

Senaj Bir

FIRST TERM (2015-2016)
CLASS XII
SUBJECT : CHEMISTRY

AFBBS
BB

Time : 3 Hours

M.M. : 70

General Instructions:

1. All questions are compulsory.
2. Question number 1 to 5 carry 1 mark each.
3. Question number 6 to 10 carry 2 marks each.
4. Question number 11 to 22 carry 3 marks each.
5. Question number 23 is a value based question carrying 4 marks.
6. Question number 24 to 26 carry 5 marks each.
7. Use log tables, if necessary, use of calculator is not allowed.

Q1. Why are the aquatic species more comfortable in cold water in comparison to warm water?

~~Q2.~~ Define Cryoscopic constant.

~~Q3.~~ In a reaction, if the concentration of reactant A is tripled, the rate of reaction becomes 27 times. What is the order of the reaction? **3**

~~Q4.~~ For a reaction,
 $2\text{NH}_3(\text{g}) \rightleftharpoons \text{N}_2(\text{g}) + 3\text{H}_2(\text{g})$

Rate = k

~~a)~~ Write the order and molecularity of this reaction.

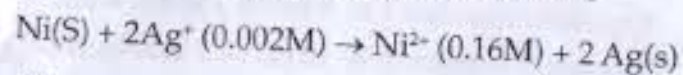
~~b)~~ Write the unit of k.

× Q5. What are antihistamines?

Q6. Account for the following:

- Fe_3O_4 is ferromagnetic at room temperature but becomes paramagnetic at 850K.
- ZnO on heating become yellow.

Q7. Calculate the emf of the cell in which the



Given that $E^\ominus_{\text{cell}} = 1.05\text{V}$.

Q8. What is meant by coagulation of a colloidal solution? Describe briefly any one method by which coagulation of lyophobic solutions can be carried out.

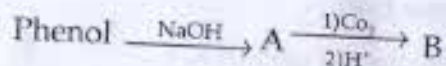
+Q9. Describe the principle behind each of the processes:

- Vapor phase refining of a metal.
- Recovery of silver after silver ore was leached with NaCN.

Or

+Q9. What is meant by term Chromatography? What criterion is followed for the selection of stationary phase in Chromatography?

- × Q10. a) Amongst the isomeric dihalobenzenes which isomer has the highest melting point and why?
- b) Identify A and B.



Q11. Niobium crystallizes in bcc structure. If density is 8.55g/cm^3 . Calculate atomic radius of Niobium using its atomic mass 93 u.

Q12. a) Which type of ionic substances show schottky defect in solids.

b) What type of substances would make better permanent magnets, Ferromagnet or Ferrimagnet? Justify your answer.

Why is glass considered as Super cool liquid?

Q13. The vapor pressure of a 5% aqueous solution of a non volatile organic substance at 373K is 745 mm. Calculate the molar mass of the solute.

OR

Q13. 2g of Benzoic acid dissolved in 25 gm. of benzene shows a depression of freezing point equal to 1.62 K. Molar depression constant of benzene is 4.9K Kg mol^{-1} . What is the percentage association of the acid if it forms dimer in the solution?

Q14. a) What type of deviation from ideal behavior will be shown by solution of cyclohexane and ethanol? Give suitable reason.

b) When fruits and vegetables that are dried are placed in water, they slowly swell and return to their original form. Explain why?

Q15. a.) What is the quantity of electricity in Coulombs needed to reduce 1mol of $\text{Cr}_2\text{O}_7^{2-}$?

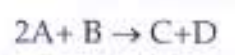
b) Define the terms given below:

- 1. Conductivity
- 2. Molar Conductivity. What are the units.

Q16. (a) The rate of reaction $2NO + Cl_2 \rightarrow 2NOCl$ is doubled when concentration of Cl_2 is doubled and it becomes eight times when concentration of both NO and Cl_2 are doubled. Deduce the order w.r.t each reactant.

- b) Define following terms:
- Pseudo first order reaction
 - Activation energy

Q17. Consider the reaction



Excp. No.	Initial concn. In Moll ⁻¹		Initial rate of formation
	A	B	
1	0.1	0.1	1.5×10^{-3}
2	0.2	0.2	3×10^{-3}
3	0.2	0.4	6×10^{-3}

1-5
0-3 {

- a) Write the rate law for the reaction.
- b) Calculate value of rate constant for reaction.
- c) Propose mechanism for the reaction.

Q18. Explain the following observations:

- (a.) Physical absorption is multilayered while chemical absorption is monolayered.

- b) Cottrell's smoke precipitator is fitted at the mouth of the chimneys used in factories.
- c) Sky appears blue in colour.

Q19. Describe the role of the following:

- a) Cryolite in electrolytic reduction of alumina.
- b) Graphite in electrometallurgy of Alluminium.
- c) Iodine in the refining of Titanium.

Q20. a) Explain why the dipole moment of Chlorobenzene is lower than that of Ethyl Chloride?

- b) An optically active compound having molecular formula $C_7H_{15}Br$ reacts with aqueous KOH to give a racemic mixture of products. Write the mechanism involved in this reaction.

Q21. 1.) Arrange the following in the increasing order of property indicated:

- (a) HCl, HBr, HI (reactivity with alcohol)
 $2 \quad 2 \quad 1$
- (b) Cresol, p-chlorophenol, p-nitrophenol, phenol (acidic character)
 $<$
- 2) The C-O bond in phenol is slightly stronger than in Methanol. Why?

Q22. a) What is Colloidion?

- b) What is the difference between multimolecular and Macromolecular colloids? Give one example of each. How are associated colloids different from these two types of Colloids.

Q23. Naresh works in a multi national company. He is stressed due to his hectic schedule. Amit, his friend came to know that he has started taking sleeping pills without consulting the Doctor. Amit request Naresh to stop this practice and takes him to a Yoga center. With regular yoga practice, Naresh is now a happy and a relaxed man. After reading the above passage, answer the following questions:

- a) Which class of drug is used in sleeping pills?
b) Why is it not advisable to take sleeping pills without consulting the Doctor?
c) Write the values shown by Amit.

Q24. a) Predict the products of electrolysis in each of the following (explain):

- 1) An aqueous solution of AgNO_3 with platinum electrodes.
- 2) An aqueous solution of CuCl_2 with platinum electrodes.

b) A solution of $\text{Ni}(\text{NO}_3)_2$ is electrolyzed between platinum electrodes using a current of 5A for 20 minutes. What mass of Nickel will be deposited at the cathode? (Atomic mass of Nickel is 58.7)

OR

Q24. a) Estimate the minimal potential difference needed to reduce Al_2O_3 at 500 degree celcius. The free energy for the decomposition reaction: $2/3 \text{Al}_2\text{O}_3 \rightarrow 4/3 \text{Al} + \text{O}_2$ is $\Delta G = 960 \text{KJ}$. ($F = 96500 \text{ C mol}^{-1}$)

b) What is corrosion? Describe the role of zinc in cathodic protection of iron. Can we use tin in place of zinc for this purpose? Give reasons.

Q25. a) Which will have a higher boiling point: 1 chloroethane or 2 chloro2 methyl butane? Give reasons.

b) P-chloronitrobenzene undergoes nucleophilic substitution faster than chlorobenzene. Explain giving resonating structure as well.
c) Although Chlorine is an electron withdrawing group, yet it is ortho and para directing in electrophilic aromatic substitution reactions. Why?

OR

Q25. a) Primary alkyl halide (A) $\text{C}_4\text{H}_9\text{Br}$ is reacted with alc. KOH to give compound (B). Compound (B) is reacted with HBr to give (C) which is an isomer of (A). When (A) was reacted with Na metal it gave compound C_8H_{18} (D) that was different than compound when n-butyl bromide was reacted with sodium. Give the structural formula of (A) to (D) and write equation for all the reactions.

$$R = k[A]^x[B]^y$$

b) What are the ambident nucleophiles? Explain with example.

c) Convert ethanol to Ethyl fluoride.

Q26. a) Carry out following conversions:

1. Propanone \rightarrow 2 Methyl propan-2-ol

~~2. Phenol \rightarrow Salicylaldehyde~~

b) Give a chemical test to distinguish between the following pairs of compounds.

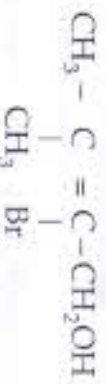
Phenol and Benzyl alcohol.

c) Bond angle C-O-C in ethers is slightly higher than the tetrahedral angle. Why?

OR

Q26. a) While separating a mixture of ortho and para nitrophenols by steam distillation, name the isomer which will be steam volatile. Give reasons.

b) Give IUPAC name of



c) Complete the following:

1. Phenol + Br₂ $\xrightarrow{\text{C}_5\text{H}_5}$

2. Ethoxybenzene $\xrightarrow{\text{HBr}}$