

CBSE Class 12 Chemistry Pre-Board Sample Paper

General Instructions:

Read the following instructions very carefully and follow them:

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- (a) There are 33 questions in this question paper with internal choice.*
- (b) SECTION A consists of 16 multiple -choice questions carrying 1 mark each.*
- (c) SECTION B consists of 5 short answer questions carrying 2 marks each.*
- (d) SECTION C consists of 7 short answer questions carrying 3 marks each.*
- (e) SECTION D consists of 2 case - based questions carrying 4 marks each*
- (f) SECTION E consists of 3 long answer questions carrying 5 marks each.*
- (g) All questions are compulsory.*
- (h) Use of log tables and calculators is not allowed.*

Section - A

Multiple Choice Questions:

1. Number of Faradays (F) required to reduce 1 mole of MnO_4^- ion into Mn^{2+} are

- (a) 7F (b) 2F (c) 1F (d) 5F

2. The half-life of a first order reaction is 69.35 s. The value of rate constant of the reaction is

- (a) 1.0 s^{-1}
(b) 0.1 s^{-1}
(c) 0.01 s^{-1}
(d) 0.001 s^{-1}

3. The magnetic nature of elements depends on the presence of unpaired electrons. Identify the configuration of transition element, which shows highest magnetic moment.

- (a) $3d^7$ (b) $3d^5$ (c) $3d^8$ (d) $3d^2$

4. A tertiary alcohol is obtained by the reaction of Grignard reagent with:

(a) Butanone (b) Propanone (c) Acetone (d) All of the above

5. An organic compound X on treatment with pyridinium chlorochromate in dichloromethane gives compound Y. Compound Y reacts with I₂ and alkali to form triiodo methane. The compound 'X' is:

(a) CH₃CH₂OH (b) CH₃CHO (c) CH₃COCH₃ (d) CH₃COOH

6. Which of the following statements are not true about glucose?

(a) It is an aldohexose (b) On heating with HI, it forms n-hexane
(c) It is present in furanose form (d) It does not give 2,4-DNP test

7. Lanthanoid contraction is due to

a) decrease of valence electrons
b) poor shielding effect of 4f
c) decrease of effective nuclear charge
d) increase of valence electrons

8. For a reaction $x + y \rightarrow z$, rate $\propto [X]$. What is (i) molecularity and (ii) order of reaction?

a) (i) 2, (ii) 1
b) (i) 2, (ii) 2
c) (i) 1, (ii) 1
d) (i) 1, (ii) 2

9. It is called ether when the alkyl groups connected to either side of the oxygen atom in an ether are different.

a) mixed
b) symmetrical
c) simple
d) diethyl

10. By reacting with which of the following, primary amines can be distinguished from secondary and tertiary amines?

a) Chloroform alone
b) Methyl iodide
c) Chloroform and alcoholic KOH
d) Zinc dust

11. The charge required for the reduction of 1 mol of MnO_4^- to MnO_2 is

- (a) 1 F
- (b) 3 F
- (c) 5 F
- (d) 6 F

12. In which of the following reactions acetamide is converted to methanamine

- a) Gabriel phthalimide synthesis
- b) Carbylamine reaction
- c) Stephen's reaction
- d) Hoffmann bromamide reaction

For Q No. 13 to 16, two statements are given-one labelled as Assertion(A) and the other labelled as Reason(R). Select the most appropriate answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A.
- (c) A is true but R is false.
- (d) A is false but R is true.

13. **Assertion(A):** Rate constant of a zero-order reaction has the same unit as the rate of a reaction.

Reason(R): Rate constant of a zero-order reaction does not depend upon the concentration of the reactant.

14. **Assertion(A):** Benzoic acid does not undergo Friedel Craft's reaction.

Reason(R): Carboxyl group is deactivating and the catalyst aluminium chloride gets bonded to the carboxyl

group.

15. **Assertion :** D(+) Glucose is dextrorotatory in nature.

Reason : 'D' represents its dextrorotatory nature.

16. **Assertion:** Aniline does not give Friedel craft alkylation or Friedel Craft acylation reaction.

Reason: Aniline forms an salt with Lewis acid like AlCl_3 which is deactivating in nature .

SECTION – B

17. Calculate the mole fraction of benzene in a solution containing 30% by mass of it in CCl_4 .

18. Give the reactions, when:

(a) Glucose reacts with bromine water .

(b) Glucose is heated with HI for long time.

19. Explain pseudo-order reaction with an example.

20. (a) Define Glycosidic linkage.

(b) Why cannot vitamin C be stored in our body.

OR

(i) What type of linkage is present in nucleic acids?

(ii) Give one example each for fibrous protein and globular protein.

21. Explain why $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ has a magnetic moment value of 5.92 BM whereas $[\text{Fe}(\text{CN})_6]^{3-}$ has a value of only 1.74 BM.

SECTION – C

22. Determine the value of ΔG° for the following reaction : $\text{Ni(s)} + 2\text{Ag}^+_{(\text{aq})} \rightarrow \text{Ni}^{2+}_{(\text{aq})} + 2\text{Ag}_{(\text{s})}$, $E^\circ = 1.05 \text{ V}$ ($1\text{F} = 96500 \text{ C mol}^{-1}$)

23. Write a mechanism of hydration of ethene to yield ethoxyethane.

24. How will you convert the following:

(i) Benzoic acid to Benzaldehyde (ii) Acetophenone to Benzoic acid

OR

Distinguish between

(i) Acetophenone and Benzophenone (ii) Acetaldehyde and Benzaldehyde.

25. (a) Write the chemical reaction of preparation of phenol from cumene.

(b) Explain the mechanism of method of preparation of alcohols from acid catalysed hydrolysis of alkenes.

26. Discuss the nature of bonding and magnetic behaviour in the following coordination entities on the basis of valence bond theory:

(i) $[\text{Fe}(\text{CN})_6]^{4-}$

(ii) $[\text{FeF}_6]^{3-}$

Q.27 a) State Henry's Law.

b) H_2S , a toxic gas with rotten egg like smell, is used for the qualitative analysis. If the solubility of H_2S in water at STP is 0.195 m, calculate Henry's law constant.

Q.28 An aromatic compound 'A' on treatment with aqueous ammonia and heating forms compound 'B' which on heating with Br_2 and KOH forms a compound 'C' of molecular formula $\text{C}_6\text{H}_7\text{N}$. Write the structures and IUPAC names of compounds A, B and C.

SECTION – D

29. Read the given passage and answer the questions that follows. Negative ion or Neutral molecule which bound to the metal ion by secondary valency is called as ligand. In a complex, metal ion acts as Lewis acid and ligand acts as Lewis base. Ligands are classified according to number of electron pair in them. The ligand which can donate one electron pair to the metal] atom is called unidentate ligand. The ligand which can donate two electron pairs to the Metal ion is called bidentate ligand. The ligand in which two or more coordination sites are there is called polydentate ligand. Polydentate ligand forms cyclic structure with metal ion and form Chelate.

- i) Give an example of unidentate neutral ligand.
- ii) What are Lewis acids and Lewis bases?.
- iii) How bidentate and Ambidentate ligands are different? Give example.

OR

What are chelate ligands? Give an example.

30. Read the passage given below and answer the following questions:

The properties of the solutions which depend only on the number of solute particles but not on the nature of the solute are called colligative properties. Relative lowering in vapour pressure is also an example of colligative properties. For an experiment, sugar solution is prepared for which lowering in vapour pressure was found to be 0.061 mm of Hg. (Vapour pressure of water at 20°C is 17.5 mm of Hg).

- (i) What is relative lowering of vapour pressure for the given solution in the passage
- (ii) What is the mole fraction of sugar in the solution in the passage.
- (iii) If weight of sugar taken is 5g in 108 g of water then mass % of sugar will be

SECTION E

31. (a) Write the cell reaction and calculate the e.m.f. of the following cell at 298 K $\text{Sn (s)} | \text{Sn}^{2+} (0.004 \text{ M}) || \text{H}^+ (0.020 \text{ M}) | \text{H}_2 (\text{g}) (1 \text{ bar}) | \text{Pt (s)}$ ($E^\circ_{\text{Sn}^{2+}/\text{Sn}} = -0.14 \text{ V}$)

(b) Give reasons :

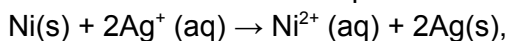
- (i) On the basis of E° values, O_2 gas should be liberated at anode but it is Cl_2 gas which is liberated in the electrolysis of aqueous NaCl .

(ii) Molar conductivity of CH_3COOH increases on dilution.

OR

(a) For the reaction

Determine the values of equilibrium constant (K_c) and ΔG° for the following reaction :



$$E^\circ = 1.05 \text{ V}$$

$$(1F = 96500 \text{ C mol}^{-1})$$

(b) Define fuel cell and write its two advantages.

32. (a) Give simple chemical tests to distinguish between the following pairs of compounds:

Benzoic acid and phenol

(b) Write the products formed when CH_3CHO reacts with the following reagents:

(i) HCN followed by hydrolysis.

ii) H_2NOH

(iii) CH_3CHO in the presence of dilute NaOH

(iv) Zn-Hg and HCl

OR

(a) Account for the following

(i) $\text{Cl}-\text{CH}_2\text{COOH}$ is a stronger acid than CH_3COOH .

(ii) Carboxylic acids do not give reactions of carbonyl group.

(b) Write the chemical equations to illustrate the following name reactions:

(i) Rosenmund reaction (ii) Cannizaro's reaction of benzaldehyde.

(c) Out of CH_3COOH and $\text{CH}_3\text{CH}_2-\text{CH}_2-\text{CO}-\text{CH}_3$ which will give the iodoform test?

33. (a) Account for the following:

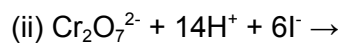
(i) Mn shows the highest oxidation state of +7 with oxygen but with fluorine it shows the highest oxidation state of +4.

(ii) Zirconium and Hafnium exhibit similar properties.

(iii) Transition metals act as catalysts.

(b) Complete the following equations :





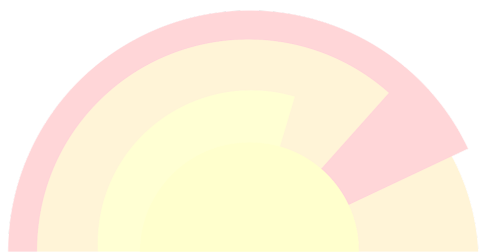
OR

The elements of 3d transition series are given as :

Sc Ti V Cr Mn Fe Co Ni Cu Zn, Now Answer the following :

- (i) Write the element which is not regarded as a transition element. Give a reason.
- (ii) Which element has the highest m.p ?
- (iii) Write the element which can show an oxidation state of +1.
- (iv) Which element is a strong oxidation agent in +3 oxidation state and why?
- (v) Explain why the enthalpies of atomisation of d- block elements are

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