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

Set 2

Chemistry

Max. Marks : 70
Time : 3 hrs.

General instructions : -

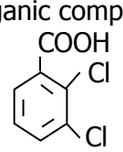
i) All questions are compulsory.
ii) Question number 1 to 5 carry 1 mark each.
iii) Question number 6 to 10 carry 2 marks each.
iv) Question number 11 to 22 carry 3 marks each.
v) Question number 23 is a value based question, it carries 4 marks.
vi) Question number 24 to 26 carry 5 marks each.
vii) Use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

1. What are n- type of semiconductors?

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

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

i) $CH_3\ CH_2\ CH_2\ CO\ NH$ with CH_3 on N

ii) 

4. Write the structural formula of the following organic compounds :-
   a) Hex 2 en 4 yn oic acid.
   b) 4 Chloro pentan 2 one.

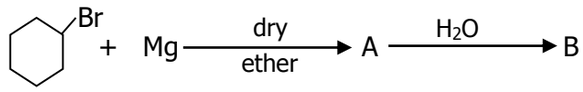
5. Which of the following compounds is more basic and why :-
   $(CH_3)_3N$ or $(CH_3)_2NH$

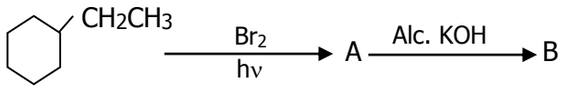
6. Write the cell reactions which occur in a lead storage battery
   a) when the battery is in use.
   b) when the battery is on recharging.

7. A first order decomposition reaction takes 40 minutes for 30 % decomposition. Calculate its rate constant and the half life period.

8. Give reason for the following :-
   a) Give any one use of coordination complexes in qualitative analysis.
   b) Cu^+ salts are colourless while Cu^{2+} salts are coloured. (At. no. of Cu = 29)

9. Complete the following sequence of reactions and identify compounds A and B:-

a) 

b) 

10. Write the chemical equation when: -
   a) Methoxy benzene reacts with hydrogen iodide.
   b) Propan 1 ol is oxidised by copper at 573 K.

(OR)

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

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) Explain disproportionate reaction with the help of a reaction.
    b) Complete and balance the following reactions :-
    i) $XeF_6 + H_2O \rightarrow$
    ii) $P_4O_6 + H_2O \rightarrow$

14. a) For the reaction at 500 K
    $NO_2(g) + CO(g) \rightarrow CO_2(g) + NO(g)$
    The proposed mechanism is as below : -
    $NO_2 + NO_2 \rightarrow NO + NO_3$ (slow)
    $NO_3 + CO \rightarrow CO_2 + NO_2$ (fast)
    What is the rate law for the reaction?

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. a) Define Kohlraush's law of independent migration.
    b) Conductivity of 0.00241 M acetic acid is 7.896×10^{-5} S cm^{-1}. Calculate its molar conductivity. If molar conductivity of acetic acid at infinite dilution is 390.5 S cm^2 mol^{-1}, what is its degree of dissociation?

17. a) What is the difference between multimolecular and macromolecular colloids?
    b) State Hardy 's rule.
    c) Explain the term electrophoresis.

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 $[NiCl_4]^{2-}$ with the help of valence bond approach. Write the name of the hybridisation, predict the shape of the complex and its magnetic behaviour. (At. no. of Ni =28)

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.

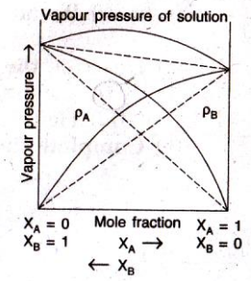
20. a) What is lanthanoid contraction? Mention any one consequence of it.
    b) Of the d^4 species, Cr^{2+} (at. no.=24) is strongly reducing while Mn^{3+} (at. no. = 25) is strongly oxidising. Explain.
    c) With the help of a chemical reaction show that acidified potassium permanganate acts as an oxidising agent.

21. Account for the following :-
    a) Boiling point of ethanol is higher than that of methoxy methane.
    b) Nitro phenol is more acidic than phenol.
    c) Boiling point of para dichloro benzene is much higher than ortho and 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. A person consumed only milk for six months. His gums started to bleed after some days.
    a) Name the vitamin whose deficiency caused the gum problem.
    b) What lesson others should learn from the eating habits of this man?
    c) Name the main nutrients which should be present in a balanced diet.

24. a) 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?

b) 45 g of Ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate
i) Depression in freezing point.
ii) Freezing point of the solution.
(molecular mass of ethylene glycol = 62 g/mol; K_f = 1.2 kg/K/mol)

(OR)

a) State Henry's law about the solubility of a gas in a liquid.
b) A solution is made by dissolving 30 g of a non volatile solute X (mol. mass =23 g/mol) in 90g of water (mol mass 18 g/mol). Calculate the mole fraction of solute in the solution.
c) An aqueous solution of potassium chloride freezes at 272.4 K, while pure water freezes at 273 K. Determine the molality of the solution. (K_f = 1.86 kg K mol^{-1})

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-