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SET A



INDIAN SCHOOL MUSCAT FIRST PRELIMINARY EXAMINATION CHEMISTRY

CLASS: XII

Sub. Code: 043

Time Allotted: 3 Hrs

13.01.2019

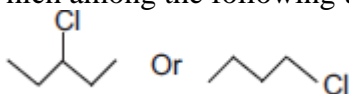
Max. Marks: 70

General Instructions:

- (a) All questions are compulsory.
- (b) Section A: Q.no. 1 to 5 are very short answer questions and carry 1 mark each.
- (c) Section B: Q.no. 6 to 12 are short answer questions and carry 2 marks each.
- (d) Section C: Q.no. 13 to 24 are also short answer questions and carry 3 marks each.
- (e) Section D: Q.no. 25 to 27 are long answer questions and carry 5 marks each.
- (f) There is no overall choice. However, an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
- (g) Use of log tables if necessary, use of calculators is not allowed.

SECTION A

1. Which among the following undergoes SN_1 faster and why? 1



2. Explain how vacancies are introduced in ionic solid when a cation of higher valence is added as an impurity in it. 1

3. Arrange the following polymers in increasing order of their intermolecular forces: Nylon-6,6, Buna-S, Bakelite 1

4. Write the IUPAC name of $[Fe(en)_2Cl_2]Cl$ 1

OR

What are ambidentate ligands?

5. What do you understand by the term peptization? 1

OR

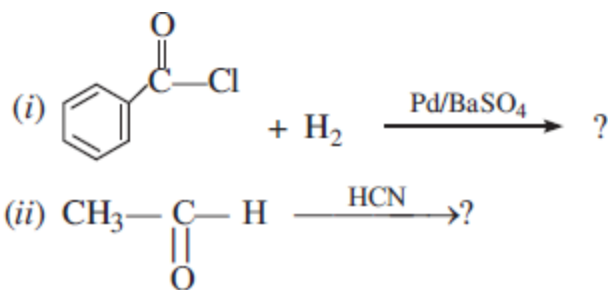
Why is adsorption exothermic in nature?

SECTION B

6. Name the reagent(s) used in the following conversions 2

- a) Phenol to 2,4,6-trinitrophenol
- b) Anisole to 4-Methoxytoluene

7. Write the structure of major product of the following reactions: 2



8. Write the structures of the monomers of the following polymers: (a) Neoprene (b) Bakelite 2
9. a) Define molal elevation constant (K_b) 2
 b) Why are the molecular masses of polymers determined by osmotic pressure method?
10. Draw the structures of following: XeO₃, H₂S₂O₈ 2
11. Complete the following equations 2
 a) $\text{Fe}^{2+} + \text{Cr}_2\text{O}_7^{2-} + \text{H}^+ \rightarrow$
 b) $\text{MnO}_4^- + \text{S}_2\text{O}_3^{2-} + \text{H}_2\text{O} \rightarrow$

OR

- Explain the preparation of potassium permanganate from pyrolusite ore.
12. Show that the half-life of a first order reaction is independent of the initial concentration of the reactants. 2

SECTION C

13. An element crystallizes in fcc with edge length 200 pm. Calculate its density if 200 grams of this element contains 24×10^{23} atoms. [$N_A = 6.023 \times 10^{23}$] 3
14. a) Which of the following is more stable complex and why? 3
 $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{Co}(\text{en})_3]^{3+}$
 b) Why is $[\text{NiCl}_4]^{2-}$ paramagnetic but $[\text{Ni}(\text{CO})_4]$ is diamagnetic?
 c) On the basis of crystal field theory, write the electronic configuration of d^4 ion, in an octahedral field when $\Delta_o > P$.
15. Write chemical equations when 3
 a) Ethyl chloride is heated with silver fluoride
 b) Chlorobenzene is treated with CH_3COCl in the presence of anhydrous AlCl_3
 c) Benzyl alcohol is treated with thionyl chloride

OR

Account for the following

- i) Ethyl iodide undergoes faster $\text{S}_\text{N}2$ than ethyl bromide
 ii) p-dichlorobenzene has higher melting point than those of ortho or meta isomers
 iii) Haloarenes are less reactive to nucleophiles
16. 2g of benzoic acid dissolved in 25g of benzene shows a depression in freezing point equal to 1.62K. What is the percentage association of acid if it forms dimer in solution? [Given K_f for benzene 4.9K kg/mol, molar mass of benzoic acid = 122g/mol, molar mass of benzene = 78g/mol] 3

17. Explain what is observed when 3
- An electric current is passed through a sol
 - A beam of light is passed through a sol
 - An electrolyte is added to ferric hydroxide sol

OR

Write one difference between

- Lyophobic and lyophilic colloids
 - Heterogenous and homogenous catalysis
 - Macromolecular and associated colloids
18. 3
- Why is the reduction of a metal oxide easier if the metal formed is in the liquid state at the temperature of reduction?
 - Describe with equations, the principle of vapour phase refining of zirconium.
19. What happens when D-glucose is treated with 3
- HI
 - NH₂OH
 - Br₂ water

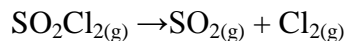
OR

What are fibrous and globular proteins? Give an example each.

20. Mention the action of the following on the human body in bringing relief from a disease 3
- Cimetidine
 - Chloramphenicol
 - Aspirin
21. Give reason for the following 3
- Of the d⁴ species, Cr²⁺ is strongly reducing whereas Mn³⁺ is strongly oxidizing
 - Cu⁺ ion is not stable in aqueous solutions
 - Transition metals generally form colored compounds.
22. A first order reaction takes 20 minutes for 25% decomposition. Calculate the time when 75% of the reaction will be completed. [Given: log 2=0.3010, log 3=0.4771, log 4=0.6021] 3

OR

The following data were obtained during the first order thermal decomposition of SO₂Cl₂ at a constant volume



Experiment	Time/s ⁻¹	Total pressure/atm
1	0	0.4
2	100	0.7

Calculate the rate constant. [given log 4=0.6021, log 2=0.3010]

23. Write the mechanism of dehydration of ethanol at 443K. 3
24. 3
- How will you distinguish between benzoic acid and phenol?
 - Illustrate the following with chemical equations
 - Clemmensen's reduction
 - Gattermann-Koch reaction

SECTION D

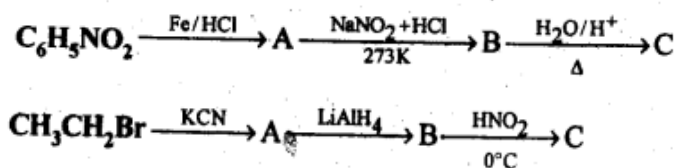
25. a) Complete the following 5
- i) $\text{XeF}_4 + \text{O}_2\text{F}_2 \rightarrow$
 - ii) $\text{NaOH}(\text{hot conc.}) + \text{Cl}_2 \rightarrow$
- b) Account for the following
- i) H_3PO_2 is a stronger reducing agent than H_3PO_3
 - ii) Noble gases have low boiling points
- c) Arrange oxoacids of chlorine in increasing order of oxidizing power.

OR

- i) Explain Haber's process
 - ii) Why is ICl more reactive than Cl_2 ?
 - iii) Name the allotrope of
 - a) sulphur that is stable at room temperature
 - b) phosphorus that is more reactive.
 - iv) What happens when sulphur dioxide gas is passed through an aqueous solution of Fe(III)salt ?
26. A colorless substance $\text{A}[\text{C}_6\text{H}_7\text{N}]$ is sparingly soluble in water and gives water soluble compound 5
on treating with mineral acid. On reacting with chloroform and alcoholic potash A forms obnoxious smell due to the formation of compound B. Reaction of A with sodium nitrite and hydrochloric acid at low temperature gives a compound C, which on reacting with phenol in alkaline medium gives an orange dye D. Identify the structures of A, B, C and D. Also write the equation of conversion of C to D.

OR

- a) Illustrate Hoffmann bromamide degradation reaction.
- b) Convert aniline to benzene nitrile.
- c) Copy and complete the following



27. a) Write the name of the cell generally used in hearing aids. Write the reactions taking place 5
at the anode and the cathode of the cell.
- b) Calculate the mass of silver deposited at the cathode when a current of 2 amperes was passed through a solution of silver nitrate for 10 minutes. [atomic mass of silver = 108g/mol, $1\text{F} = 96500\text{C}$]
- c) Calculate the emf of the following cell at 298 K
 $\text{Mg(s)}/\text{Mg}^{2+}(0.1\text{M})//\text{Cu}^{2+}(0.001\text{M})/\text{Cu(s)}$
 Given: $E^\circ_{\text{cell}} = +2.71\text{V}$, $1\text{F} = 96500\text{C/mol}$

OR

- i) State Kohlrausch's law of independent migration of ions. Give two applications of this law.
- ii) In a copper-silver cell, the concentration of copper ions is 0.10M and the concentration of silver ions is not known. The cell potential when measured was 0.422V. Determine the concentration of silver ions in the cell. [Given $E^\circ_{\text{Ag}^+/\text{Ag}} = +0.80\text{V}$, $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$]

End of the Question Paper

