



OXFORD PUBLIC SCHOOL, RANCHI
HALF YEARLY EXAMINATION
SESSION 2016-2017

Class – XII

Sub – Chemistry

Name _____

Class & Sec _____

Time: 3 Hrs

F.M.: 70

Roll No _____

GENERAL INSTRUCTIONS :

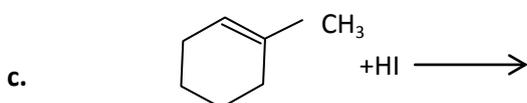
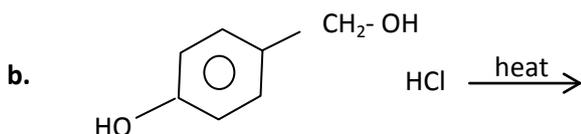
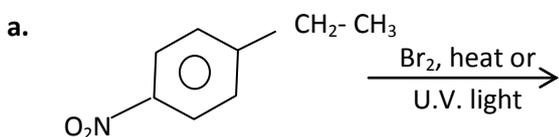
1. Answer all the questions in serial order.
2. Question No. 1 to 5 are very short answer questions carry 1 mark each.
3. Question No. 6 to 10 are short answer questions carry 2 marks each.
4. Question No. 11 to 22 are short answer questions carry 3 marks each.
5. Question No. 23 is a value based question and carries 4 marks.
6. Question No. 24 to 26 are long answer questions carry 5 marks each.
7. Use log tables, if necessary. Use of calculators is not allowed.

1. What is the coordination number of hcp and ccp ?
2. Which will have a greater boiling point 0.1 NaCl or 0.1 BaCl₂ solution in water ?
3. What is the order of reaction whose rate constant has the same units as the rate of reaction ?
4. Which compound of the following pairs will react faster in SN² reaction with $\bar{O}H$?
(CH₃)₃CCl or CH₃Cl
5. Unlike phenols, why alcohols are easily protonated ?
6. State and explain Raoult's Law for a solution containing volatile solute.
7. For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.
8. Following reaction takes place in one step :
 $2NO(g) + O_2(g) \rightarrow 2NO_2(g)$
How will the rate of above reaction change if the volume of the reaction vessel is diminished by one – third of its original volume ? will there be any change in the order of reaction with reduced volume ?
9. Distinguish between :
 - a. Aldehyde and Ketone
 - b. Ethanal and propanal
10. Account for the following :
 - a. pK_b of aniline is more than that of methylamine.
 - b. Aniline does not undergo Friedel – crafts reaction.
11.
 - a. Ionic solids which have anionic vacancy due to metal excess defect, develop colour. Explain with the help of a suitable example.
 - b. What is antiferromagnetism ? Write one example of antiferromagnetic substance.
12. Aluminium crystallizes in a cubic closed packed structure. Its metallic radius is 125 pm.
 - a. What is the length of a side of the unit cell ?
 - b. How many unit cells are there in 1 cm³ of Aluminium ?

Or

Niobium crystallizes in a body – centred cubic structure. If the density is 8.55 gcm⁻³, calculate the atomic radius of Niobium using its atomic mass 93u.

13. The rate of reaction triples when temperature changes from 20°C to 50°C. Calculate energy of activation for the reaction. ($R = 8.314 \text{ JK}^{-1}\text{mol}^{-1}$)
14. Explain the following terms :
- Electrophoresis
 - Peptization
 - Tyndall effect
15. Draw the structures of major mono halo products in each of the following reactions.



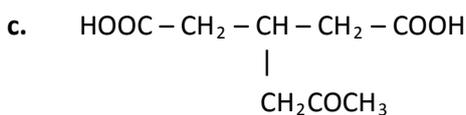
16. What happens when :-
- n-Butyl Chloride is treated with alcoholic KOH ?
 - Chloro benzene is subjected to hydrolysis ?
 - Methyl bromide is treated with Sodium in presence of dry ether ?
17. Explain the following with example :-
- Reimer – Tiemann reaction
 - Saytzeff's Rule
 - Willamson synthesis

18. Write the mechanism of hydration of ethene to yield ethanol.

19. Write the IUPAC names of the following compounds :



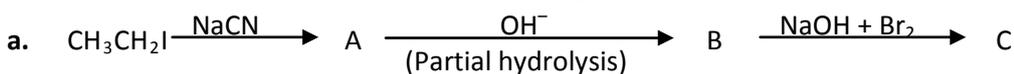
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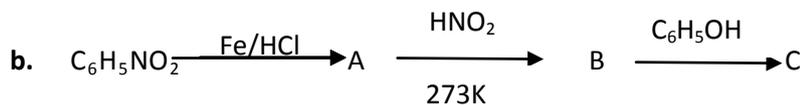


20. Accomplish the following conversions :-

- Propanoic acid to ethanoic acid.
- Nitrobenzene to benzoic acid.
- Aniline to p-bromoaniline.

21. Give the structures of A, B and C in the following reactions :-





22. Define conductivity and molar conductivity for solution of an electrolyte. Discuss their variation with concentration.
23. Surface Chemistry deals with phenomenon that occurs at all the surfaces or interfaces. Many important phenomena – Corrosion, electrode processes, heterogeneous catalysis, dissociation, adsorption, crystallization occur at interfaces.
- Why do we use charcoal, in gas mask, in coal mines?
 - How is animal charcoal, used in decolourisation of sugar?
 - What is the use of silica gel which is given along with camera and other electronic equipments ?
 - There is safety lamp in coal mines, what is its purpose ?
24. a. What type of deviation (positive or negative) from ideal behavior will be shown by the solution of cyclohexane and ethanol ? Give suitable reason.
- b. Two elements A and B form compounds having molecular formula AB_2 and AB_4 . When dissolved in 20 g of benzene (C_6H_6), 1.0 g of AB_2 lowers the freezing point by 2.3K whereas 1.0g of AB_4 lowers it by 1.3K. The molal depression constant for benzene is $5.1K \text{ kg mol}^{-1}$. Calculate atomic masses of A and B.

Or

- Illustrate elevation in boiling point with the help of vapour pressure – temperature curve of a solution. Show that elevation in boiling point is a colligative property.
 - Determine the osmotic pressure of a solution prepared by dissolving 25 mg of K_2SO_4 in 2 litre of water at $25^\circ C$, assuming that it is completely dissociated ($R = 0.0821L \text{ atm K}^{-1} \text{ mol}^{-1}$, At. mass K = 39, S = 32 O = 16)
25. a. Suggest a way to determine the Δ_m^o value of water.
- b. the molar conductivity of 0.025 mol l^{-1} methanoic acid is $46.1 \text{ Scm}^2 \text{ mol}^{-1}$. Calculate its degree of dissociation and dissociation constant. Given $\lambda^o(H^+) = 349.6 \text{ Scm}^2 \text{ mol}^{-1}$ and $\lambda^o(HCOO^-) = 54.6 \text{ Scm}^2 \text{ mol}^{-1}$.

Or

- Predict the products of electrolysis of the following :-
 - An aqueous solution of $AgNO_3$ with silver electrodes.
 - An aqueous solution of $CuCl_2$ with platinum electrodes.
 - Represent the cell in which the following reaction takes place :-
 $Mg(s) + 2Ag^+(0.0001M) \longrightarrow Mg^{2+}(0.130M) + 2Ag(s)$
 Calculate its Ecell. Given that $E^oMg^{2+}/Mg = -2.37V$ and $E^o_{Ag^+/Ag} = +0.80V$
26. a. An organic compound with molecular formula $C_9H_{10}O$ forms 2, 4 – DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro reaction. On vigorous oxidation, gives 1, 2 – benzene dicarboxylic acid. Identify the compounds.
- b. Explain the following name reactions with suitable example :-
- Aldol condensation.
 - HVZ reaction.

Or

- Although phenoxide ion has more number of resonating structures than carboxylate ion, carboxylic acid is a stronger acid than phenol. Why ?
- How will you bring about the following conversions :-
 - Benzoic acid to m – nitrobenzyl alcohol.
 - Bromobenzene to 1 – phenyl ethanol.
 - Benzaldehyde to α – hydroxy phenyl acetic acid.