CBSE Class 12 Chemistry 2015 - Set 56/2/G

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)

Time Allowed: 3 Hours **Maximum Marks: 70**

General Instructions

(i) This question paper contains 26 questions. All questions are compulsory.
(ii) All questions are compulsory.
(iii) Questions number 1 to 5 are very short answer questions and carry 1 mark each.
(iv) Questions number 6 to 10 are short answer questions and carry 2 marks each.
(v) Questions number 11 to 22 are also short answer questions and carry 3 marks each.
(vi) Question number 23 is a value based question and carry 4 marks.
(vii) Questions number 24 to 26 are long answer questions and carry 5 marks each.
(viii) Use log tables, if necessary. Use of calculators is not allowed.

Questions

1. Why is zinc not regarded as a transition element?

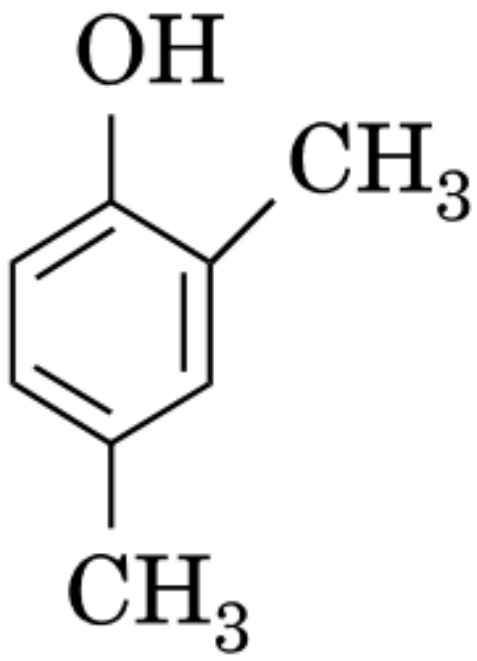
2. How much charge in Faraday is required for the reduction of 1 mol of Ag^+ to Ag?

3. Which would undergo S_N1 reaction faster in the following pair:

$C_6H_5-CH_2-Br$ and $C_6H_5-CH(CH_3)-Br$

4. Write the dispersed phase and dispersion medium of smoke.

5. Write the IUPAC name of the given compound:



6. What do you understand by depression of freezing point? Derive the relationship between depression of freezing point and molar mass of the solute.

7. Write two differences between order of a reaction and molecularity of a reaction.

8. Arrange the following:

(i) In increasing order of their basic strength:

$C_6H_5-NH_2$, $CH_3-CH_2-NH_2$, $CH_3-NH-CH_3$

(ii) In increasing order of solubility in water:

CH_3-NH_2, $(CH_3)_3N$, $CH_3-NH-CH_3$

9. Write the structures of the following:

(i) N_2O_5

(ii) BrF_3

10(a). Write down the IUPAC name of the complex $[Co(en)_2Cl_2]^+$. What type of isomerism is shown by this complex?

OR

10(b). Using IUPAC norms write the formulae for the following coordination compounds:

(i) Tetracarbonylnickel(0)

(ii) Potassium tetracyanidoferrate(II)

11. Write the structures of the major product in each of the following reactions:

(i) $CH_3-CH=CH_2$ (i) B_2H_6 (ii) H_2O_2/OH^- →

(ii) $CH_3-CH_2-CH(Br)-CH_3$ + KOH (aq.) →

(iii) Bromobenzene + Mg, dry ether →

12. How do you convert the following:

(i) Phenol to 2-hydroxyacetophenone

(ii) Ethyl chloride to methoxy ethane

(iii) Acetone to 2-methylpropan-2-ol

13. Give reasons for the following:

(i) Aniline does not undergo Friedel-Crafts reaction.

(ii) p-methylaniline is more basic than p-nitroaniline.

(iii) Acetylation of $-NH_2$ group is done in aniline before preparing its ortho and para compounds.

14. Vapour pressure of water at 20°C is 17.5 mm Hg. Calculate the vapour pressure of water at 20°C when 15 g of glucose (molar mass = 180 g mol^{-1}) is dissolved in 150 g of water.

15. Define the following terms:

(i) Crystalline solids

(ii) Frenkel defect

(iii) n-type semiconductor

16. A first order reaction takes 10 minutes for 25% decomposition. Calculate $t_{1/2}$ for the reaction.

(Given: log 2 = 0.3010, log 3 = 0.4771, log 4 = 0.6021)

17. Define the following terms:

(i) Sorption

(ii) Lyophilic colloids

(iii) Associated colloids

18. (i) Indicate the principle behind the method used for the refining of Zirconium.

(ii) What is the role of CO in the extraction of iron?

(iii) What is 'copper matte'?

19(a). Write the names and structures of the monomers of the following polymers:

(i) Polystyrene

(ii) Nylon 6,6

(iii) Terylene

OR

19(b). Describe the classification of polymers on the basis of structure.

20. (i) Write the product obtained when D-glucose reacts with HCN.

(ii) What type of bonding stabilizes the α-helix structure of proteins?

(iii) Write the name of the disease caused by the deficiency of vitamin B_{12}.

21. Give reasons for the following:

(i) NH_3 has a higher boiling point than PH_3.

(ii) H_2Te is more acidic than H_2S.

(iii) Chlorine water on standing loses its yellow colour.

22. (a) Write the hybridization and shape of the following complexes:

(i) $[FeF_6]^{3-}$

(ii) $[Ni(CO)_4]$

(Atomic number: Fe = 26, Ni = 28)

(b) Out of CN^- and CO, which ligand forms more stable complex with metal and why?

23. **Case Study:** Mr. Roy, the principal of one reputed school organized a seminar in which he invited parents and principals to discuss the serious issue of diabetes and depression in students. They all resolved this issue by strictly banning junk food in schools and introducing healthy snacks and drinks like soup, lassi, milk, etc. in school canteens. They also decided to make compulsory half an hour of daily physical activities for the students in the morning assembly. After six months, Mr. Roy conducted the health survey in most of the schools and discovered a tremendous improvement in the health of the students.

After reading the above passage, answer the following questions:

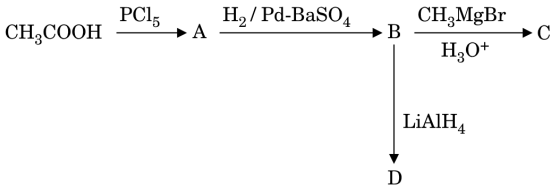
(i) What are the values (at least two) displayed by Mr. Roy?

(ii) As a student, how can you spread awareness about this issue?

(iii) What are tranquilizers? Give an example.

(iv) Why is the use of aspartame limited to cold foods and drinks?

24(a). (a) Write the structures of A, B, C and D in the following reactions:



(b) Distinguish between the following:

(i) $CH_3-CO-CH_2CH_3$ and $CH_3-CH_2-CH_2-CHO$

(ii) Ethanal and ethanoic acid

(c) Write the structure of 4-chloropentan-2-one.

OR

24(b). (a) Write the structures of the main products when propanal (CH_3-CH_2-CHO) reacts with the following reagents:

(i) Zn−Hg/conc. HCl

(ii) H_2N-OH/H^+

(iii) HCN

(b) Arrange the following in the decreasing order of their reactivity towards nucleophilic addition reaction:

HCHO, $CH_3-CO-CH_3$, CH_3-CHO

(c) Give a simple chemical test to distinguish between the following pair of compounds:

C_6H_5CHO and $C_6H_5-CO-CH_3$

25. Calculate the electromotive force (e.m.f.) and ΔG of the following cell at 298 K:

Mg (s) | Mg^{2+} (0.01 M) || Ag^+ (0.0001 M) | Ag (s)

Given: $E^\circ_{Mg^{2+}/Mg} = -2.37\,V$, $E^\circ_{Ag^+/Ag} = +0.80\,V$.

OR

25. (a) The conductivity of $0.001\,mol\,L^{-1}$ solution of CH_3COOH is $4.95 \times 10^{-5}\,S\,cm^{-1}$. Calculate its molar conductivity and degree of dissociation (α).

Given: $\Lambda^\circ(H^+) = 349.6\,S\,cm^2\,mol^{-1}$ and $\Lambda^\circ(CH_3COO^-) = 40.9\,S\,cm^2\,mol^{-1}$.

(b) What is a fuel cell? Write its one advantage over other ordinary cells.

26(a). (a) Account for the following:

(i) Eu^{2+} is a strong reducing agent.

(ii) Transition metals form coloured compounds.

(iii) Zn has lowest enthalpy of atomization in 3d series.

(b) Complete the following equations:

(i) $KMnO_4 \rightarrow$

(ii) $Cr_2O_7^{2-} + 14\,H^+ + 6\,Fe^{2+} \rightarrow$

OR

26(b). (a) Account for the following:

(i) Transition elements form interstitial compounds.

(ii) Mn^{3+} ($3d^4$) is strongly oxidizing whereas Cr^{2+} ($3d^4$) is strongly reducing.

(iii) Transition metals have high melting points.

(b) What is 'misch metal'? Write its one use.

- End of Question Paper -