

Chemistry
Sample Question Paper
Class XII

Class:12
Time 3hrs

Max Mks:70
No of pages:6

General Instructions:

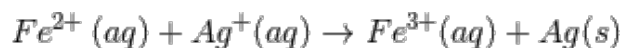
- All questions are compulsory.
- Questions 1 to 5 are one mark questions.
- Questions 6 to 10 are two marks questions.
- Questions 11 to 22 are three marks questions.
- Question 23 is four marks question.
- Question 24 to 26 are five marks questions.
- There is no overall choice in the question paper, but internal choice is there.
- Use of calculator is not permitted.

1. What is the molecularity of $Cl \rightarrow \frac{1}{2}Cl_2(g)$?
2. Give IUPAC name of $CH_3COCH_2COCH_3$.
3. Why all other vitamins of group P should be supplied regularly in a diet except for vitamin B12?
4. Bond enthalpy of fluorine is lower than that of chlorine, why?
5. Give reason: "Ferric chloride preferred over potassium chloride in case of a cut leading to bleeding.
6. Rate constant K for first order reaction has been found to be $2.45 \times 10^{-3} sec^{-1}$.
Calculate its three-fourth life.
7. a) Define Hardy Schulze rule.

- b) How does an increase in temperature affect both physical as well as chemical adsorption?
8. What is the effect on rate, if
- a) Concentration of A is tripled.
 - b) Concentration of A and B is doubled.
9. Which is a stronger acid phenol or cresol? Explain.
10. Aluminum crystallizes in cubic close packed structure. Its metallic radius is 125 pm.
- a) What is the length of side of its unit cell?
 - b) How many unit cells would occur in 1.00 cm³ of aluminum?
11. Account for the following:
- (a) The reduction of a metal oxide is easier if the metal formed in liquid state at the temperature of reduction.
 - (b) The reduction of Cr₂O₃ with Al is thermodynamically feasible, yet it does not occur at room temperature
 - (c) Pine oil is used in froth floatation method.
12. a) Name the method used for refining of (i) Nickel (ii) Zirconium.
- b) The extraction of Au by leaching with NaCN involves both oxidation and reduction. Justify giving equations.
13. Why o-hydroxybenzaldehyde is a liquid at room temperature while p-hydroxybenzaldehyde is a high melting solid?
14. a) What are the main constituents of Dettol?
- b) Why is the use of aspartame limited to cold foods and soft drinks?

c) Give equation for the preparation of non-ionic detergents. Mention the name of their constituents.

15. Write the cell formulation and calculate the standard cell potential of the galvanic cell in which the following reaction takes place.



Calculate $\Delta_r G^0$ for the above reaction.

16. a) Which cleaning agent will you prefer in order to wash clothes with water containing dissolved calcium hydrogen carbonate, soaps or synthetic detergents? Why?
b) Give an advantage of soaps over synthetic detergents.

OR

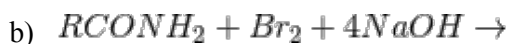
- a) What are anti-fertility drugs? Give two examples.
b) Why ranitidine better antacids than sodium bicarbonate or magnesium hydroxide?
17. a) Harmful effects of lead on the human being as well as on the environment
b) (i) Environmental protection
(ii) Health concerns
18. a) Which of the following two compounds would react faster by SN2 path way: 1-bromobutane or 2-bromobutane. Give reasons.
b) Why allyl chloride is more reactive than n-propyl chloride towards nucleophilic substitution reaction?
c) Haloalkanes react with KCN to give alkyl cyanide as main product while with AgCN they form isocyanide as main product. Give reason.
19. a) What are the consequences of lanthanoid contraction?

b) Why E^0 for Mn^{3+} / Mn^{2+} couple is much more positive than Fe^{3+} / Fe^{2+} ?

20. A metal ion M^{n+} having d^4 valence electronic configuration combines with three didentate ligands to form a complex compound. Assuming $\Delta_0 > p$,

- Draw the diagram showing d orbital splitting during this complex formation.
- Write the electronic configuration of the valence electrons of the metal M^{n+} ion in terms of t_{2g} and e_g .
- What type of hybridization will M^{n+} ion have?
- Name the type of isomerism exhibited by this complex.

21. (i) Complete and name the following reactions:



(ii) Give chemical tests to distinguish between compounds in each of the following pairs:

- a) Phenol and Benzyl alcohol
- b) Butane -2-ol and 2-Methyl propan - 2 -ol

22. Write the following name reaction with one suitable example.

- a. Gabriel Phthalimide Reaction
- b. Hofmann Bromamide Reaction

23. The term Green chemistry as adopted by the IUPAC working party on synthetic pathways and process in green chemistry is getting awareness even among the common people. My father who retired twenty years ago was working with a laboratory synthesizing aldehydes using. Myself, working in the same Lab adopted this method but my father advised not to use this method and suggested another one.

Answer the following question based on the above passages

- a. Why did my father advise not to use given method?
- b. What was another method? Did you consider it to be environment friendly or economically?

24. Give reasons for the following:

- a) Transition metals have enthalpies of atomization.
- b) Among the lanthanoids, Ce(III) is easily oxidized to Ce(IV).
- c) $\text{Fe}^{3+}|\text{Fe}^{2+}$ redox couple has positive electrode potential than $\text{Mn}^{3+}|\text{Mn}^{2+}$ couple.
- d) Cu (I) has d^{10} configuration while Cu (II) has d^9 configuration, still Cu (II) is more stable in aqueous solution than copper (I).
- e) The second and third transition series elements have almost similar atomic radii.

25.

- a) Derive the relationship between relative lowering of vapour pressure and mole fraction of the volatile liquid.
- b) i) Benzoic acid completely dimerises in benzene. What will be the vapour pressure of a solution containing 61g of benzoic acid per 500g benzene when the vapour pressure of pure benzene at the temperature of experiment is 6606 torr?
ii) What would have been the vapour pressure in the absence of dimerization?
- iii) Derive a relationship between mole fractions and vapour pressure of a component of an ideal solution in the liquid phase and vapour phase.

Or

- a) Which aqueous solution has higher concentration - 1 molar or 1 molal solution of the same solute? Give reason.
- b) 0.5g KCl was dissolved in 100g water and the solution originally at 200C, freeze at - 0.240C. Calculate the percentage ionization of salt. K_f per 1000g of water = 1.86K.
26. a) Write the cell reaction involved in recharging of lead storage battery.
- b) Write the Nernst equation and emf of the following cells at 298K ($E^\circ \text{Fe}^{2+} / \text{Fe} = -0.44\text{V}$) $\text{Fe(s)} / \text{Fe}^{2+} (0.001\text{M}) // \text{H}^+ (1\text{M}) / \text{H}_2 (1\text{bar}) / \text{Pt(s)}$.
- c) How much electricity in terms of Faraday is required to produce 40.0g of Al from molten Al_2O_3 ?

OR

- a) In a chemistry lab, if a student stores CuSO_4 solution in a Zn vessel, what will happen? Why?
- b) State two advantage of $\text{H}_2\text{-O}_2$ fuel cell over ordinary cell.
- c) State Kohlrausch's law.
- d) In the button cells widely used in watches and other devices the following reaction takes place: $\text{Zn(s)} + \text{Ag}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{Ag(s)} + 2\text{OH}^-(\text{aq})$
- Determine $\Delta_r G^\circ$ and E° for the reaction. Assume: $E^\circ \text{Zn}^{2+}/\text{Zn} = -0.76\text{ V}$ and $E^\circ \text{Ag}^+ / \text{Ag} = 0.8\text{ V}$.