Pre Board Examination 2015
Std. 12
19-01-2015

Set 1

Chemistry

Max. Marks : 70
Time : 3 hrs.

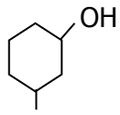
General instructions : -

i) All questions are compulsory.
ii) Question number 1 to 5 carry 1 mark each.
iii) Question number 6 to 10 carry 2 marks each.
iv) Question number 11 to 22 carry 3 marks each.
v) Question number 23 is a value based question, it carries 4 marks.
vi) Question number 24 to 26 carry 5 marks each.
vii) Use of calculator is not allowed, log books would be provided if required.

1. What type of solids are electrical conductors, malleable and ductile?

2. What is the effect of pressure on sodium chloride type of crystals?

3. Assign name to the following organic compounds as per IUPAC nomenclature :-

a) $CH_3\ CH(CH_3)\ CH(OH)\ C(CH_3)_3$ b) 

4. Write the structural formula of the following organic compounds :-

a) 4 methyl pent 3 ene 2 one. b) N methyl butanamide.

5. Arrange the following compounds in an increasing order of their basic character : -

CH_3NH_2, $(CH_3)_2NH$, $(CH_3)_3N$, NH_3

6. Write the cell reactions which occur in a lead storage battery

a) when the battery is in use.
b) when the battery is on recharging.

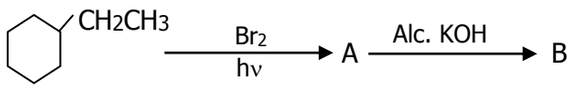
7. a) A reaction is second order with respect to a reactant .How is the rate affected if the concentration of this reactant is doubled?
b) Show that the half life period for a first order reaction is independent of initial concentration of the reactant.

8. Give reason for the following:-

a) Transition metals and many of its compounds show paramagnetic behaviour.
b) Transition metals act as good catalysts.

9. Complete the following reactions and identify products A and B.

a) $CH_3\ CH_2\ Br \xrightarrow{KCN} A \xrightarrow{Hydrolysis} B$

b) 

10. a) Out of ethyl bromide and ethyl chloride which one has a higher boiling point and why?
b) What is an absolute alcohol?

(OR)

Give equation for the following reactions : -

a) Treating methoxy benzene with hydrogen iodide.
b) Oxidation of propan1ol with alkaline $KMnO_4$ solution.

11. a) What is meant by the term broad band spectrum antibiotics?
b) Name the type of drugs prescribed to the patients suffering from anxiety and tension.
c) What are antacids?
d) Chemically what are soaps?
e) Why do we require artificial sweetening agents?
f) What are cationic detergents?

12. a) Name the process used for concentration of an ore which when roasted produces sulphur dioxide.
b) Explain the process used to purify Zirconium.
c) What is the roll of (i) graphite rod and (ii) cryolite in the extraction of aluminium by Hall's process?

13. a) Why is white phosphorous more reactive than red phosphorous?
    b) Complete the following reaction and balance: -
    (i) $XeF_6 + H_2O \rightarrow$
    (ii) $MnO_2 + HCl \rightarrow$

14. a) Write the mathematical relationship between rate constant, temperature and activation energy.
    b) Sucrose decomposes in acid solution into glucose and fructose according to the first order rate law with half life of 3 hrs. What fraction of the sample of sucrose remains after 8 hrs.?

15. a) In an oxide of a metal M the oxide ions are arranged in fcc structure and the metal ions occupy two third of octahedral voids .What is the chemical formula of the oxide?
    b) Define coordination number of the central metal in a coordination complex.
    c) Differentiate between Schottky and Frenkel defect. (Two points)

16. From the data given below:
    $Cu^{2+} + 2e \rightarrow Cu \qquad E^{\mathbf{0}} = 0.34$ V
    $Ag^{+} + e \rightarrow Ag \qquad E^{\mathbf{0}} = 0.80$ V
    a) Calculate standard cell potential of the cell.
    b) Calculate equilibrium constant for the reaction. (Given that F = 96500 C, R = 8.314 J K^{-1} mol^{-1}) (solve upto log k_c value)

17. Explain the following terms:-
    a) Tyndal effect b) Shape selective catalyst c) Sorption.

18. a) Write the IUPAC name of the **linkage isomer** of the coordination complex $[Cu(NH_3)_5NO_2]^{2+}$.
    b) Differentiate between primary and secondary valency. (two points only)
    c) Select a complex formation reaction and write an expression for the stability constant of the complex species. How is the magnitude of stability constant related to stability of the complex?

    (OR)

    Explain the formation of the following coordination complex with the help of valence bond theory, name the hybridisation, predict the shape of the complex and its magnetic character.
    $[Co(NH_3)_6]^{3+}$ (At. no. of Co = 27)

19. a) Write the mechanism of hydration of an alkene to an alcohol.
    b) How is t – butyl alcohol obtained from acetone?
    c) Explain how OH^- group attached to a carbon atom in benzene ring activates it towards electrophillic attack.

20. Describe the preparation of potassium dichromate from iron chromite ore with the help of balanced chemical reactions. What is the effect of increasing pH on a solution of potassium dichromate and give reason for it.

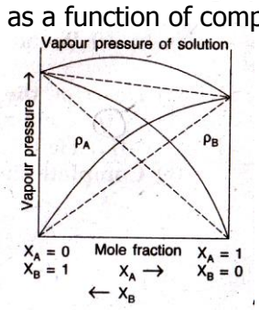
21. Account for the following :-
    a) To convert aniline to mono bromo aniline , aniline is acetylated first and then brominated.
    b) Solubility of alcohols decreases down the homologous series of alcohols.
    c) Boiling point of para dichloro benzene is much higher than ortho or the meta dichloro benzene.

22. a) Give an example of a polymer which is a polyamide.
    b) Name the steps involved in the free radical polymerisation of an alkene.
    c) What are biodegradable polymers?
    d) What is vulcanised rubber?
    e) Write one difference between thermosetting and thermoplastic polymers.
    f) Name a synthetic rubber.

23. Two 9th standard students Sunil and Sanjay went to a restaurant. Sanjay ordered an orange juice and Sunil ordered alcohol. After consuming alcohol Sunil complained about visibility loss and started vomiting.
    a) What could be the reason for Sunil to be suffering?
    b) What values have been ignored in the above case by Sunil?
    c) Which vitamin should be used by Sunil for his vision?
    d) What are the legal rules disobeyed in this incident?

24. a) What is observed when dry resins are placed in water and why?

b) Given below is a graphical representation of vapour pressure of two compound system as a function of composition. Answer the following questions :-



i) What will be ΔH mix for this system?
ii) What will be ΔV mix for this system?
iii) New A-B interactions are stronger; weaker or of the same magnitude as A-A and B-B interactions in this system.
iv) What are Azeotropes?

c) Calculate the mass of ascorbic acid ($C_6H_8O_6$) to be dissolved in 75 g of acetic acid to lower its melting point by 1.5^0C. (K_f = 3.9 K kg mol^{-1}) (At. mass of C = 12, H = 1, O = 16).

(OR)

a) Define mole fraction of a component in a binary solution.

b) What would be the value of Van't Hoff factor for a dilute solution of K_2MnO_4?

c) Calculate the molarity of a solution of 30 g of a solute (mol.mass = 290.9 g) in 4.3 litre solution.

d) Vapour pressure of pure water at 298 K is 23.8 mm of Hg. 50 g of urea (mol. mass = 60) is dissolved in 850g of water. Calculate the vapour pressure of the solution.

25. Explain the following :-

a) Phophorous shows greater tendency for catenation than nitrogen.

b) SF_6 is inert towards hydrolysis.

c) As we move down the group stability of higher oxidation state decreases.

d) Inter halogens are more reactive than halogens.

e) Group 18 elements gases are mostly inert.

(OR)

a) Give reason for the following :-

i) H_3PO_2 behaves like a monoprotic acid.

ii) Among the noble gases only Xenon is known to form compounds with fluorine.

b) i) Draw the structure of $XeOF_4$ and BrF_3.

ii) Name the process for the manufacture of sulphuric acid. Write the reactions involved in the process.

26. a) Only name the chemicals required to distinguish between the following pairs of organic compounds :-

i) Phenol and propanoic acid.

ii) Primary and Secondary alcohols.

b) Write chemical reactions to bring about the following conversions :-

i) Propanone to iodoform.

ii) Ethanol to ethoxy ethane.

c) Describe the following reactions with the help of suitable reactions :-

i) Clemmenson's reduction reaction.

ii) Gattermann's reaction.

(OR)

a) Name the chemicals required to distinguish between the following pairs of organic compounds:-

i) Chloro benzene and Benzyl Chloride.

ii) Propanal and Propanone.

b) An organic compound A has molecular formula C_2H_3N. It undergoes reduction to produce compound B which when warmed with chloroform and alcoholic potassium hydroxide produces a foul smell. To compound B nitrous acid is added it gets converted to another organic compound C which undergoes esterification with acetic acid forming an ester D. Identify compounds A, B, C and D.

c) Write suitable reactions to bring about the following conversions :-

i) Benzene to acetophenone.

ii) 2 Chloro butane to but 2 ene.

-x-x-x-x-x-x-