



PRINCE ACADEMY

OF HIGHER EDUCATION

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CBSE SAMPLE PAPER (2024-25)

Time : 03 :00 Hours

CLASS - XII CHEMISTRY (043)

M. M. : 70

Read the following instructions carefully.

- 15- minute prior reading time allotted for Q-paper reading.
- There are 33 questions in this question paper with internal choice.
- SECTION A consists of 16 multiple -choice questions carrying 1 mark each.
- SECTION B consists of 5 short answer questions carrying 2 marks each.
- SECTION C consists of 7 short answer questions carrying 3 marks each.
- SECTION D consists of 2 case - based questions carrying 4 marks each.
- SECTION E consists of 3 long answer questions carrying 5 marks each.
- All questions are compulsory.
- Use of log tables and calculators is not allowed.

SECTION-A

The following are the multiple choice questions, each carry one mark

1. Which of the following expression is correct for the rate of reaction given below.



(a) $\frac{d[\text{Br}^-]}{dt} = \frac{5d[\text{H}^+]}{dt}$

(b) $\frac{d[\text{Br}^-]}{dt} = \frac{6}{5} \frac{d[\text{H}^+]}{dt}$

(c) $\frac{d[\text{Br}^-]}{dt} = \frac{5}{6} \frac{d[\text{H}^+]}{dt}$

(d) $\frac{d[\text{Br}^-]}{dt} = 6 \frac{d[\text{H}^+]}{dt}$

2. A catalyst alter's which of following in a chemical reaction

(a) entropy (b) enthalpy (c) activation energy (d) equilibrium constant

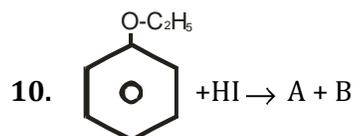
3. The Cu^{+2} oxidation state is more stable than Cu^+ in aq. medium, while Cu^{+2} has d^9 electric configuration due to.

(a) High Stability of d^9 (b) Low atomization enthalpy
(c) High Hydration enthalpy (d) None of these

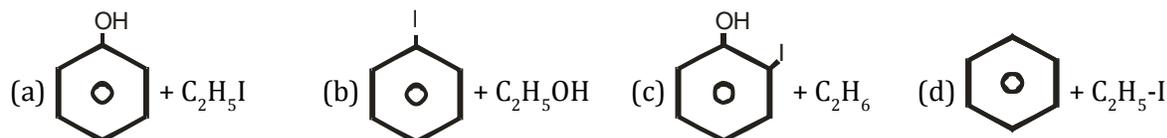
4. KMnO_4 act an oxidising agent in alkaline medium when alkaline KMnO_4 is treated with KI, Iodide ion is oxidised to

(a) I_2 (b) IO_3^- (c) IO^- (d) IO_4^-

5. Which of following is not a chelating ligand
 (a) EDTA (b) en (c) Ox (d) Nitrito-N
6. Which of following is central metal ion in Vitamin-B₁₂
 (a) Pt (b) Au (c) Rh (d) Co
7. SN² reaction proceed with
 (a) Retention (b) Inversion (c) Racemisation (d) Both b and c
8. Phenol react with bromine water to produce white precipitate of
 (a) m-bromophenol (b) o and p-bromophenol
 (c) p-bromophenol (d) 2, 4, 6- tribromo phenol
9. Which of the following give 3°- alcohol on reaction with grignard reagent.
 (a) Formaldehyde (b) Acetaldehyde (c) Propanone (d) Benzaldehyde



A and B respectively are



11. Which of following do not give cannizzaro reaction
 (a) Methanal (b) Benzaldehyde (c) Benzophenone (d) 2, 2- dimethyl propenal
12. Which of following compound form when benzyl alcohol is oxidised with acidified KMnO₄.
 (a) CO₂ and H₂O (b) Benzoic acid (c) Benzaldehyde (d) Benzophenone

For Questions number (13-16) , two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R) . Select the correct answer to these questions from the codes (A), (B), (C) , and (D) as given below.

(A) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason(R) is not the correct explanation of the Assertion(A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

13. Assertion :- The boiling point of 0.1 M urea solution is less than that of 0.1 M KCl solution.
 Reason :- Elevation in boiling point is directly perposhnal to number of species present in solution.
14. Assertion :- Ethyl alcohol-water mixture is known as minimum boiling azeotrope.
 Reason :- Solution which show negative deviation from Raoult's law show minimum boiling azeotrope
15. Assertion :- For a cell reaction Zn (s) + Cu²⁺ (aq) → Zn²⁺ (aq) + Cu (s) at equilibrium voltmeter give zero reading.
 Reason :- At equilibrium there is no change in concentration of Cu²⁺ and Zn²⁺ ion.

16. Assertion :- The cell potential of mercury cell remain constant throughout its life.

Reason :- No ion involve in redox reaction.

SECTION-B

Section B carry 5 question - 2 marks each with internal choice.

17. Give reason :

(a) The tank used by suba divers are filled with air diluted with helium.

(b) It is safe to inject normal saline solution intravenously.

18. (i) How does conductivity and molar conductivity vary with dilution.

(ii) Calculate degree of dissociation of acetic acid if its molar conductivity is $39.05 \text{ Scm}^2 \text{ mol}^{-1}$

Given

$$\lambda^{\circ} m(\text{H}^+) = 349.6 \text{ Scm}^2 \text{ mol}^{-1}, \lambda^{\circ} m(\text{CH}_3 \text{ COO}^-) = 40.9 \text{ Scm}^2 \text{ mol}^{-1}$$

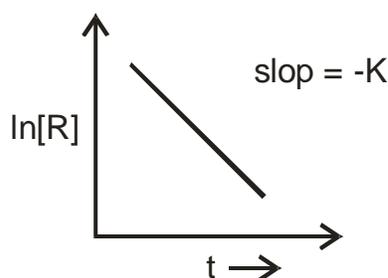
OR

Calculate emf of following cell



[Given $E^{\circ}_{\text{Zn}^{+2}/\text{Zn}} = -0.76 \text{ V}$, $E^{\circ}_{\text{Ag}^+/\text{Ag}} = 0.80 \text{ V}$]

19. Observe the given graph



(i) Give order of reaction and unit of rate constant.

(ii) What are Pseudo first order reaction Give example.

20. For the complex $[\text{Cr} (\text{NH}_3)_2 \text{Cl}_2 (\text{en})]^+$

(i) IUPAC name of the complex.

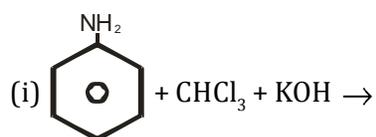
(ii) Co-ordination number and oxidation state of Cr.

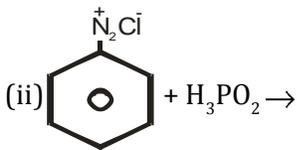
OR

(i) Give formula of complex Iron (III) hexacyano ferrate (II).

(ii) Complex $\text{Co. } 5\text{NH}_3. \text{Cl}_3$ when react with AgNO_3 give 2 mole of AgCl , write formula of complex.

21. Complete the following reactions.





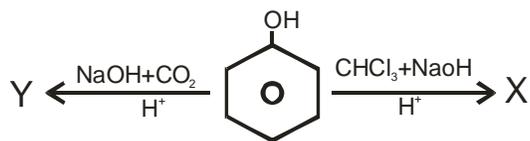
SECTION-C

Contain 7 question with 3 marks each with internal choice.

22. For a 5% solution of urea (Molar Mass = 60g) Calculate the osmotic pressure at 300 K.
[R = 0.0821 L atm K⁻¹ mol⁻¹]
23. a first order reaction takes 69.3 min for 50% completion. What is the time needed for 80% of the reaction to be completed ?
[log 5 = 0.6990, Log 8 = 0.9030, Log 2 = 0.3010]
24. (a) What is chelate effect.
(b) What type of isomerism is shown by complex [Co (NH₃)₅(NO₂)]SO₄.
(c) Write hybridisation of metal ion in complex [Cr (NH₃)₆]³⁺

OR

- (a) Write electronic configuration of d⁴ system as per CFT when
(i) Δ_o > P (ii) Δ_o < P
(b) Low spin tetrahedral complex are rarely observed. Why ?
25. (i) Why phenol is more acidic than alcohol.
(ii) Identify X and Y.



- (iii) Give chemical test to distinguish between Phenol vs Benzoic acid.
26. (i) Write Following reaction
(a) Etard reaction of Toluene.
(b) Wolf- Kishner of Acetophenone.
(iii) Complete following Reaction :
CH₃-CH=CH-CH₂-CN $\xrightarrow{\text{DIBAL-H}}$
27. (i) Arrange the following compounds in the increasing order of their property as indicated.
(a) Cl-CH₂-COOH, F- CH₂- COOH, CH₃ COOH [Acidic character]
(b) CH₃COCH₃, C₆H₅COCH₃, CH₃ CHO [Reactivity toward Nucleophilic addition]

(ii) Why α – Hydrogen is acidic in aldehyde and ketone.

28. (i) What type of linkage is present between protein molecule.

(ii) Which carbohydrate is also known as animal starch.

(iii) What product is formed when a nucleotide from DNA containing thymine is hydrolysed.

SECTION-D

Following questions are case based question. each question carry 4 marks with internal choice.

29. Each organism has different vitamin requirements. For example, humans need to get vitamin C from their diets - while dogs can produce all the vitamin C that they need. Most vitamins need to come from food because the body either does not produce them or produces very little. For humans, vitamin D is not available in large enough quantities in food. The human body synthesizes the vitamin when exposed to sunlight, and this is the best source of vitamin D. Different vitamins play different roles in the body and a person requires a different amount of each vitamin to stay healthy.

(i) Write the disease caused by deficiency of vitamin B₁₂.

(ii) A person is facing medical problem due to not clotting of blood after injury. Which vitamin is responsible for it.

(iii) Name nitrogenous base not present in RNA.

(iv) Name protein which contain 51 α - amino acid.

30. Azo dyes are organic compounds bearing the functional group R-N=N-R', in which R and R' are usually aryl and substituted aryl groups. They are a commercially important family of azo compounds, i.e. compounds containing the C-N=N-C linkage. Azo dyes are synthetic dyes and do not occur naturally. Most azo dyes contain only one azo group, but some dyes contain two or three azo groups, called "diazon dyes" and "triazon dyes" respectively. Azo dyes comprise 60-70% of all dyes used in food and textile industries. Azo dyes are widely used to treat textiles, leather articles, and some food. Chemically related derivatives of azo dyes include azo pigments, which are insoluble in water and other solvents.

(i) Why aromatic diazonium salt are more stable than aliphatic diazonium salt.

(ii) During nitration of aniline why meta product form in good yield.

(iii)

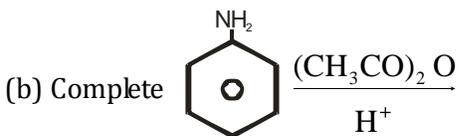
(a) Write reaction involved in carbylamine reaction.

(b) Complete $\text{CH}_3 - \text{NH}_2 + \text{C}_6\text{H}_5\text{SO}_2\text{Cl} \rightarrow$

OR

(iii)

(a) Why pyridine is used during acylation of amine.



SECTION-E

This section carry three question of five marks each.

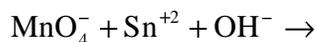
31. (i) Give reason :

(a) Zn, Cd, Hg are not considered as transition element

(b) Zr and Hf have similar atomic size.

(c) Transition metal form alloy

(ii) Balance the Chemical Reaction.



(iii) Name only Lanthenoid show +4 oxidation state

OR

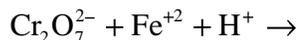
(i) Give reason.

(a) Transition metal show variable oxidation state

(b) Sc^{+3} is colourless while Ti^{+3} is coloured.

(c) Actinoids show large number of oxidation state.

(ii) Balance given reaction.



(iii) what happen when KMnO_4 is heated.

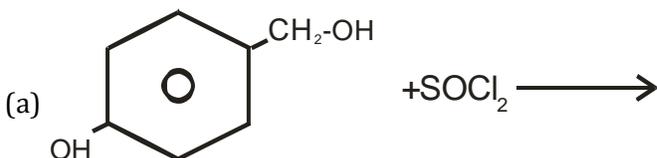
32. (i) What happen when.

(a) n-butyl chloride react with KCN.

(b) Chlorobenzene subjected to hydrolysis.

(ii) Give Possible structure of C_5H_{10} which on chlorination in presence of light, give single monochloro product.

(iii) Complete the reaction :



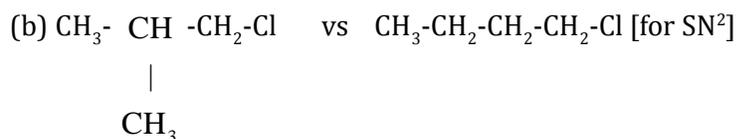
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(i) Give reaction.

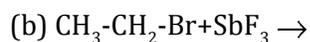
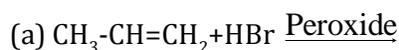
(a) Chloroform is kept in dark colored bottles.

(b) Grignard reagent is prepared under unhydrous condition.

(ii) Which is most reactive toward



(iii) Complete following reactions.



33. (i) Give product of electrolysis when aq. CuSO_4 is electrolysed between Pt electrodes.

(ii) Conductivity of CH_3COOH decrease during dilution, why

(iii) Suggest a method to Calculate limiting molar conductivity for weak electrolyte.

(iv) The conductivity of $0.001028 \text{ mole L}^{-1}$ acetic acid is $4.95 \times 10^{-5} \text{ Scm}^{-1}$. Calculate dissociation constant when λ_m° for acetic acid is $390.5 \text{ Scm}^2 \text{ mol}^{-1}$.

OR

(i) Calculate the amount of electricity in columbs when 1 mole of Ca is obtained by electrolysis of molten CaCl_2 .

(ii) The molar conductivity of CH_3COOH acid increase drastically on dilution, why ?

(iii) Which electrolyte is used in lead storage battery.

(iv) Calculate ΔG° and $\text{Log } K_c$ for the given Cell



give $E^\circ_{\text{Cell}} = 1.56 \text{ V}$.
