



**INDIAN SCHOOL SOHAR**  
**SECOND TERM EXAM - 2014**  
**CHEMISTRY**

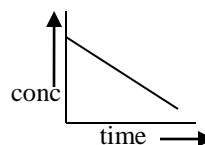
STD: XII  
Date: 25-11-14

Marks: 70  
Time: 3Hrs

**Instructions:**

1. All questions are compulsory.
  2. Question nos. 1-5 are very short answer questions and carry one mark each.
  3. Question nos. 6-10 are short answer questions and carry two marks each.
  4. Question nos. 11-22 are also short answer questions and carry three marks each.
  5. Question no. 23 is value based question and carry four marks.
  6. Question nos. 24-26 are long answer questions and carry five marks each.
  7. Use log tables if necessary. Calculators are not allowed.
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1. What is coupling reaction?
2. What are F-centres?
3. State one disadvantage of using molarity to represent the concentration of a solution.
4. Why does the conductivity of a solution increase with dilution?
5. Following graph is a plot of concentration of the reactant vs time. What is the order of the reaction?



6. Explain Freundlich adsorption isotherm?

OR

State Hardy schulze rule.

7. Illustrate the following with an example:

a) Decarboxylation      b) Crossed Aldol condensation

8. Write the structure of the major organic product in each of the following reactions:



9. Complete the following chemical equations:



10. The reaction of methyl ethyl ether with HI follows  $\text{S}_\text{N}^2$  mechanism but the reaction of methyl-tert- butyl ether with HI follows  $\text{S}_\text{N}^1$  mechanism. Explain.
11. a) Differentiate between Schottky defect and Frenkel defect.  
b) Copper crystallizes in fcc unit cell with cell edge length of  $3.6 \times 10^{-8}$  cm. Calculate the density of copper. ( Atomic mass of Cu =  $63.5 \text{ gmol}^{-1}$ ,  $N_0 = 6.02 \times 10^{23}$  )
12. Explain the following methods for the purification of metals giving suitable examples.  
a) Zone refining      b) Van Arkel method      c) Mond's process
13. a) Show that for a 1<sup>st</sup> order reaction the time required for 99.9% completion of the reaction is thrice the time required for 90% completion.  
b) Define molecularity of a reaction.

14. Write equations of the following reactions:
- Friedel-Crafts alkylation of anisole
  - tert-butyl alcohol with 20%  $\text{H}_3\text{PO}_4$  at 358K
  - Phenol with bromine in the presence of  $\text{CS}_2$  at 273K.

15. What are nucleic acids? Mention its functions.

OR

Define the terms : a) glycosidic linkage b) invert sugar c) denaturation of protein

16. How are the following conversions done?

- 4-nitrotoluene to 2-bromobenzoic acid
- benzamide to toluene
- ethanoic acid to methanamine

17. Explain why?

- dipole moment of chlorobenzene is lower than cyclohexyl chloride
- alkyl halides are immiscible in water
- Grignard reagent should be prepared under anhydrous conditions

18.a) Account for the following?

- $[\text{Cr}(\text{NH}_3)_6]^{3+}$  is paramagnetic while  $[\text{Ni}(\text{CN})_4]^{2-}$  is diamagnetic.
  - $[\text{Co}(\text{NH}_3)_6]^{3+}$  is an inner orbital complex whereas  $[\text{Ni}(\text{NH}_3)_6]^{2+}$  is an outer orbital complex. (Atomic no. Cr=24, Co = 27, Ni = 28)
- b) Out of the following two coordination entities, which is chiral and why?
- cis- $[\text{CrCl}_2(\text{ox})_2]^{3-}$
  - trans- $[\text{CrCl}_2(\text{ox})_2]^{3-}$

19.a) What is the basicity of  $\text{H}_3\text{PO}_4$ ?

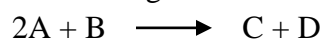
- Mention the conditions required to maximize the yield of ammonia by Haber's process.
- How is the presence of  $\text{SO}_2$  detected?

20. Explain what happens when

- light is passed through a colloid
- electric current is passed through a colloid
- electrolyte is added to a colloid?

21. Describe the preparation of potassium dichromate from chromite ore giving reactions.

22. The following results have been obtained during the kinetics studies of the reaction:



Experiment	[A] $\text{Mol l}^{-1}$	[B] $\text{Mol l}^{-1}$	Initial rate of formation of D $\text{Mol l}^{-1}\text{min}^{-1}$
I	0.1	0.1	$6.0 \times 10^{-3}$
II	0.3	0.2	$7.2 \times 10^{-2}$
III	0.3	0.4	$2.88 \times 10^{-1}$
IV	0.4	0.1	$2.40 \times 10^{-2}$

Determine the order and rate constant for the reaction.

23. Students of Indian school sohar decided to create awareness among the people about the harmful effects of plastic bags. They urged shopkeepers to use bags which are biodegradable. The students made paper bags and distributed to vegetable vendors and departmental stores. All students pledged not to use plastic bags in future.

- What values are shown by the students ?
- Why should we ban polythene? Is polythene a homopolymer or copolymer?
- Give an example of a biodegradable polymer. Write the reaction for its preparation.

24. a) Arrange the following in the increasing order of their property mentioned:  
 i) Acetaldehyde, acetone, methyl-tert-butyl ketone ( reactivity towards HCN)  
 ii) Benzoic acid, 4-nitrobenzoic acid, 4-methoxybenzoic acid ( acid strength)
- b) Explain, giving reaction, what happens when  
 i) Toluene is oxidized with chromic oxide in acetic anhydride  
 ii) Formaldehyde reacts with conc. NaOH  
 iii) Benzoic acid reacts with  $\text{NH}_3$  followed by heating at high temperature

OR

- a) Write the products formed when ethanal reacts with the following reagents:  
 i)  $\text{CH}_3\text{MgBr}$  and then  $\text{H}_3\text{O}^+$   
 ii)  $\text{Zn-Hg}$  / conc.HCl  
 iii)  $\text{C}_6\text{H}_5\text{CHO}$  in the presence of dil.NaOH
- b) Give simple chemical tests to distinguish between the following pairs of compounds:  
 i) Benzoic acid and ethyl benzoate      ii) propanal and butan-2-one

25. a) Account for the following:

- i) Aluminium containers can be used for storing conc. $\text{HNO}_3$ .  
 ii) Ozone is more reactive than oxygen.  
 iii) Ionisation enthalpy of nitrogen is more than oxygen.  
 iv) HF is a liquid but other hydrogen halides are gases at room temperature.  
 v) ICl is more reactive than  $\text{I}_2$  or  $\text{Cl}_2$ .

OR

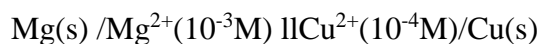
- a) Arrange the following in the increasing order of their acidic nature:  
 $\text{HOF}$ ,  $\text{HOCl}$ ,  $\text{HOBr}$ ,  $\text{HOI}$ . justify your answer
- b) Draw the structure for the following compounds.  
 i)  $\text{H}_2\text{S}_2\text{O}_3$       ii)  $\text{H}_4\text{P}_2\text{O}_7$       iii)  $\text{XeOF}_4$

- 26.a) Account for the following:

- i) Molar conductivity of weak electrolyte rises steeply at infinite dilution  
 ii) The cell potential of mercury cell remains constant during its life.
- b) A conductivity cell whose cell constant is  $3\text{cm}^{-1}$  is filled with  $0.1\text{M}$   $\text{CH}_3\text{COOH}$  solution. Its resistance is  $4000\Omega$ . Find a) molar conductance b) degree of dissociation of acetic acid given limiting molar conductivity of  $\text{CH}_3\text{COOH}$  is  $400\text{Scm}^2\text{mol}^{-1}$ .

OR

- a) Calculate emf and  $\Delta G^\circ$  for the following cell at  $298\text{K}$  :



given  $E^\circ_{\text{Mg}^{2+}/\text{Mg}} = -2.36\text{V}$  ;  $E^\circ_{\text{Cu}^{2+}/\text{Cu}} = +0.34\text{V}$  ;  $1\text{F} = 96500\text{coul mol}^{-1}$ .

- b) What type of battery is lead storage battery? Write the anode and cathode reactions and the overall reaction occurring in a lead storage battery sending out an electric current.

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