Chandan Singh

First Terminal Examination, 2017-18

Class- XII

Chemistry

Time allowed: 3 hours. **Max. Marks: 70**

General Instructions:

1. **All questions are compulsory.**
2. **Answer should be brief and relevant.**
3. **Marks are indicated against each question.**
4. **Use Log Tables, for calculations, if necessary. Use of calculators is not allowed.**

Q.1. Suggest the most important type of intermolecular attractive interaction between $NaClO_4$ and water. 1

Q.2. Why does the conductivity of a solution decrease with dilution? 1

Q.3. Out of p-cresol and p-nitrophenol, which is more acidic and why? 1

Q.4. What are artificial sweeteners? Give an example. 1

Q.5. How many lattice points are there in one unit cell of a face-centred cubic crystal? 1

Q.6. A solution of glucose in water is labelled as 10% w/w. What is the molality of the solution and what is the mole fraction of glucose in the solution? 2

Q.7. The electron gain enthalpy of fluorine is less negative as compared to that of chlorine, yet F_2 is a stronger oxidising agent than Cl_2. Explain. 2

Q.8. Write equations for the preparation of 1-iodobutane from – (i) 1-butanol and (ii) but 1-ene. 2

Q.9. From the given cells: 2
Lead storage cell, mercury cell, fuel cell and dry cell-
a) Which cell is used in hearing aids?
b) Which cell was used in Apollo Space Programme?
c) Which cell is used in automobiles and in verters?
d) Which cell does not have long life?

Q.10. What happens when – (Write equations also) 2

a) Ethanol is treated with Cu at 573K.
b) Ethyl chloride is treated with Sodium methoxide.

Q.11. a) Why does LiCl acquire pink colour when heated in lithium vapours? 3
b) What change occurs when AgCl is doped with $CdCl_2$?
c) What type of semiconductor is produced when Silicon is doped with boron?

Q.12. 3.9g of benzoic acid dissolved in 49g of benzene shows a depression in freezing point of 1.62K. calculate the van't Hoff factor and predict the nature of solute (associated or dissociated). 3
(Given: molar mass of benzoic acid is 122g mol^{-1} and K_f for benzene is 4.9K $Kgmol^{-1}$).

Q.13. The rate constant of a first order reaction increases from $2x10^{-2}$ to $8x10^{-2}$ when the temperature changes from 300K to 320K. Calculate the energy of activation. 3
(log 2=0.301, log 3=0.4771, log 4=0.6021)

Q.14. a) What are disinfectants? Give an example. 3
b) Give two examples of macromolecules that are chosen as drug targets.
c) What are anionic detergents? Give an example.

Q.15. Give reasons for the following: 3
a) Ethyl iodide undergoes S_N2 faster than ethyl bromide.
b) (+) – 2- Butanol is optically inactive.
C-X bond in haloarenes is smaller than C-X bond in CH_3 –X.

Q.16. An aqueous solution of copper sulphate was electrolysed between platinum electrodes using a current of 0.1287 ampere for 50 minutes. (at mass of Cu=63.5g mol^{-1}) 3
a) Write the cathodic reaction.
b) Calculate – i) electric charge passed during eletrolysis. ii) Mass of copper deposited at the cathode.

Q.17. a) On the basis of VSEPR theory, predict the shape of BrF_3. 3
b) Draw the structures of XeF_2 and $HClO_4$.
c) complete the equation: $SiO_2+6HF \rightarrow$

Q.18. a) Write the mechanism of hydration of ethene to ethanol. 3
b) Explain Reimer- Tiemann reaction with an example.

Q.19. a) A reaction is of second order with respect to a reactant. How is its rate affected if the concentration of the reactant is reduced to half? 3

b) The rate constant for a first order reaction is $60S^{-1}$. How much time will it take to reduce the initial concentration of the reactant to $\frac{1}{10}$ th of its initial value?

Q.20. a) What are azeotropes? What types of azeotrope is formed by solutions showing positive deviation from Raoult's law. 3

b) On mixing two liquids, volume of the resulting solution decreases. What type of deviation from Raoult's law is shown by the resulting solution? What is the change in temperature observed after mixing the two liquids?

c) What is the effect of temperature on the solubility of a gas in a liquid?

Q.21. How will you convert the following:- 3

a) Aniline to phenol

b) Prop-1-ene to 1-Propanol

c) Anisole to 2-methoxytoluene

Q.22. Calculate the degree of dissociation of acetic acid at 298K, given that $\Delta m^{\circ}(CH_3COOH) = 11.7\ Scm^2mol^{-1}$, $\Delta m^{\circ}(CH_3COO^-) = 40.9\ Scm^2mol^{-1}$ and $\Delta m^{\circ}(H^+)$is $349.1\ Scm^2mol^{-1}$. 3

Q.23. Mamta, a housewife, lives in Sonepat (Haryana). The tap water she gets is rich in dissolved salts. She uses ordinary Washing Soap for washing clothes and she finds that soaps are not very effective in cleaning her clothes. One of her neighbours, Shilpa, is a student of Science. Shilpa suggested to her to use Synthetic detergents for washing clothes. 3

Answer the following questions:-

a) As a science student, why did Shilpa suggest Mamta to use Synthetic detergents?

b) Give one chemical reaction to justify not using ordinary Soap.

c) What were the values associated with the above decision?

Q.24. a) Complete the following chemical equations: 5

i) $AgCl\ (s) + NH_3(aq) \rightarrow$

ii) $P_4(S) + NaOH(aq) + H_2O\ (\ell) \rightarrow$

b) Give reasons for the following observations:

i) H_2S is less acidic than H_2Te.

ii) XeF_2 has a linear shape and not a bent structure.

iii) SF_6 is less reactive SF_4.

OR

a) Complete the following equation:-

i) $HgCl_2$ (aq) + PH_3(g) →

ii) SiO_2 (g)+ HF (g) →

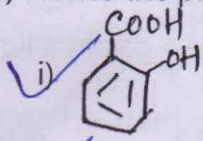
b) Account for the following-

i) Bi (V) is stronger oxidant than Sb(V).

ii) Fluorine can exhibit an oxidation state of-1 only.

iii) Interhalogen compounds are more reactive than halogens.

Q25. a) Write the products in the following reaction: 5

i) 

ii) CH_3-CH-O-CH_3 HI
CH_3

iii) CH_3-CH = CH-CH_2-OH PCC

b) Give simple chemical tests to distinguish between the following pairs of compounds:

i) Ethanol and phenol

ii) Propanol and 2-methylpropan-2-ol

OR

a) Write the formula of reagents used in following reactions:

i) Bromination of phenol to 2,4,6- tribromophenol

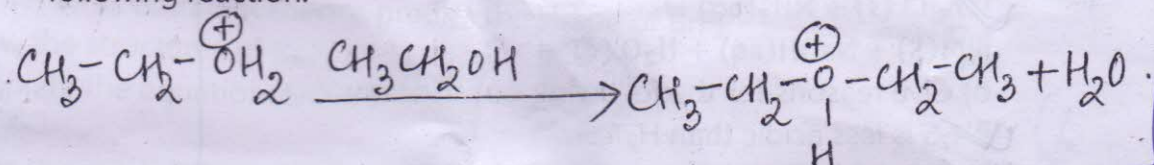
ii) Hydroboration of propene and then oxidation to propanol.

b) Arrange the following in the increasing order of their property indicated-

i. Propanol, propane, methoxyethane (boiling points)

ii. Ethanol, phenol, water (acidic character)

c) Write the mechanism (using curved arrow notation) for the following reaction:-



Q.26 a) Write the anode and cathode reactions and the overall reaction occurring in a lead storage battery. 5

b) A copper-silver cell is set up. The copper ion concentration is 0.10M. The concentration of silver ion is not known. The cell potential is 0.422V. Determine the concentration of silver ions in the cell.
(Given $E^0Ag^+/Ag = 0.80V$, $E^0Cu^{2+}/Cu = 0.34V$.)

OR

a) Explain the chemistry of rusting of iron with the necessary chemical equations.

b) Zine rod is dipped in 0.10M solution of ZnSO4. The salt is 95% dissociated at this dilution at 298K: Calculate the electrode potential.
(Given: $E^0Zn^{2+}/Zn = -0.76V$)

c) Predict the products of electrolysis when an aqueous solution of $AgNO_3$ is electrolysed with platinum electrodes.