



St. Xavier's Senior Secondary School, Jaipur

Final Examination: 2014 – 15

26-02-2015	XI CDE	CHEMISTRY	TIME: 3 Hrs	MM: 70
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Instructions:

1. All the questions are compulsory. However internal choices are given in some questions.
2. Questions 1 – 5 are very short answer questions and carry 1 mark each.
3. Questions 6 – 10 are short answer questions and carry 2 marks each.
4. Questions 11– 22 are also short answer questions and carry 3 marks each.
5. Question no. 23 is a Value Based Question which carries 4 marks only.
6. Questions 24 – 26 are long answer questions and carry 5 marks each.
7. Use log tables if necessary, use of calculator is not allowed.

- 1) Calculate the mass of 1×10^{23} molecules of methane.
- 2) The first ionization enthalpy of carbon atom is greater than that of boron whereas the reverse is true for the second ionization enthalpy. Explain.
- 3) Are the oxidation state and covalency of Al in $[\text{AlCl}(\text{H}_2\text{O})_6]^{2+}$ same?
- 4) Which has higher dipole moment H_2O or CO_2 ? Why?
- 5) $\text{H}_2\text{C}=\text{O}$ or CH_3CN acts as a nucleophile as well as an electrophile. Explain.
- 6) 2.38g of uranium was heated strongly in a current of air. The resulting oxide weighed 2.806g. Determine the empirical formula of the oxide. (At. Mass of U = 238g/mol)
- 7) Assign the position (i.e., period and group) of the element having outer electronic configuration –
(i) ns^2np^4 for $n = 3$ (ii) $(n - 1)d^2ns^2$ for $n = 4$
- 8) Find out the oxidation number of the underlined species –
(i) $\underline{\text{C}}\text{r}_2\underline{\text{O}}_7^{2-}$ (ii) $\underline{\text{C}}\text{O}_3^{2-}$ (iii) $\underline{\text{C}}\text{lO}_4^-$ (iv) $\underline{\text{H}}_2\underline{\text{P}}\text{O}_2^-$
- 9) Explain how temporary hardness is removed by Clark's process. Give necessary reactions.
- 10) (i) What do you mean by Eutrophication?
(ii) Write a short note on Green chemistry.
- 11) (i) The density of 3 molal solution of NaOH is 1.110g/mL. Calculate the molarity of the solution. (Mass of NaOH = 40g/mol)
(ii) Define the following – (a) Absorption spectrum (b) Work function
- 12) (i) Draw the resonating structures of nitrate ion.
(ii) Write two differences between bonding and anti – bonding molecular orbitals.
- 13) (i) Write two points of difference between Inter molecular H-bonding and Intra molecular H-bonding.
(ii) What do you mean by Boyle Point?
- 14) (i) The critical temperature of NH_3 (450K) is more than CH_4 (190.6K). Which of them have stronger inter – molecular forces and why?
(ii) 2.9g of a gas at 95°C occupied the same volume as 0.184g of hydrogen at 17°C at the same pressure. What is the molar mass of the gas?
- 15) (i) Define Calorific value and Entropy.
(ii) An athlete is given 100g of glucose of energy equivalent to 1560kJ. He utilizes 50% of this gained energy in the event. In order to avoid storage of energy in the body, calculate the weight of water he would need to perspire. The enthalpy of evaporation of water is 44kJ/mol.

OR

- 2) The first ionization enthalpy of carbon atom is greater than that of boron whereas the reverse is true for the second ionization enthalpy. Explain.
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OR

- (i) The enthalpy change for the reaction $\text{Zn} + 2\text{H}^+ \rightarrow \text{Zn}^{2+} + \text{H}_2$ is -154.40kJ/mol . The formation of 2g of hydrogen expands the system by 22.4litres at 1 atm pressure. What is the internal energy change of the reaction?
- (ii) Derive relationship between C_p and C_v .

(Contd.....)

- 16) (i) Derive relationship between K_p and K_c .
(ii) Give reason why Zn is not precipitated as $Zn(OH)_2$ on adding NH_4OH to a Zn salt solution containing NH_4Cl .
- 17) (i) Balance the following equation by ion electron method –
 $Fe^{2+} + MnO_4^- \rightarrow Fe^{3+} + Mn^{2+}$ (In acidic medium)
(ii) What do you mean by salt like hydride? Explain.
- 18) (i) Explain by giving reaction also why halides of beryllium fume in moist air but that of barium does not?
(ii) Why is Li_2CO_3 decomposed at lower temperature whereas Na_2CO_3 is not?
(iii) Draw the structure of $BeCl_2$ in solid state.
- 19) (i) Draw the structure of diborane.
(ii) Write the balanced equation for the following –
(a) $H_3BO_3 \xrightarrow{\Delta}$
(b) $Na_2B_4O_7 \cdot 10H_2O + H_2SO_4 \longrightarrow$
- 20) (i) Write a short note on Zeolite.
(ii) What are Silicones? How are they prepared?
- 21) (i) Explain hyperconjugation.
(ii) An alkane C_8H_{18} is obtained as the only product on subjecting a primary alkyl halide to Wurtz reaction. On monobromination this alkane yields a single isomer of a tertiary bromide. Write the structures
- 22) (i) Predict products A and B in the following reaction –
 $CH_3 - CH = CH_2 \xrightarrow{Br_2, CCl_4} A \xrightarrow{NaNH_2/Liq. NH_3} B$
(ii) How will you convert benzene into p – nitrobromobenzene?
(iii) Convert propanoic acid to ethane.
- 23) Heaps of garbage is seen at different places in our country. With the passage of time it starts stinking thereby causing pollution in the atmosphere. For this nobody else but we ourselves are responsible. If we dispose off our garbage in a proper way, we can keep our environment clean. Smoking in public places not only affects the health of the smoker, it pollutes the air around him and affects the health of others. Disposal of industrial waste into rivers and lakes causes pollution of water which affects the aquatic life. After reading the above paragraph, answer the following questions –
(i) What values are expressed in the above paragraph? (Mention at least two important points).
(ii) What should be done to manage – (a) Household waste (b) Industrial waste
- 24) (i) Illustrate Pauli's exclusion principle.
(ii) Write one difference between orbit and orbital.
(iii) Draw the shapes of any four d – orbitals.
(iv) Two particles A and B are in motion. If wavelength associated with particle A is $5 \times 10^{-8} m$, calculate the wavelength associated with particle B if its momentum is half of A.

OR

- (i) Illustrate Hund's rule of maximum multiplicity.
(ii) Write one difference between principal and azimuthal quantum number.
(iii) What is the difference between wave emitted by a bulb or heater and that emitted by a particle?
(iv) If photon of the wavelength 150pm strikes an atom and one of its inner bound electron is ejected out with a velocity of $1.5 \times 10^7 m/s$, calculate the energy in eV with which it is bound to the *nuc leu.*

25) (i) The pH of 0.05M aqueous solution of diethyl amine is 12. Calculate its K_b –



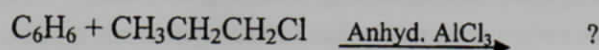
(ii) Explain Le – Chatelier's principle.

(iii) Give reason that a real crystal has more entropy than an ideal crystal.

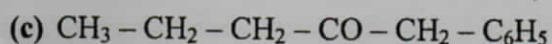
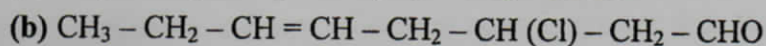
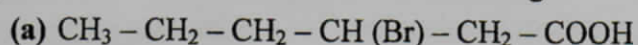
(iii) An open vessel at $27^{\circ}C$ is heated until $3/5$ parts of the air in it has been expelled. Assuming that the volume of the vessel remains constant, find the temperature to which the vessel has been heated.

(v) Draw the shapes of ClF_5 and XeF_4 .

26) (i) What will be the product obtained as a result of the following reaction and why?



(ii) Write the IUPAC names of the following –



OR

(i) Draw the resonating structures of C_6H_5OH .

(ii) Write the name and structure of alkene which undergoes ozonolysis to form butanal and butan-2-one.

(iii) Convert the following reactants –

(a) Ethyne to Ethylbenzene.

(b) Benzene to m – Bromobenzenesulphonic acid.

(c) Tertiary butylbromide to Iso butylbromide.
