KENDRIYA VIDYALAYA

SESSION ENDING EXAMINATION

CLASS - XI **SUBJECT - CHEMISTRY**

TIME : 3 HOURS **MAX. MARKS : 70**

General instructions :
1.All questions are compulsory
2.Marks for each question are mentioned against it.
3.Question numbers 1-5 are very short answer questions each of one mark. Answer them in about one sentence each.
4. Question numbers 1-5 are very short answer questions each of one mark. Answer them in about one sentence each
5.Question numbers 6-10 are short answer questions of two mark each .Answer them in not more than 30 words.
6. Question numbers 11-22 are short answer questions of 3 marks each. Answer them in about 40 words each.
7. Question number 23 is a value based question for 4 marks .
8. Question numbers 24-26 are long answer questions each of five mark each. Answer them in not more than 70 words each.
9. Use log tables if necessary. Calculators are not required.
10.15 minutes time has been allotted to read this question paper.

1. Write the values of 'n' and ' l' for 4f orbital.
2.Define electron gain enthalpy.
3. Which of the following is more acidic?
Ethane ,ethyne,ethene.
4. Define solubility product.
5. Give an example for Friedel Craft's reaction.
6. (a) Under what conditions will a real gas show deviation from ideal gas behaviour?
(b)Which faulty assumptions in kinetic theory was responsible for this deviation?

7. Derive an expression relating density of a gas to its molar mass.

8. a) Which out of NH_3 and NF_3 has higher dipole moment and why?
b) Use molecular orbital theory to explain why Be_2 molecule does not exist.
9. A sample of nitric acid is 69% by mass and has density of 1.41 g/cm^3 . Find its molarity.

or

Calculate the volume of oxygen at STP liberated by heating 12.25g of $KClO_3$.
(Atomic weight of K =39, Cl=35.5 ,O=16)
10.Write the chemical equations for the manufacture of Sodium carbonate by Ammonia Solvay process.
11.a)Write the general electronic configuration of a transition element.
b) State any 4 characteristics of d block elements.

or

a) State modern periodic law.

b) Give reasons for the following:

i) Ionization enthalpy of Nitrogen is more than Oxygen.

ii) The first element of each group of the periodic table shows anomalous properties.

12. a)Draw the resonance structure of phenol clearly indicating the movement of electrons by curved arrows.

b) Name the following compound according to the IUPAC system.

$CH_3\,CH = CH_2\,CHO$

c) Write the formula of the Prussian Blue compound formed in the Lassaigne's test for the detection of Nitrogen in an organic compound.

13.Draw the shapes of the following molecules :

a) ClF_3 b) SF_4 c) SF_6

14. a) State the difference between Extrinsic and Intrinsic properties.

b) The enthalpies of formation of CO (g) , CO_2 (g) , N_2O (g) and N_2O_4 (g) are -110 , - 393 , 81 and 9.7 KJ mol^{-1} respectively. Find the value of $\Delta_r H$ for the reaction :

$$N_2O_4\ (g) + 3\ CO\ (g) \longrightarrow N_2O\ (g) + 3\ CO_2\ (g)$$

or

What is the value of equilibrium constant for the following reaction at 400 K?

$$2\ NOCl\ (g) \rightleftharpoons 2\ NO\ (g) + Cl_2\ (g)$$

$\Delta H^0 = 77.5$ KJ mol^{-1} , $R = 8.314$ J $mol^{-1}K^{-1}$, $\Delta S^0 = 135$ $JK^{-1}mol^{-1}$

15. a) Derive the relationship , $\Delta G = - T\Delta S_{Total}$

b) Under what condition will an endothermic reaction occur spontaneously?

16. a) Draw the structure of $BeCl_2$.

b) Account for the following :

i) Alkali metals give deep blue colour with ammonia solution.

ii) NaOH is a stronger base than LiOH .

17. a) Find the oxidation number of Cr in $(CrO_4)^{2-}$ & C in $(C_2O_4)^{2-}$

b) Balance the following redox reaction in the acidic medium by oxidation number method:

$$(Cr_2O_7)^{2-}\ (aq) + (SO_3)^{2-}\ (aq) \longrightarrow Cr^{3+}\ (aq) + (SO_4)^{2-}\ (aq)$$

18. a)Write a chemical reaction to justify that Hydrogen peroxide can function as both oxidising as well as reducing agent.

b) What is the cause of temporary hardness of water?

19. a) What will happen during Lassaigne's test for nitrogen if the compound also contains sulphur.

b) In the estimation of sulphur by Carius method 0.468 g of an organic compound yielded 0.668 g of $BaSO_4$.Find out the percentage of sulphur in the given compound.

20.Define the following :

a) Molarity

b) Mole fraction

c) Limiting Reagent

21.Draw the Staggered and Eclipsed conformations of ethane.Why staggered conformation of ethane is more than eclipsed conformation ?

22.What happens when:

a) Chloro propane is treated with alcoholic KOH.

b) Benzene is treated with CH_3COCl and anhydrous aluminium chloride.

c) Ethyl alcohol is treated with conc. Sulphuric acid.

23. Deepthi Drycleaner's owner ,Mr.Nambiar was using tetrachloroethene as a solvent for dry- cleaning. The compound contaminates the ground water and is also a suspected carcinogen.Mr.Suresh ,owner of Cleanomat Dry-cleaners is using super critical CO_2 for drycleaning and H_2O_2 for bleaching

a) What is the advantage of using liquid CO_2 with suitable detergent for dry-cleaning?

b) What is the advantage of using H_2O_2 as bleaching agent?

c) What is your responsibility as a human being to protect environment?

d) What are the values possessed by Mr.Suresh?

24.a) Give reasons:

i) Boron trihalides act as Lewis acids.

ii) Lead (IV) Compounds are unstable while Tin(IV) Compounds are stable.

iii) $[SiF_6]^{2-}$ is known while $[SiCl_6]^{2-}$ is not known.

b) Write balanced equations for then following:

i) $BF_3 + LiH \longrightarrow$

ii) $H_3BO_3 \xrightarrow{\Delta}$

or

a) Write balanced equations for the following:

i) $B_2H_6 + H_2O$

ii) $Al + NaOH$

iii) $NaH + B_2H_6$.

b) Account for the following:

i) CCl_4 does not undergo hydrolysis while $SiCl_4$ undergoes hydrolysis.

ii) CO_2 is a gas while SiO_2 is a solid at room temperature.

25.a) Calculate the wavelength and the frequency of the photon that is emitted when an electron in a hydrogen atom makes a transition from n=1 to n=3 energy level.

b)With reference to Bohr's model explain the following terms: Stationary state and quantization of angular momentum.

or

a) What is photoelectric effect?

b) Calculate wavelength of an electron moving with a Kinetic Energy of 3×10^{-25}J. Mass of electron $=9.1 \times 10^{-31}$Kg.

c) What is the energy of the third orbit of $(Li)^{2+}$ ion.

26. a) For the reaction :

$N_2(g) + 3H_2(g) \leftrightarrow 2NH_3(g)$ the value of $K_p$is 3.6×10^{-2} at 500K. Calculate the value of K_c for the reaction at the same temperature. R=0.083L bar K^{-1} mol^{-1}

b) What do you understand by :

i) Common ion effect.

ii) Buffer solution.

or

a) At 473 K ,equilibrium constant,K_c for decomposition of PCl_5 is 8.3×10^{-3}.

If decomposition is depicted as $PCl_5(s) \leftrightarrow PCl_3(s) + Cl_2(g)$; $\Delta_r H^o = 124.0$ kJ mol^{-1}

i) Write an expression for K_c for the reaction.

ii) What is the value of K_c for the reverse reaction at the same temperature.

iii) What would be the effect on K_c if:

1. The pressure is increased?
2. The temperature is increased?

b) Write equilibrium constant for the following equations:

i) $BaCO_3(s) \leftrightarrow BaO(s) + CO_2(g)$

ii) $CH_4(g) + 2O_2(g) \leftrightarrow CO_2(g) + 2H_2O(g)$