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HALF YEARLY EXAMINATION PHASE I

Class-XII

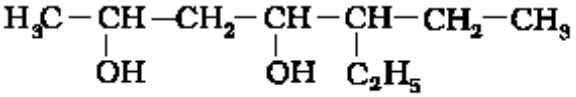
SUBJECT: CHEMISTRY (Theory)

Time: 3 Hours **M.M.70**

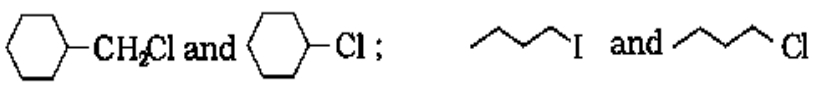
General Instructions:

1. All questions are compulsory.
2. Question nos. 1 to 8 are very short answer questions and carry 1 mark each.
3. Question nos. 9 to 18 are short answer questions and carry 2 marks each.
4. Question nos. 19 to 27 are also short answer questions and carry 3 marks each
5. Question nos. 28 to 30 are long answer questions and carry 5 marks each
6. Use log tables if necessary, use of calculators is not allowed.

1. The decomposition reaction of ammonia gas on platinum surface has a rate constant = 2.5×10^{-4} mol L^{-1} S^{-1}. What is the order of the reaction?
2. Name the non- stoichiometric defect responsible for colour in alkali halides.
3. What happens when white phosphorus is heated with concentrated NaOH solution in an inert atmosphere of CO_2?
4. Describe Freundlich adsorption isotherm
5. Draw the structure of the compound whose IUPAC name is: 4-Methylpent-3-en-2-one
6. Write the IUPAC Name of the following compound:



7. Exemplify Hoffmann bromamide reaction.
8. Write the structure of monomer and polymer of Nylon 6, 6
9. Distinguish between order of reaction & Molecularity.
10. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction
11. What is osmosis & reverse osmosis?
12. (a) In the following pairs of halogen compounds, which would undergo S_N2 reaction faster?



(b) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN forms isocyanides as the chief product. Explain.

13. How the following conversions can be carried out (a) 1-Bromopropane to 2-bromopropane (b) Chloroethane to butane

14. (a) HCl is less acidic than HI. Why?
    (b)Why is H_2O a liquid and H_2S a gas ?
15. (a) Transition element form generally coloured compounds. Give reason
    (b) Transition metals show paramagnetic behaviour. Give reason.
16. Write the important structural and functional differences between DNA and RNA.
17. Differentiate between globular and fibrous proteins.

Or

How are vitamins classified?Name the deficiency diseases caused due to lack of vitamin A & C.

18. Give difference between the following:
(a) Thermoplastic polymers. & Thermosetting polymer
(b) Addition & Condensation Polymerization
19. Calculate the mass of a nonvolatile solute (molecular mass = 40) which should be dissolved in 114g octane to reduce its vapour pressure to 80%.
20. Silver forms *ccp* lattice and X-ray studies of its crystals show that the edge length of its unit cell is 408.6 pm. Calculate the density of silver (Atomic mass = 107.9 u).
21. (a) What is the difference between multimolecular and macromolecular colloids? (b) What do you mean by terms (a) Tyndall effect (b) Coagulation
22. (a) Describe How Potassium dichromate is made from Chromite ore (b) Write balanced ionic equations for reacting ions to represent the action of acidified Potassium permanganate solution on oxalic acid (c) The lowest oxide of transition metal is basic, the highest is acidic. Why.
23. For the complex $[Fe(CN)_6]^{4-}$ answer the following: (i) Write the IUPAC name.(b) Using VBT Predict the Magnetic behaviour, Hybridization, Shape.(c) Draw all the structures of geometrical isomers.
24. Account for the following: (i)Phenols not undergo Nucleophilic substitution reaction easily but undergo elecrophilic substitution reaction easily at ortho and para positions.(ii) Ortho – nitrophenol is more acidic than Ortho – methoxyphenol.
25. (a) Giving chemical equations explain how leaching is used in metallurgy of aluminium.(b) What is the role of cryolite & graphite rod in the metallurgy of aluminium?
26. (i)Distinguish between the Methylamine and dimethylamine.(ii) Arrange the following in increasing order of basic strength
    a. $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_2H_5NH_2$ NH_3 (in gas phase)
    b. $(C_2H_5)_2NH$, $(C_2H_5)_3N$, $C_2H_5NH_2$ NH_3 (in aqueous phase)
27. Define the following terms giving suitable examples:
    (i)Analgesics(ii)Tranquilizers (iii)Antifertility drugs

Or

(a) Name a substance which can be used as an antiseptic as well as disinfectant.(b) Name the sweetening agent used in the preparation of sweets for a diabetic patient.(c) What are the main constituents of dettol**?**

28. (a) Conductivity of 0.00241M acetic acid is 7.896×10^{-6} S cm^{-1}. Calculate its molar conductivity. If Λ^0 for acetic acid is 390.5 S cm^2 mol^{-1}. What is its dissociation constant? (b) Write the Nernst equation and emf of the following cells at 298K: $Sn/Sn^{2+}(0.050M)//H^+(0.020M)/H_2(g)/Pt(s)$
$E^o_{Sn^{2+}/Sn} = -0.13V$

Or

(a) In the button cell widely used in watches and devices the following reaction takes place: $Zn(s) + Ag_2O(s) + H_2O(l) \rightarrow Zn^{2+}(aq) + 2Ag(s) + 2OH^-(aq)$
Determine Δ_rG^0 & E^0 for the reaction. $E^o_{Zn^{2+}/Zn} = -0.76V$, $E^o_{Ag^+/Ag} = +0.80V$
(b) The molar Conductivity of 0.025 $molL^{-1}$ methanoic acid is 46.1 S cm^2 mol^{-1}. Calculate its degree of dissociation & dissociation constant. If $\lambda^0(H^+)$ is 349.6 S cm^2 mol^{-1} and $\lambda^0(HCOO^-) = 54.6$ S cm^2 mol^{-1}

29. (a)Explain why (i) There are two $-NH_2$ group in semi carbazide however only one is involved in the formation of semi carbazones.
(ii) Aldehydes are more reactive than Ketones towards Nucleophilic addition reaction.
(b) Give simple chemical tests to distinguish between Propanal and Propanone
(c) Describe the following :(i)Aldol condensation(ii) Clemmensen Reaction

Or

(a)A compound 'X' (C_2H_4O) on oxidation gives 'Y' ($C_2H_4O_2$). 'X' undergoes haloform reaction. On treatment with HCN 'X' forms a product 'Z' which on hydrolysis gives 2- hydroxy propanoic acid.
(i) Write down structures of 'X' and 'Y'.
(ii) Name the product when 'X' reacts with dil NaOH.
(iii) Write down the equations for the reactions involved.
(b) Explain why (i) Carboxylic acids are more acidic than phenols.
(ii) During the preparation of esters from a carboxylic acid and an alcohol in the presence of an acid catalyst, the water or the ester should be removed as fast as it is formed.

30. (a)Assign reasons for the following:
(i)Sulphur vapour is paramagnetic.
(ii) Fluorine exhibits only –1 oxidation state whereas other halogens exhibit + 1, + 3, + 5 and + 7 oxidation states also.
(iii) Of the noble gases only xenon is known to form well-established chemical compounds.
(b) Draw the structure of XeF_4 & $H_2S_2O_7$

Or

(a)Why does $R_3P = O$ exist but $R_3N = O$ does not (R = alkyl group)?
(b) Explain why NH_3 is basic while BiH_3 is only feebly basic.
(c) Nitrogen exists as diatomic molecule and phosphorus as P_4. Why?
(d)Why does nitrogen show catenation properties less than phosphorus?
(e) Give the structure of H_3PO_3.