PRE-BOARD EXAMINATION, JANUARY/FEBRUARY-2018

Time:3 hours.   CHEMISTRY   Max. Mark: 70
Date: SET- B   Class: XII

All questions are compulsory
Question number **1 to 5** are very short answer questions and carry **one mark** each
Question number **6 to 10** are short answer questions and carry **two marks** each
Question number **11 to 22** are also short answer questions and carry **three marks** each
Question number **23** is a value based questions and carry **four mark**
Question number **24 to 26** are long answer questions and carry **five marks** each
Use log table if necessary. Use of calculator is not allowed

$$CH_3-\underset{\underset{O}{\|}}{C}-CH=\underset{\underset{CH_3}{|}}{C}-CH_3$$
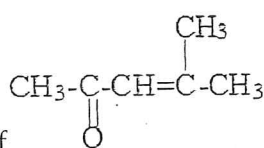
1. Write the IUPAC name of
2. What is rate constant? Give its unit for n^{th} order reaction
3. Define peptization. What do you mean by peptising agent?
4. Differentiate between weak field ligands and strong field ligands?
5. Give the structure and name of product formed when phenol reacts with a mixture of $Na_2Cr_2O_7$ and H_2SO_4
6. Which of the following solution has higher freezing point 0.1 M $Al_2(SO_4)_3$ or 0.1 M $K_3[Fe(CN)_6]$? Justify
7. Calculate the emf of the following cell at 298K.

$$Cr_{(s)} | Cr^{3+}{}_{(0.1M)} \| Fe^{2+}{}_{(0.01M)} | Fe_{(s)} \quad [Given\ E^0{}_{cell} = +0.30V]$$
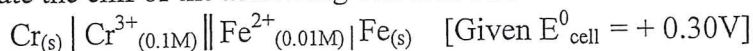
OR

The conductivity of 10^{-3} mol/L acetic acid at 25^0C is 4.1×10^{-5}. Calculate its degree of dissociation, if $\wedge^0{}_m$ for acetic acid at 25^0C is 390.5 S cm^2 mol^{-1}

8. What happens when
   (i) Cl_2 gas is passed through a hot concentrated solution of NaOH
   (ii) SO_2 gas is passed through an aqueous solution of Fe(III) salt
9. Assign reasons for each of the following:
   (i) transition metals generally form coloured compounds
   (ii) Manganese exhibit the highest oxidation state of +7 among the 3d series.
10. Which one in the following pairs undergoes SN^2 reaction faster and why?

(i)   (ii)   or
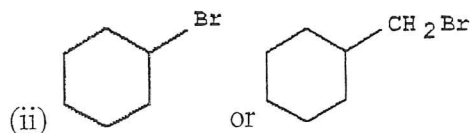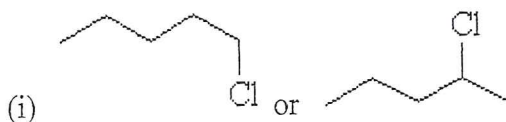
11. Determine the osmotic pressure of a solution prepared by dissolving 2.5×10^{-2} g of K_2SO_4 in 2L of water at 25^0 C, assuming that it is completely dissociated. (R= 0.0821 L atm K^{-1} mol^{-1}, molar mass of K_2SO_4= 174 g/mol)

12. (a) write the cathode, anode and overall reactions takesplace when lead storage battery is in use

    (b) why does the voltage of mercury cell remain constant during its operation?

13. The following data were obtained on performing the experiments:

$$2NO(g) + Cl_2(g) \rightarrow 2NOCl(g)$$
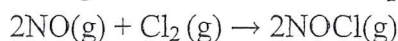
Expt.	[Cl2] in mol/L	[NO] in mol/ L	Initial rate in mol L^{-1} s^{-1}
1.	0.02	0.01	2.40×10^{-4}
2.	0.02	0.03	2.16×10^{-3}
3.	0.04	0.03	4.32×10^{-3}

Determine (i) the rate law of reaction

(ii) order of the reaction with respect to Cl_2 and NO

(iii) rate constant of the reaction

14. Explain what is observed when

    (i) an electrolyte, NaCl is added to hydrated ferric oxide sol

    (ii) Electric current is passed through a colloidal solution

    (iii) when a beam light is passed through a colloidal solution

15. Explain the role of

    (i) Cryolite in the electrolytic reduction of alumina.

    (ii) Lime stone in the extraction of iron using blast furnace

    (iii) NaCN in the froth floatation process

16. Account the following:

    (i) The lowest oxides of transition metal is basic, the highest is acidic or amphoteric

    (ii) A transition metal exhibits higher oxidation states in oxides and fluorides.

    (iii) With same d-orbital configuration, Cr^{2+} ion is reducing agent while Mn^{3+} ion is oxidising agent.

17. A metal ion M^{n+} having d^4 valance shell electronic configuration combines with three bidentate ligands to form a complex compound. Assuming $\Delta_0 > P$:

    (i) write the electronic configuration of d^4 ion

    (ii) what type of hybridisation will M^{n+} ion has?

    (iii) Name the types of isomerism exhibited by this complex
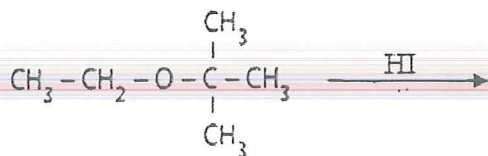
18. Explain the following:

    (i) alkyl halides though polar are immiscible in water?

    (ii) the dipole moment of chlorobenzene is lower than that of cyclohexyl chloride?

    (iii) p-dichlorobenzene has higher melting point than those of o- and m-isomers?

19. (a) Describe the mechanism of acid catalysed dehydration of ethanol to yield ethene (b) predict the product of given reaction

$$CH_3-CH_2-O-\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle CH_3}{|}}{C}}-CH_3 \xrightarrow{\quad HI \quad}$$

20. (a) Give possible explanation for the following:

   (i) the presence of a base is needed in the ammonolysis of alkyl halides

   (ii) Aromatic primary amines cannot be prepared by Gabriel phthalimide synthesis

   (b) Suggest a route by which the following conversion can be accomplished
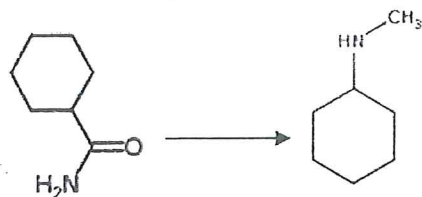
21. What happens when D-glucose is treated with following reagents? Write the chemical equation for each reactions

   (i) HI(excess)   (ii) Bromine water   (iii) HNO_3

22. Differentiate between the followings:

   (i) Buna-S and Buna-N

   (ii) thermoplastics and thermosetting plastics

   (iii) Nylon-6 and Nylon-6,6

23. Upasana's younger brother likes taking medicines. He sometimes drinks cough syrups even when he is not ill. One day, he drank cough syrup when he was healthy. After some time, he started feeling headache and his body started itching. Upasana's father did not take him to the doctor and want to give medication on his own. Upasana insists that her father should not give medicines to her brother on his own but should take him to a doctor.

   (i) Mention the values shown by Upasana

   (ii) why did his body started itching?

   (iii) why should not medicines be taken without consulting doctor?

24. (a) Account the following:

   (i) Fe_3O_4 is ferromagnetic at room temperature but becomes paramagnetic at 850K

   (ii) Zinc oxide on heating becomes yellow

   (b) Iron has body centred cubic unit cell with edge length of 286.65 pm. the density of iron is 7.874 g/cm^3. Calculate Avogadro's number (Atomic mass of iron is 56 g/mol)

                                   OR

   (a) Describe the two main types of semiconductors and contrast their conduction mechanism

   (b) An alloy of gold and cadmium crystallises with a cubic structure in which gold atoms occupy the corners and cadmium atoms fit in to the face centres. Assign formula of this alloys

25. (a) Complete the following chemical reactions:

   (i) $PH_3 + HgCl_2 \rightarrow$ (ii) $XeF_4 + O_2F_2 \rightarrow$

(b)Explain the following observations:

(i) Sulphur in vapour state exhibit paramagnetic behaviour

(ii) NH_3 is a stronger base than PH_3

(iii) XeF_2 has a linear shape and not bent shape

OR

(a) Draw the structure of following molecules

(i) $HClO_4$ (ii) $H_2S_2O_7$

(b) Give reason for the followings :

(i) NF_3 is an exothermic compound whereas NCl_3 is not

(ii) Noble gases form compounds with fluorine and oxygen only

(iii) Noble gases are mostly inert

26. (a) Bring about the following conversions:

(i) acetylene to acetaldehyde

(ii) acetic acid to methenamine

(b) Complete each synthesis by giving missing reagents or products in the following :

(i) $\xrightarrow[\text{Heat}]{\text{SOCl}_2}$

(ii) $C_6H_5CHO \xrightarrow{H_2NCONHNH_2}$

(iii)
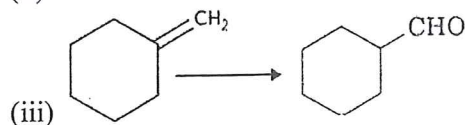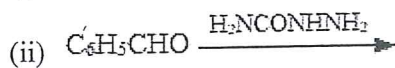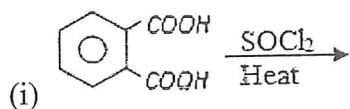
OR

(a)Write the chemical equation to illustrate the following name reactions

(i) Cannizzaro's reaction

(ii) Aldol condensation

(b) Give a chemical test to distinguish between

(i) pentan-2-one and pentan-3-one

(ii) benzaldehyde and acetophenone

(iii) Benzoic acid and ethyl benzoate