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INDIA INTERNATIONAL SCHOOL

HALF YEARLY EXAMINATION 2014-15
CLASS -XII
CHEMISTRY

Time-3 hours **M.M. 70**

Important instructions:

1. All questions are compulsory.
2. Q.No. 1 to 8 are very short answer type questions and carry 1 mark each.
3. Q. No. 9 to18 are short answer type questions carrying 2 marks each.
4. Q.No. 19 to27 are short answer type questions carrying 3 marks each.
5. Q.No. 28 to 30 are long answer type questions carrying 5 marks each.

1. Of 0.1 molal solutions of glucose and KCl respectively, which one will have a higher boiling point?

2. Write the IUPAC name of $CH_2=CHCH_2Br$

3. How many Faradays of charge are required to convert 1 mole of MnO_4^- to Mn^{2+} ions?

4. Why is ortho nitrophenol more acidic than ortho methoxyphenol?

5. Write a chemical reaction in which iodide ion displaces diazonium group from a diazonium salt.

6. Write the structure of : 4-methylpent-3-en-2-one.

7. How is copper extracted from low grade copper?

8. Which method is usually employed for purifying Nickel ?

9. Determine the type of cubic lattice to which a given crystal belongs if it has edge length of 290 pm and density is 7.80 g/cm^3 (molecular mass = 56 g/mol)

10. A first order reaction takes 40 minutes for 30 % decomposition. Calculate $t_{½}$ for the reaction.

OR

The thermal decomposition of HCOOH is a first order reaction with a rate constant of 2.4×10^{-3}. Calculate how long will it take for 3/4th of initial quantity to decompose ?

11 The conductivity of 0.02 M KCl at 398 K is 0.025 Scm^{-1} .Calculate its molar conductivity.

12 Which of the following electrolytes will be most effective in the coagulation of As_2S_3 sol and why : $AlCl_3$, $BaCl_2$, NaCl ?

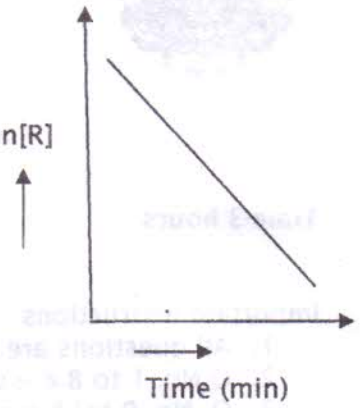
13. For a chemical reaction variation in concentration, ln [R] vs time (min) plot is shown alongside:

(a) What is the order of reaction ?

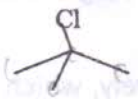
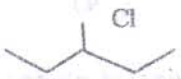
(b) What are the units of rate constant, k ?

(c) If initial concentration of the reactant is half of the Original concentration, how will $t_{1/2}$ change?

(d) Draw the plot of log $[R]_0$/ [R] vs time (sec)



14. In the following pairs of compounds which undergoes faster S_{N1} reaction ?

(i)  and 

(ii)  and 

15. Explain : (a) Grignard reagents should be prepared under aprotic conditions.
(b) $C_6H_5CHClCH_3$ is hydrolysed more easily with KOH than $C_6H_5CH_2Cl$

16. Give chemical tests to distinguish between compounds in each of the following pairs:
(i) phenol and ethyl alcohol. (ii) Butan-2-ol and propan-2-ol

17. Describe the role of the following :
(i) NaCN in the extraction of silver from a silver ore.
(ii) Iodine in the refining of titanium.

18. Account for the following:
(i) Phenol is stronger acid than an alcohol
(ii) The boiling points of ethers are lower than isomeric alcohols

19. Write the Nernst equation and calculate e.m.f of cell and maximum work obtainable from the following cell: Fe (s)/ Fe^{2+}(0.001 M) //H^+(1 M) / H_2(g)(1 bar) / Pt(s) $E^\circ_{Fe2+/Fe}$ = **-0.44 V**

20. Calculate the freezing point depression expected for 0.0711 molal aqueous solution of Na_2SO_4. If this solution actually freezes at -0.320°C, what would be the value of van't Hof factor? (K_f for water = 1.86 °C mol^{-1})

21. The molar conductivity of 0.025 mol/L methanoic acid is 46.1 S cm^2 mol^{-1}. Calculate its degree of dissociation and dissociation constant. Given: (H^+) = 349.6 S cm^2 mol^{-1} and $(HCOO^-)$ = 54.6 S cm^2 mol^{-1}

22. The rate constant of a reaction at 400 K and 800 K are $0.02s^{-1}$ and $0.07s^{-1}$ respectively. Calculate the value of activation energy for the reaction.

23. How are the following colloids different from each other in respect of their dispersion medium and dispersed phase? Give one example of each (i) Aerosol (ii) Emulsion (iii) solid sol

24. Explain the mechanism of the following reactions :
(i) Addition of Grignard reagent to the carbonyl compound forming an adduct followed by hydrolysis. (ii) Acid catalysed dehydration of an alcohol forming an alkene .

25. What happens when :
(i) n-butyl chloride is treated with alcoholic KOH
(ii) ethyl chloride is treated with aqueous KOH
(iii) bromoethane is treated with magnesium in the presence of dry ether

26. Give the chemical equations for the following reactions:
(i) oxidation of propan-1-ol with alkaline $KMnO_4$ solution.
(ii) Bromine in CS_2 with phenol
(iii) Treating phenol with chloroform in the presence of aqueous NaOH

27. Give simple tests to distinguish between the following pair of compounds :
(i) propan-1-ol and propan-2-ol
(ii) ethanol and propanone
(iii) Ethanal and propanal

OR

Write short notes on the following reactions :
(i) Cannizaro reaction (ii) Rosenmund reduction

28. Complete the following reaction , give the names of the major products :
(i) $CH_3CH_2OH + PCl_5 \xrightarrow{\text{heat}}$
(ii) $CO_2 + CH_3CH_2MgBr \xrightarrow{H_3O^+}$
(iii) $C_6H_5CH_3 \xrightarrow{\text{alk.}KMnO_4}$
(iv) $C_6H_6 + CH_3COCl \xrightarrow{\text{anhydrous } AlCl_3}$
(v) $CH_3COOH + C_2H_5OH \xrightarrow{\text{conc } H_2SO_4}$

29. Account for the following :
(i) Chlorobenzene is much less reactive than chloro ethane towards nucleophilic substitution reactions.
(ii) Although chlorine is an electron withdrawing group, yet it is ortho, para directing in electrophilic aromatic substitution reactions. Why?
(iii) Alcohols have higher boiling point than that of the hydrocarbon of comparative molecular mass.
(iv) o- nitro phenol has higher boiling point than p- nitrophenol.
(v) 2-chloroethanoic acid is more acidic than ethanoic acid.

30 (i) Explain the mechanism of nucleophilic attack on the carbonyl group of an aldehyde or a ketone.
(ii) An organic compound 'A' (molecular formula $C_8H_{16}O_2$) was hydrolysed with dilute H_2SO_4 to give a compound 'B' and a compound 'C'. Oxidation of 'C' with chromic acid also produced 'B'. On dehydration 'C' gives but-1-ene. Identify compounds 'A' , 'B' and 'C' and write the chemical equations for the reaction involved.