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**INDIAN SCHOOL SOHAR**  
**PRE BOARD EXAM 2017-2018**  
**CHEMISTRY**

**Class : XII**  
**Date : 14.01.2018**

**Time : 3.00 Hrs.**  
**Max. Marks : 70**

**General Instructions:**

- (i) All questions are compulsory.
- (ii) Question numbers 1 and 5 are very short answer questions carrying 1 mark each.
- (iii) Question numbers 5 to 10 are short answer questions carrying 2 marks each.
- (iv) Question numbers 11 to 22 are also short answer questions carrying 3 marks each.
- (v) Question numbers 23 is a value based question carrying 4 marks.
- (vi) Question numbers 24 and 26 are long answer questions carrying 5 marks each.
- (vii) Use log tables, if necessary. Use of calculator is not allowed.

**Constants :**  $R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$ ;  $1 \text{ F} = 96500\text{C}$ ;  $N_A = 6.02 \times 10^{23}$

1. Write IUPAC name of  $\text{CH}_3\text{CH}(\text{CHO})\text{CH}_2\text{CH}=\text{CH}_2$ .
2. Arrange the following according to increasing boiling point: 2-Bromobutane, 2-Bromo-2-methylpropane, 1-Bromopropane and 1-Bromobutane.
3. Draw the structure of 4-methoxy-N,N-dimethyl aniline.
4. Write the structure and reaction for preparation of semicarbazone of cyclobutanone.
5. Gelatin is generally added to ice cream. Give reason.
6. Explain the following terms:
  - (i) Electrophoresis
  - (ii) Dialysis
7. Draw the structure of the following molecules: (i)  $\text{IF}_4^-$  (ii)  $\text{XeF}_6$ 

OR

  - (a) Draw the structure of  $\text{BrF}_4^-$ .
  - (b) Arrange according to increasing boiling point HF, HCl, HI, HBr.
8. Calculate mass of glucose (molar mass 180g/mol) to be diluted in 60g of  $\text{H}_2\text{O}$  to lower the freezing point of its solution by 0.93 K ( $K_f$  for  $\text{H}_2\text{O}$  is  $1.86 \text{ Kkgmol}^{-1}$ )
9. An element with density  $5.6\text{gcm}^{-3}$  exists in bcc lattice with edge length 400 pm. Calculate atomic mass of this element. ( $N_A = 6.02 \times 10^{23}$ )
10. Calculate  $\Delta G^0$  for the following cell at 298K.  
 $\text{Mg}_{(s)}|\text{Mg}^{2+}||\text{Cu}^{2+}|\text{Cu}_{(s)}$ ;  $E^0_{(\text{Mg}^{2+}/\text{Mg})} = -2.37 \text{ V}$  and  $E^0_{(\text{Cu}^{2+}/\text{Cu})} = +0.34\text{V}$
11. Three electrolytic cells A,B and C containing molten  $\text{NaNO}_3$ ,  $\text{ZnSO}_4$  and  $\text{AlF}_3$  respectively are connected in series. A steady current of 5 ampere flows through cells until 1.15g of sodium is deposited at the cathode of the cell 'A'. How long did the current flow? What mass of Zn and Al were deposited in the respective cells?
12. Calcium crystallises in Face Centred Cubic structure. Radius of the atom in the metal is 141.4 pm.
  - (i) What is the length of the side of the unit cell?
  - (ii) How many atoms of Calcium are there in its  $5 \text{ cm}^3$ ?
13. (a) What is the significance of leaching in the extraction of Al?  
(b) Describe a method for refining of nickel.

- (c) Which possesses more carbon-pig iron or cast iron?
14. Among the isomeric alkanes of molecular formula  $C_5H_{12}$ . Identify the one that on photochemical chlorination yields:
- A single monochloride which does not gives elimination reaction.
  - Three isomeric monochloride
  - Four isomeric monochloride
15. Carry out the following conversions in not more than 2 steps:
- Ethanol to 3-Hydroxybutanal
  - Benzaldehyde to benzophenone
  - Benzaldehyde to 3-phenylpropan-1-ol
16. Give the structures of A,B and C in the following reactions:
- $CH_3CH_2Br \xrightarrow{KCN} A \xrightarrow{LiAlH_4} B \xrightarrow{HNO_2/H_2O} C$
  - $CH_3COOH \xrightarrow{NH_3/Heat} A \xrightarrow{NaOBr} B \xrightarrow{NaNO_2+HCl} C$
17. Calculate (a) molality, (b) molarity and (c) mole fraction of KI if the density of 20% by mass aqueous KI solution is 1.2g/mL.
18. Give reason for the following:
- Most of the known noble gas compounds are those of Xe.
  - Write formula of any oxoacid of sulphur.
  - Sulphur has higher tendency for catenation than O or Se.

OR

Account for the following:

- $BiH_3$  is the strongest reducing agent amongst all the trihydrides of 15<sup>th</sup> group elements.
  - $H_2S$  is less acidic than  $H_2Te$ .
  - When HCl reacts with powdered iron, it forms ferrous chloride and not ferric chloride.
19. (a) Draw optical isomer of  $[Cr(NH_3)_2Cl_2(en)]^+$ .
- (b)  $[Cr(NH_3)_6]^{3+}$  is paramagnetic while  $[Co(CN)_6]^{3-}$  is diamagnetic. Give reason.
20. (a) Write the names and structures of the monomers of the following polymers:
- Neoprene
  - Novolac
- (b) Define Copolymerisation.
21. Complete the following chemical equations:
- $XeF_2 + H_2O \rightarrow$
  - $H_2O + F_2 \rightarrow$
  - $Zn + HNO_3(dil.) \rightarrow$
22. (a) Name the water soluble component of starch.
- (b) Define peptide linkage
- (c) Name an amine hormone
23. In a holiday, Neelam wanted to prepare some halwa for her husband who is diabetic. She does not want to add sugar to halwa, so she wants to use aspartame as artificial sweetener. Her daughter Tanya, a student of class XII chemistry suggested not to use aspartame.
- Why do Tanya suggested her not to use aspartame?
  - Suggest a suitable artificial sweetener for making halwa.
  - In which type of food aspartame can be used.
  - Mention the values associated with the suggestion of Tanya.
24. (a) 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 its  $1/16^{th}$  value?

(b) Differentiate between order and molecularity of reaction.

(c) Write unit of rate constant (k) for

- (i) First order reaction            (ii) second order reaction

OR

(a) The rate of a reaction quadruples when the temperature changes from 290 K to 310 K, Calculate the activation energy for this reaction.

(b) A reaction is first order with respect to P and second order with respect to Q, Write the differential rate equation for it.

(c) Write factors (any two) that affects the rate of a chemical reaction.

(d) Define specific rate constant.

25. (a) Arrange the following sets of compounds in increasing order according to the given instruction.

(i) Phenol, 2-nitrophenol, cyclohexanol (Acidic character)

(ii) Pentan-1-ol, n-butane, pentanal, ethoxyethane (boiling points)

(b) Describe the mechanism of hydration of ethene to yield ethanol.

(c) Write Kolbe's reaction with an example.

OR

(a) Explain the following name reactions with a suitable example:

(i) Reimer-Tiemann reaction

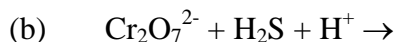
(ii) Williamson's synthesis

(b) Haloalkanes are more soluble in organic solvent as compared to water, why?

(c) Grignard's reagent is prepared under anhydrous conditions, why?

(d) Phenol is more acidic than ethanol, why?

26. (i) Complete the following chemical reactions:



(ii) Describe the preparation of potassium dichromate from chromate ore with chemical equations involved. What is the effect of increasing  $\text{p}^{\text{H}}$  on a solution of potassium dichromate?

OR

Explain the following:

(i) Copper(I) ion is not stable in an aqueous solution.

(ii) Transition metal in general acts as good catalysts.

(iii) Lanthanoid contraction is less than actinoid contraction.

(iv) Melting point of Fe is more than Mn.

(v) Name the lanthanoid having +4 oxidation state and which acts as oxidising agent.