CBSE · CLASS 12 · CHEMISTRY

CBSE Class 12 Chemistry Guess Paper 2027

Time: 3 hours · Maximum marks: 70 · 33 questions

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Section A
16 questions of 1 mark each — 14 MCQ + 2 Assertion-Reason

Q1. In the ring structure of fructose, the anomeric carbon is : 1 mark
(A) C2
(B) C3
(C) C4
(D) C1

Q2. Assertion (A): Starch forms colloidal solution with water. 1 mark
Reason (R): Starch contains 80-85% of amylopectin which is insoluble in water.
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, and R is not the correct explanation of A.
C. A is true but R is false.
D. A is false but R is true

Q3. The correct IUPAC name of $[Pt(NH_3)_2Cl_2]^{2+}$ is 1 mark
(A) Diamminedichloridoplatinum (II)
(B) Diamminedichloridoplatinum (IV)
(C) Diamminedichloridoplatinum (O)
(D) Diamminedichloridoplatinate (IV)

Q4. The magnetic moment is associated with its spin angular momentum and orbital angular momentum. Spin only magnetic moment value of Cr^{3+} ion (Atomic no. : Cr = 24) is _____. 1 mark
(A) 2.87 B.M.
(B) 3.87 B.M.
(C) 3.47 B.M.
(D) 3.57 B.M.

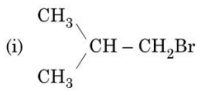
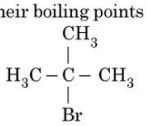
Q5. The organic compounds A, B and C are amines having equivalent molecular weight. A and B on reaction with benzene sulphonyl chloride give white precipitate, however white precipitate obtained from compound B remains insoluble in NaOH. 1 mark
The variation in the boiling point of A, B and C can be seen as :
A. A> B>C
B. B>A>C
C. A=B > C
D. C>B>A

Q6. Assertion (A) : p-nitrophenol is less acidic than phenol. 1 mark
Reason (R) : Nitro group is an electron-withdrawing group, which stabilises the phenoxide ion.

Q7. Acetamide reacts with Br_2 and aqueous KOH to form : 1 mark
(A) Ethanamine
(B) Ammonia
(C) Methanamine
(D) Ethanenitrile

Q8. Arrange the following compounds in increasing order of their boiling points: 1 mark
(i) $(CH_3)_2CH\text{-}CH_2Br$ (ii) $CH_3CH_2CH_2CH_2Br$ (iii) $(CH_3)_3C\text{-}Br$
The correct order is
(A) (ii) < (i) < (iii)
(B) (i) < (ii) < (iii)
(C) (iii) < (i) < (ii)
(D) (iii) < (ii) < (i)

6. Arrange the following compounds in increasing order of their boiling points :

(i)  (ii) $CH_3CH_2CH_2CH_2Br$ (iii) 

The correct order is

Q9. The name inner transition metals is often used to refer to the 1 mark
A. lanthanoids
B. actinoids
C. both lanthanoids and actinoids
D. d block elements

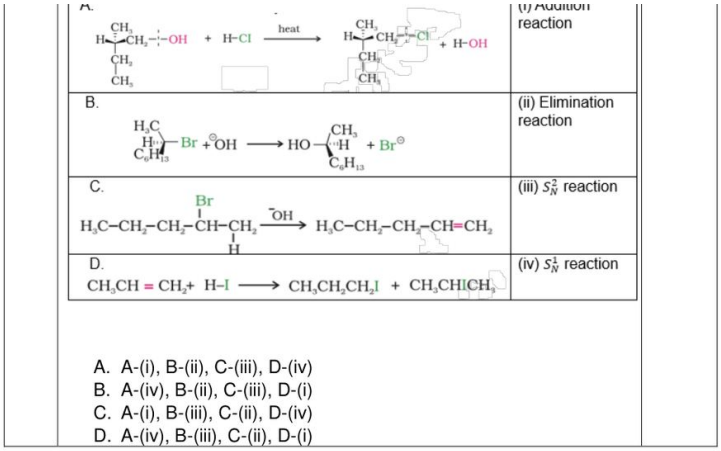
Q10. For an electrolyte consisting of a monovalent cation and a monovalent anion undergoing dissociation in water, the van't Hoff factor (i) is : 1 mark
(A) less than 1
(B) equal to 1
(C) greater than 1
(D) greater than 2

Q11. 70 gm solute is dissolved in 700 gm solvent to prepare a solution having density 1.5 g/ml. The ratio of its molality and molarity will be: 1 mark
A. 0.77
B. 1.4
C. 0.73
D. 1.3

Q12. Match the column I and column II: 1 mark

Column I (reactions of organic halides/alcohols shown as structures) with Column II: (i) Addition reaction, (ii) Elimination reaction, (iii) S_N^2 reaction, (iv) S_N^1 reaction.

A. A-(i), B-(ii), C-(iii), D-(iv)
B. A-(iv), B-(ii), C-(iii), D-(i)
C. A-(i), B-(iii), C-(ii), D-(iv)
D. A-(iv), B-(iii), C-(ii), D-(i)



*Please note that the assessment scheme of the Academic Session 2024-25 will continue in the current

Q13. Formulation of Cobalt(III) Chloride-Ammonia Complexes: 1 mark

Colour / Formula / Solution conductivity corresponds to
Yellow / $[Co(NH_3)_6]^{3+}$ 3Cl^- / Y
Purple / $[CoCl(NH_3)_5]^{2+}$ 2Cl^- / 1:2 electrolyte
Green / X / 1:1 electrolyte
'X' and 'Y' in the above table are:

a. X=$[Co(NH_3)_6]^{2+}$ 3Cl^-, Y= 1:3
b. X= $[Co(NH_3)_4Cl_2]$^+ Cl^-, Y= 1:3
c. X=$[Co(NH_3)_4Cl_2]$^+ Cl^-, Y= 1:1
d. X=$[Co(NH_3)_4Cl_2]^{3+}$ 3Cl^-, Y= 1:1

Colour	Formula	Solution conductivity corresponds to
Yellow	$[Co(NH_3)_6]^{3+}3Cl^-$	Y
Purple	$[CoCl(NH_3)_5]^{2+}2Cl^-$	1:2 electrolyte
Green	X	1:1 electrolyte

Q14. Which of the following will give a yellow or orange ppt. with 2,4 DNP? 1 mark

(i) Porpanal (ii) Propanone (iii) Propanoic acid

A. (i) and (ii)
B. (ii) and (iii)
C. (i) and (iii)
D. (i), (ii) and (iii)

Q15. Assertion (A): The pK_a of ethanoic acid is lower than that of Cl-CH_2-COOH. Reason (R): Chlorine shows electron withdrawing (-I) effect which increases the acidic character of Cl-CH_2-COOH. Select the correct answer: (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. 1 mark

Q16. Assertion (A): The boiling point of ethanol is higher than that of methoxymethane.
Reason (R): There is intramolecular hydrogen bonding in ethanol.
(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. 1 mark

Section B
5 Very Short Answer questions of 2 marks each

Q17. Write the reactions involved when D-glucose is treated with the following reagents:
(a) HCN
(b) Br_2 water 2 marks

Q18. Define the following terms :
(a) Ambidentate ligand
(b) Crystal field splitting energy 2 marks

Q19. On diluting two electrolytes 'A' and 'B', the Λ_m of 'A' increases 25 times while that of 'B' increases by 1.5 times. Which of the two electrolytes is strong ? Justify your answer graphically. 2 marks

Q20. Write the Nernst equation for the following cell reaction : $Zn(s) + Cu^{2+}(aq) \rightarrow Zn^{2+}(aq) + Cu(s)$. How will the E_{cell} be affected when concentration of (i) Cu^{2+} ions is increased and (ii) Zn^{2+} ions is increased ? 2 marks

Q21. Complete the following reactions by writing the major and minor product in each case (any 2)
a. $CH_3CH_2Br + KCN \rightarrow$
b. $CH_3CH_2CH = CH_2 + HBr \rightarrow$
c. $(CH_3)_2CHCHClCH_3$ + alc KOH -> 2 marks

Section C
7 Short Answer questions of 3 marks each

Q22. The elements of 3d transition series are given as: Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn. Answer the following: 3 marks
(a) Copper has exceptionally positive $E°_{M^{2+}/M}$ value, why?
(b) Which element is a strong reducing agent in +2 oxidation state and why?
(c) Zn^{2+} salts are colourless. Why?

Q23. (a) What is the difference between native protein and denatured protein? 3 marks
(b) Which one of the following is a disaccharide? Glucose, Lactose, Amylose, Fructose
(c) Which vitamin is responsible for the coagulation of blood?

Q24. (i) Write the hybridisation and magnetic behaviour of the following complexes : 3 marks
(I) $[Ni(CN)_4]^{2-}$
(II) $[FeF_6]^{3-}$
(ii) What type of isomerism is shown by $[Co(NH_3)_5(NO_2)]^{2+}$ and $[Co(NH_3)_5(ONO)]^{2+}$?
[Given : Atomic number : Ni = 28, Fe = 26]

Q25. The equilibrium constant of cell reaction: $Sn^{4+}(aq) + Al(s) \rightarrow Al^{3+} + Sn^{2+}(aq)$ is 4.617×10^{184}, at 25 °C 3 marks
a. Calculate the standard emf of the cell. (Given: $\log 4.617 \times 10^{184} = 184.6644$)
b. What will be the E° of the half cell Al^{3+}/Al, if E° of half cell Sn^{4+}/Sn^{2+} is 0.15 V.

Q26. Answer the following questions: 3 marks
I. Are the enthalpies of atomisation of Zinc and Copper matched correctly? Justify your answer. (Enthalpy of atomisation / $kJmol^{-1}$: Zinc 339, Copper 130)
II. Out of sulphuric acid and hydrochloric acid, which acid will you prefer for permanganate titrations and why?
III. $5NO_2^- + 2MnO_4^- + 6H^+ \rightarrow$ (complete the equation)

Q27. A certain reaction is 50% complete in 20 minutes at 300 K and the same reaction is 50% complete in 5 minutes at 350 K. Calculate the activation energy if it is a first order reaction. 3 marks
[$R = 8.314\ J\ K^{-1}\ mol^{-1}$; $\log 4 = 0.602$]

Q28. Various isomeric haloalkanes with the general formula C_4H_9Cl undergo hydrolysis reaction. Among them, compound "A" is the most reactive through S_N1 mechanism. Identify "A" citing the reason for your choice. Write the mechanism for the reaction. 3 marks

Section D
2 Case-study based questions of 4 marks each (with sub-parts)

Q29. [Case: Phenols undergo electrophilic substitution reactions readily due to the strong activating effect of OH group attached to the benzene ring. Since, the OH group increases the electron density more to o- and p- positions therefore OH group is ortho, para-directing. Reimer-Tiemann reaction is one of the examples of aldehyde group being introduced on the aromatic ring of phenol, ortho to the hydroxyl group. This is a general method used for the ortho-formylation of phenols.] 4 marks

Answer the following questions:

(a) What happens when phenol reacts with (i) Br_2/CS_2 (ii) Conc. HNO_3

(b) Why phenol does not undergo protonation readily?

(c) Which is a stronger acid - phenol or cresol? Give reason.

OR

(c) Write the IUPAC name of the product formed in the Reimer-Tiemann reaction.

Q30. [Case: The rate of a chemical reaction is expressed either in terms of decrease in the concentration of reactants or increase in the concentration of a product per unit time. Rate of the reaction depends upon the nature of reactants, concentration of reactants, temperature, presence of catalyst, surface area of the reactants and presence of light. Rate law states that the rate of reaction depends upon the concentration terms on which the rate of reaction actually depends, as observed experimentally. The sum of powers of the concentration of the reactants in the Rate law expression is called order of reaction while the number of reacting species taking part in an elementary reaction which must collide simultaneously in order to bring about a chemical reaction is called molecularity of the reaction.] 4 marks

Answer the following questions:

(a) (i) What is a rate determining step?

(ii) Define complex reaction.

(b) What is the effect of temperature on the rate constant of a reaction?

OR

(b) Why is molecularity applicable only for elementary reactions whereas order is applicable for elementary as well as complex reactions?

(c) The conversion of molecule X to Y follows second order kinetics. If concentration of X is increased 3 times, how will it affect the rate of formation of Y?

Section E

3 Long Answer questions of 5 marks each

Q31. Attempt either A or B. 5 marks

A. Answer the following questions:

I. Write the structure of expected product of Cannizzaro reaction of 2-chlorobenzaldehyde.

II. How would the presence of $-SO_3H$ group effect the basic strength of aniline.

III. Convert acetic acid to ethanamine.

IV. Write the steps to prepare Benzoic acid from Benzoyl chloride.

V. Give a chemical test to distinguish between: propanal and propanone

Q32. (i) Write the Nernst equation and calculate the emf of the following cell at 298 K : 5 marks

$Mg\ (s)\ |\ Mg^{2+}\ (0.001\ M)\ ||\ Cu^{2+}\ (0.0001\ M)\ |\ Cu\ (s)$

Given : $E^{o}_{Mg^{2+}/Mg} = -2.36\ V$, $E^{o}_{Cu^{2+}/Cu} = +0.34\ V$

[log 10 = 1]

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

Q33. (i) Carry out the following conversions : 5 marks

(1) Ethanal to But-2-en-1-al

(2) Propanoic acid to 2-chloropropanoic acid

(ii) An alkene with molecular formula C_5H_{10} on ozonolysis gives a mixture of two compounds 'B' and 'C'. Compound 'B' gives positive Fehling test and also reacts with iodine and NaOH solution. Compound 'C' does not give Fehling solution test but forms iodoform. Identify the compounds 'A', 'B' and 'C'.

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