Tripura Board
Class XII
Chemistry
Sample Paper - 2

Time: 3.15 hours **Maximum Marks: 70**

General Instructions

i) All questions are compulsory.

ii) Questions number 1 to 8 are very short--answer questions and carry 1 mark each.

iii) Questions number 9 to 18 are short--answer questions and carry 2 marks each.

iv) Questions number 19 to 27 are also short--answer questions and carry 3 marks each.

v) Questions number 28 to 30 are long--answer questions and carry 5 marks each.

vi) Use log Tables, Calculators if necessary.

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1. Alums purify muddy water by which phenomenon: dialysis or coagulation?

2. Write the formula of Tetraamminediaquacobalt(III)chloride.

3. Alcohols have a higher boiling point as compared to isomeric ethers. Why?

4. Give IUPAC name of $OHCCH_2CH_2CH\ (CH_3)\ CH2COOH$.

5. Why are aliphatic amines are stronger bases than ammonia?

6. Glucose or sucrose are soluble in water but cyclohexane or benzene (simple six membered ring compounds) are insoluble in water. Explain.

7. Give the formulae of the monomers of given polymer.
$(-CO(CH_2)_8-CONH(CH_2)_4NH-)_n$

8. Give one point of difference between antiseptics and disinfectants. Give one example each.

9. Calculate the amount of KCl which must be added to 1 kg water so that the freezing point is depressed by 3K. (K_f = 1.86 K kg mol^{-1}).

10. What are the reactions taking place at cathode and anode of a H_2-O_2 fuel cell?

11. An orange solid 'A' is prepared by the reaction of conc. H_2SO_4 on a yellow solid 'B'. 'A' on heating gives back 'B' and a green solid 'C' is formed along with liberation of oxygen gas. The acidified solution of 'A' changes to green due to formation of 'D' when SO_2 gas is passed through it. Identify A, B, C and D .Write all equations involved.

12. $FeSO_4$ solution mixed with ammonium sulphate solution in 1:1 molar ratio gives positive test for ferrous ions but $CuSO_4$ solution mixed with aqueous ammonia in 1:4 molar ratios does not give test for Cu^{2+} ions. Why?

13.A compound is formed by two elements A and B. Atoms of B make a ccp arrangement and those of A occupy half the tetrahedral voids and all the octahedral voids. Derive the formula of the compound.

Or

Potassium crystallizes in bcc lattice. What is the number of unit cells in 3.9g of K?
(Atomic mass of K = 39u)

14. Calculate the percentage of Fe^{2+} and Fe^{3+} ions in $Fe_{0.93}O_{1.00}$.

15.Which polymer is used as a substitute for wool in making commercial fibers? Give the name and structure of its monomer.

16.What are antihistamines? Give an example. Discuss their working in the human body.

17. Arrange the following in order of increasing reactivity in S_N1 and S_N2 reaction $C_6H_5CH_2Br$, $C_6H_5CH\ (C_6H_5)\ Br$, $C_6H_5CH\ (CH_3)\ Br$, $C_6H_5C\ (CH_3)\ (C_6H_5)\ Br$.

18. What happens when:
(a) Chloroethane is made to react with KCN
(b) 1-Bromopropane reacts with silver acetate
Give equations involved.

19. Why is boiling point of a solution containing non volatile solute more than that of pure solvent? Explain graphically.

20. Lalit and his father were going in a boat in the river. Lalit's father threw away the cell used in watches and hearing aids into the water. Lalit prevented him from doing so.
(a) As a student of chemistry, why would you advise Lalit's father not to throw the cell in the water body.
(b) What is the value associated with the above decision?

21.
(a) What is meant by peptization? Explain.
(b) Why does a sugar solution containing coloured impurities become colourless when passed over activated charcoal?
(c) What are associated colloids? Give an example.

22.
(a) Can Al be used to reduce CaO? Explain your answer.
$\Delta G^{\Theta}_{(Ca,CaO)}$ = -604.2 kJmol^{-1} $\Delta G^{\theta}_{(Al,Al_2O_3)}$ = - 1582.4 kJmol^{-1}
(b) State the principle behind zone refining.

23.
i) Give reason for the following
(a) NH_3 is a good complexing agent.
(b) HNO_2 acts as an oxidising as well as reducing agent.
ii) What are the products of complete hydrolysis of XeF_6?

Or

i) Bond dissociation energy of F_2 is less than that of Cl_2. Why?
ii) Oxygen is a gas while sulphur is a solid. Why?
Which compound of Xe is isostructural with IF_5? What is the shape of the molecules?

24.
i) Why do transition metals form complex compounds?
ii) What is lanthanoid contraction?
iii) Why does Cr have a high melting point?

25.
i) Distinguish between
(a) Aniline and benzyl amine
(b) $CH_3CH_2NH_2$ and $(CH_3)_2NH$
ii) Write a note on Hoffmann Bromamide reaction.

26.
(a) Give two reasons to support the cyclic structure of glucose.
(b) Why are amino acids soluble in water?
(c) Name the pyrimidine bases present in DNA and RNA.

27.
(a) Give the mechanism of acid catalysed dehydration of ethanol to yield ethyne.
(b) Compound (A) $C_4H_{10}O$ is found to be soluble in sulphuric acid. (A) does not react with sodium metal or potassium permanganate. When is heated with excess of HI, it is converted into single alkyl halide. What is the structural formula of (A)?

28. Complete the equations

(a) $NaCl + MnO_2 + H_2SO_4 \rightarrow$

(b) $Al + O_2 \rightarrow$

(c) $2Pb(NO_3)_2 \xrightarrow{673K}$

(d) $C + H_2SO_4$ (conc) $\rightarrow$

(e) $PbS + O_3 \rightarrow$

Or

Complete the equations

(a) $NH_4Cl(aq) + NaNO_2(aq) \rightarrow$

(b) $P_4 + NaOH + H_2O \rightarrow$

(c) $CaF_2 + H_2SO_4 \rightarrow$

(d) NaOH (conc, hot) $+ Cl_2 \rightarrow$

(e) $PCl_3 + H_2O \rightarrow$

29.

(a) Decomposition of a compound follows first order kinetics. It takes 15min for 20% of the starting compound to react. Calculate

i) Rate constant for the reaction

ii) Time at which 10% of the reactant is left unreacted.

iii) Time taken for the next 20% of the reactant to react after first 15min.

(b) Derive a relationship between rate constant and half life for a zero order reaction.

Or

(a) The rates of a reaction starting with initial concentrations 2.0×10^{-3} M and 1.0×10^{-3} M are equal to 2.40×10^{-4} M s^{-1} and 0.60×10^{-4} M s^{-1} respectively. Calculate the order of the reaction with respect to the reactant and also the rate constant.

(b) For a reaction A+B $\rightarrow$ C, it is found that

i. Rate becomes double when concentration of A is doubled.

ii. Rate becomes 16 times when concentration of both A and B are doubled. Write the rate expression and calculate the overall order of the reaction.

30.

(a) Convert

i) Acetic acid to ethylamine

ii) Propionic acid to lactic acid

(b) Identify A, B and C in the following reactions:

$$CH_3COCH_3 \xrightarrow{LiAlH_4} A \xrightarrow{SOCl_2} B \xrightarrow{KOH(alc)} C$$

Or

(a) Convert

i) Acetaldehyde to crotonic acid

ii) Formaldehyde to chloroethane

iii) Acetic acid to propanoic acid

(b) Identify A and B in given equation

$$HCHO \xrightarrow{Conc.NaOH} A + B$$