SECOND YEAR SAMPLE QUESTION PAPER 2023

CHEMISTRY

Time: 2 Hrs

Score: 60

Section A (Answer any four questions from 1 -5. Each carries 1mark.)

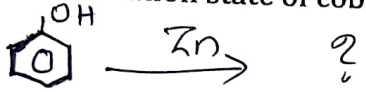
1.Which among the following is temperature dependent

(Normality, Molarity, Molality, Mole fraction)

2. The rate constant of a reaction k= 0.0304 min^{-1}.The order of the reaction is.....

3. Name a Transition element which does not exhibit variable Oxidation State

4. Indicate the oxidation state of cobalt in $[Co(en)_3]Cl_3$

5. 

(Chlorobenzene,Benzene, toluene, aniline)

Section B (Answer any eight questions from 6 to 15. Each question carries 2 mark)

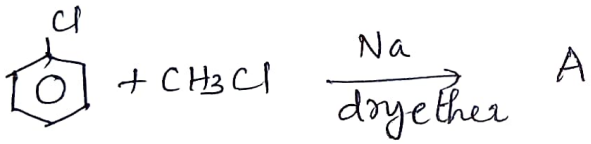
6.Differentiate between primary cells and secondary cells.

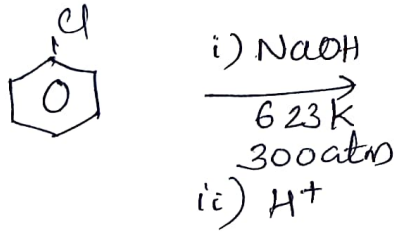
7.Explain pseudo first order reaction with an example.

8. Explain the preparation of potassium permanganate from pyrolusite ore

9.Draw the splitting of d- orbitals in an octahedral complex.

10. Differentiate between S_N1 and S_N2 reaction mechanisms.

11. a) 

b) 

Identify A and B

12. Convert

a) Formaldehyde to ethanol

b) Ethanal to Ethane

13.Which is more acidic.? Acetic Acid or fluoro acetic acid. Why?

14. Arrangethe following in the increasing order of basicity.

CH_3NH_2 $C_6H_5NH_2$ $(CH_3)_2NH$ NH_3 $(CH_3)_3N$

15.a) The optically inactive amino acid is .....

b) The animal starch is.....

Section C (Answer any 8 questions from 16 to 26. Each carries three mark.)

16. If an electrolyte on dissociation gives V_+cations andV_-anions then it's limiting molar conductivity is given by

$$\Lambda^{\circ}_m = \nu_+ \lambda^{\circ}_+ + \nu_- \lambda^{\circ}_-$$

a. Name the law (1)

b. For NaCl, HCl and NaAc are 126.4, 425.9 and 91.0 $Scm^{-2}mol^{-1}$ respectively. Calculate for HAc (2)

17.The boiling point of benzene is 353.23K. When 1.80 g of a non volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K. Calculate the molar mass of the solute. ($K_b$for benzene is 2.53 K Kg/mol)

18. The rate of a chemical reaction doubles for an increase of 10 Kelvin in absolute temperature from 298 Kelvin. Calculate activation energy.

19. For a reaction $t_{½} \alpha [R]_0$

a) Find the order of the reaction. (1)

b) Derive its integrated rate equation. (2)

20. What is lanthanoid contraction? What are its consequences?

21. $[Co(NH_3)_6]^{3+}$is paramagnetic while $[CoF_6]^{3-}$ is diamagnetic. Justify using VB theory.

22. a) What is Grignard reagent ? (1)

b) 2-bromo pentane on dehydrohalogenation gives pent-2-ene as major product. Name and state the law behind this reaction. (2)

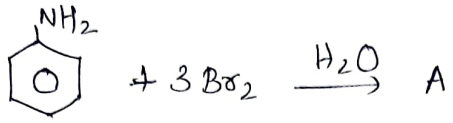
23.a)What is Luca's reagent? (1)

b) How will you distinguish Primary, secondaryand tertiary alcohols using Luca's reagent? (2)

24. a)How will you distinguish betweenpropanal and propanone? (2)

b) Aldehydes are less reactive than ketones towards nucleophilic substitution reactions. Why?(1)

25.Identify A,B and C

a) 

b) 

c) $CH_3CH_2CONH_2 + Br_2 \xrightarrow{alc.KOH} C$

26.a) The linkage present in carbohydrate is.....

b) Give any two differences between DNA and RNA

Section D (Answer any three questions. Each carries 4 mark)

27. The cell reaction in Daniel cell is

$Zn + Cu^{2+} \longrightarrow Zn^{2+} + Cu$

a) Represent the cell. (1)

b) Derive Nernst equation for Daniel cell (3)

28.a) Aqueous sodium chloride and benzoic acid in Benzene show abnormal molar mass. Give reason (2)

b) Graphically represent the deviation shown by a mixture of ethanol and acetone (2)

29.a) Draw the geometrical isomers of $[Fe(NH_3)_2(CN)_4]^-$ (2)

b) Give IUPAC names of the following coordination compounds

i) $K_3[Fe(CN)_6]$ ii) $[Co(NH_3)_6]Cl_3$

30.a) What is cumene? How will you prepare phenol from cumene? (2)

b) Write a suitable reaction for the preparation of tert- butyl ethyl ether. (2)

31.Explain the following

a. Aldol condensation

b. HVZ reaction