) First ionization enthalpy of boron (Z = 5) is slightly less than that of beryllium (Z= 4).

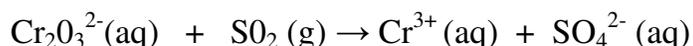    (b) Electron gain enthalpy of F is less negative than chlorine (Cl).

    (c) The size of an anion is always larger than that of parent atom.

16. Deduce the structures of (i) $SF_6$ (ii) $BeCl_2$ on the basis of VSEPR theory.

**or**

  (a)Using MO diagram calculate the bond order of $O_2^{2+}$ ion.

17. Balance the following redox reaction in acidic medium by ion electron method.

$$Cr_2O_3{}^{2-}(aq) \ + \ SO_2 (g) \rightarrow Cr^{3+} (aq) \ + \ SO_4{}^{2-} (aq)$$

18. Give one method of preparation hydrogen peroxide. Write chemical reactions to justify that it can function as an oxidising as well as reducing agent. Write its two uses.

19. Assign a reason for each of the following statements.

    (a) Alkali metals dissolve in liquid ammonia to give deep blue solution.

    (b) Beryllium and magnesium do not give colour to the flame whereas other alkaline earth metals do so.

    (c)  PbCl4 is a stronger oxidizing agent than PbCl2.

20. (a) How is diborane prepared in the laboratory? Draw its structure.

(b) Explain why $CO_2$ is a gas whereas $SiO_2$ is a solid.

21. A certain salt X gives the following results

(a) its aqueous solution is alkaline to litmus.

(b) It swells up to a glassy material Y on strong heating

(c) When conc $H_2SO_4$ is added to a hot solution of X, white crystals of an acid Z separates out

Write equations for all the above reactions and identify X, Y and Z

22. (a) Write the chemical equations involved in the Lassaigne's test for sulphur in an organic compound.

(b) In Carius method of estimation of halogen, 0.15g of an organic compound gave 0.12g of AgI. Find the percentage of bromine in the compound.(At. mass of Ag = 108 u, I=127 u).

23. Write a short note on :

(a) (i) Friedel-Crafts alkylation        (ii) Decarboxylation        (iii) Markownikoff's rule

24. Write down the chemical equations of reactions involved during the formation of photochemical smog. How can it be controlled?

25. (a) Define the following:

(i) Hess's law of constant heat summation.     (ii) First law of thermodynamics. .

(b) Find out whether it is possible to reduce MgO using carbon at 298K. If not at what temperature it becomes spontaneous. For reaction: MgO (s)+ C (s) → Mg(s) + CO(g)

$\Delta H$=91.18 kJ/mol and $\Delta S$ =197.67JK /mol

26. (a) State Le Chatelier's Principle.

(b) Write the conjugate acid of $HCO_3^-$ and $H_2O$

(c) Two moles of $PCl_5$ were heated to $327^0C$ in a closed 2 L vessel and when equilibrium was achieved, $PCl_5$ was found to be 40 % dissociated into $PCl_3$ and $Cl_2$. Calculate the equilibrium constants $K_p$ and $K_c$ for the reaction.

27. (a) The electrophilic substitution of aniline gives predominantly the ortho and para derivatives and not meta why?

(b) Arrange ethene, ethyne and ethane in the decreasing order of acidic nature.

(c) How will you bring about the following conversions in not more than two steps ?

(i) Ethyne to brome ethane  (ii) l-Bromopropane to 2-Bromopropane

Or

(a) Complete the following reactions:

    (i)    $CH_3\text{-}CH=CH_2 + HBr \rightarrow$

    (ii)    $CH_2 = CH_2 + O_3 \rightarrow$
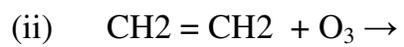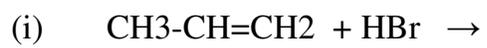
(b) Write a short note on hyperconjugation.