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Candidates must write the Set No on the title page of the answer book.

**SAHODAYA PRE BOARD EXAMINATION – 2025-26**

- ◆ Please check that this question paper contains **10** printed pages.
- ◆ Set number given on the right-hand side of the question paper should be written on the title page of the answer book by the candidate.
- ◆ Check that this question paper contains **33** questions.
- ◆ Write down the Serial Number of the question in the left side of the margin before attempting it.
- ◆ 15 minutes time has been allotted to read this question paper. The question paper will be distributed 15 minutes prior to the commencement of the examination. The students will read the question paper only and will not write any answer on the answer script during the period. Students should not write anything in the question paper.

**CLASS – XII****Sub.: CHEMISTRY (043)****Time Allowed: : 3 hours****Maximum Marks: 70****General Instructions:****Read the following instructions very carefully and strictly follow them:**

- (i) This question paper contains 33 questions. All questions are compulsory.
- (ii) Question paper is divided into five sections - Section A, B, C, D and E
- (iii) In Section A : Question numbers 1 to 16 are Multiple Choice (MCQ) type Questions carrying 1 mark each.
- (iv) In Section B : Question numbers 17 to 21 are Very Short Answer (VSA) type questions carrying 2 marks each.
- (v) In Section C : Question numbers 22 to 28 are Short Answer (SA) type questions carrying 3 marks each.
- (vi) In Section D : Question numbers 29 and 30 are Case based questions carrying 4 marks each.
- (vii) In Section E : Question numbers 31 to 33 are Long Answer (LA) type questions carrying 5 marks each.
- (viii) There is no overall choice. However, an internal choice has been provided in one question in Section B, one question in Section C, two questions in Section D and three questions in Section E.
- (ix) Use of Calculator is NOT allowed.

**SECTION - A**

01. Consider the following pairs of solution and find which will be Isotonic at the same temperature? (1)

- (a) 2M Aq. NaCl and 2M Aq. Urea
- (b) 1.5M CaCl<sub>2</sub> and 1.5M KCl
- (c) 1.5M AlCl<sub>3</sub> and 3M Na<sub>2</sub>SO<sub>4</sub>
- (d) 2.5M KCl and 1M Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>

02. The decreasing order of electrical conductivity of the following Aq. Solution (1)

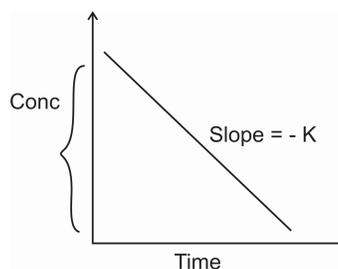
- 0.1 M NaCl (A)
- 0.01M NaCl (B)
- 0.001 M NaCl (C)

- (a) A > B > C
- (b) A = B = C
- (c) A > C > B
- (d) C > B > A

03. For a reaction  $A + B \rightarrow C$  of the rate law (1)

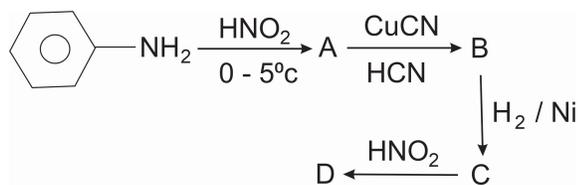
$r = K[A]^2[B]$ , when the conc. of both A and B are doubled rate increases by "X" times.

At the same time conc Vs T graph gives for a reaction whose order is "Y". Find the value of X + Y = ?



- (a) 3
- (b) 4
- (c) 8
- (d) 9

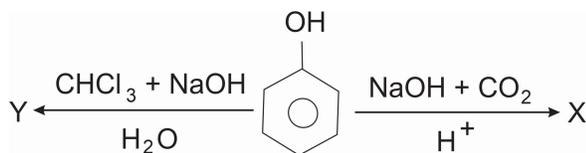
04. (1)



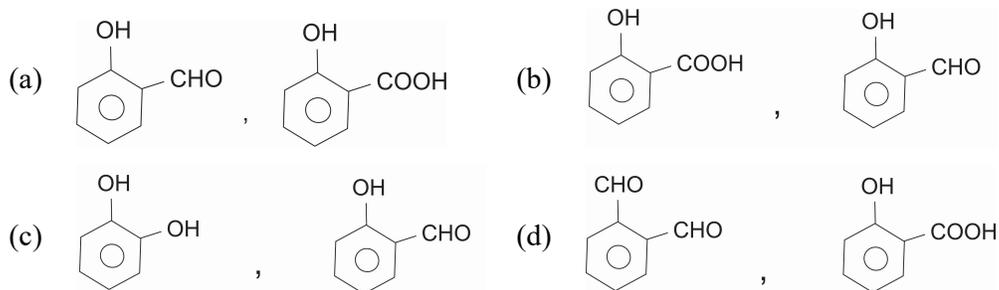
Structure of D will be

- (a)  $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$
- (b)  $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$
- (c)
- (d)

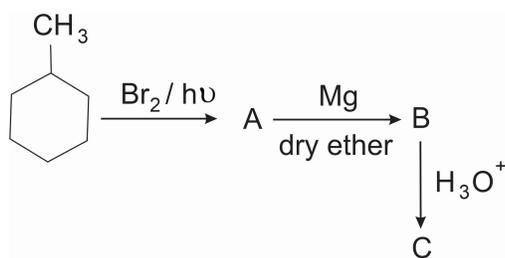
05. (1)



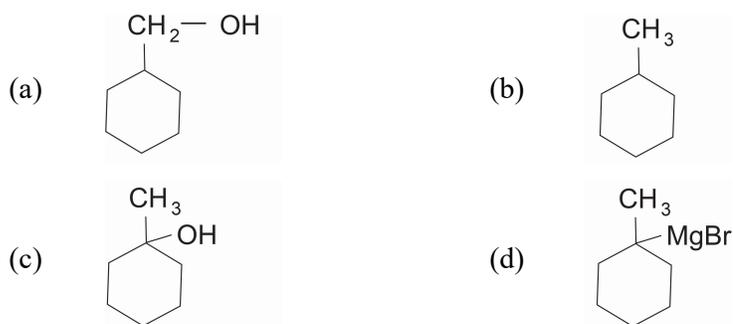
X and Y will be



06. (1)



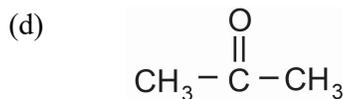
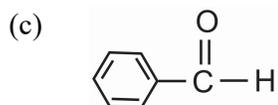
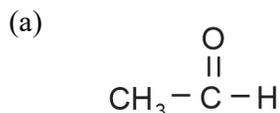
Compound C is



07. Which of the following reaction of glucose can be explained only by its cyclic structure? (1)

- (a) Glucose forms pentaacetate
- (b) Glucose reacts with hydroxylamine to form an oxime.
- (c) Pentaacetate of glucose does not react with hydroxylamine.
- (d) Glucose is oxidized to saccharic acid by nitric acid .

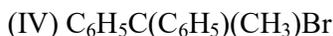
08. Which of the following doesn't give aldol condensation reaction? (1)



09. Which of the following compound gives Oxime with  $\text{NH}_2\text{OH}$  (1)



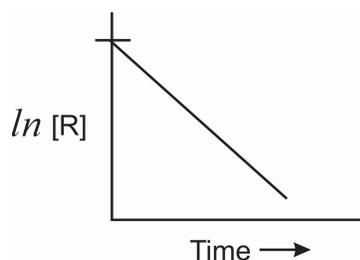
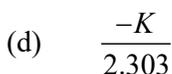
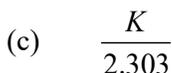
10. The correct order of decreasing reactivity of the following compounds towards  $\text{SN}^1$  reactions is (1)



11. Van't hoff factor of  $\text{Aq. } K_4[\text{Fe}(\text{CN})_6]$  is (1)



12. In the following graph the slope is (1)



(Q.No 13 to 16 are Assertion and Reason based questions)

(a) Both Assertion and Reason are correct and Reason is a correct explanation of the Assertion.

(b) Both Assertion and Reason are correct but Reason is not the correct explanation of the Assertion.

(c) Assertion is correct but Reason is incorrect.

(d) Assertion incorrect but reason is correct.

(e) Both the Assertion and Reason are incorrect.

13. **Assertion :** Benzyl chloride is hydrolysed less readily than chlorobenzene. (1)

**Reason :** Benzyl carbocation is stabilised by resonance.

14. **Assertion :** During electrolysis of Aq. NaCl using pt electrode O<sub>2</sub> is liberated instead of Cl<sub>2</sub> at anode. (1)

**Reason :** The over potential of OH<sup>-</sup> for the formation O<sub>2</sub> gas at anode is quite high in comparison to the formation of chlorine.

15. **Assertion :** α-Amino acids exist as dipolar ions or zwitter ions. (1)

**Reason :** α-Amino acids are the building blocks of proteins.

16. **Assertion :** Benzoic acid doesn't undergo Friedel craft reactions. (1)

**Reason :** Carboxyl group is deactivating and it is bonded to AlCl<sub>3</sub> to form a salt.

### SECTION - B

17. The vapour pressure of a solution of glucose in water is 750 mm Hg at 100°C. (2)  
Calculate the mole fraction of solute.

(Vapour pressure of water at 373 K = 760 mm Hg)

**OR**

(a) 20 ml of a liquid A was mixed with 20 ml of liquid B. The volume of resulting solution was found to be less than 40 ml. What do you conclude from this data? (1+1)

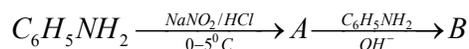
(b) How does sprinkling of salt help in clearing the snow covered roads in hilly areas?

18. (a) Write the chemical name of Vitamin B<sub>12</sub> and name one of its deficiency disease. (2)

(b) Where does the water present in the egg go after boiling the egg?

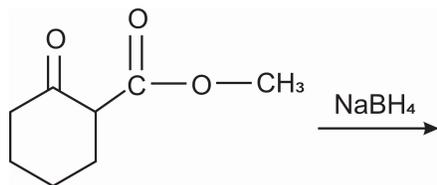
19. (a) Give reason for the following: (1+½+½)  
Aniline does not undergo Friedel Crafts reaction.

(b) Identify A and B in each of the following processes.



20. (a) Write the reactions involved in Williamson synthesis. (1+1)

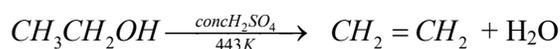
(b) Complete the reaction



21. (a) Write magnetic nature and colour of  $MnO_4^-$  ion. (1+1)  
 (b)  $Cu^+(aq)$  undergoes disproportionation reaction. Give reason.

**SECTION - C**

22. Write the mechanism of the following reaction. (3)



23. Answer the following (1+1+1)

- (a) Convert the following  
 Aniline to p-Bromoaniline  
 (b) Give a chemical test to distinguish between  
 N – methyl Aniline and N, N- Dimethyl aniline  
 (c) Arrange the following.  
 $CH_3NH_2$ ,  $NH_3$ ,  $(CH_3)_2NH$ ,  $(CH_3)_3N$   
 (Decreasing order of basicity in aqueous solution)

24. (a) Give reason for the following. (1+1+1)

Allyl chloride is more reactive than n-propyl chloride towards nucleophilic substitution reaction.

- (b) Write the chemical equation for Swarts reaction.  
 (c) Convert the following.  
 But-1-ene to But-2-ene

25. (a) Draw the Geometrical Isomer of  $[Co(NH_3)_4Cl_2]^+$  which is optically (2+1)

inactive and write its IUPAC name.

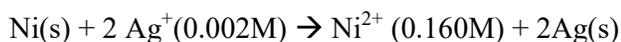
- (b) Write the electronic configuration for  $d^5$  ion if  $\Delta_0 > P$

26. 3.9g of benzoic acid dissolved in 49g of benzene shows a depression in freezing (3)  
 point of 1.62K. Calculate the van't Hoff factor and predict the nature of solute  
 (associated or dissociated).

[ Given:  $K_f$  for benzene = 4.9 K kg mol<sup>-1</sup> ]

27. (a) Calculate the pH of the hydrogen electrode in contact with a solution whose (1+2)  
 pH is 10.

- (b) Calculate the e.m.f of the cell in which the following reaction takes place:



Given that  $E^0_{cell} = 1.05V$ .

28. What happens when D-glucose reacts with following reagent (3)
- (i) Br<sub>2</sub> water            (ii) HCN            (iii) (CH<sub>3</sub>CO)<sub>2</sub>O

**OR**

Differentiate between the following.

- (i) Amylose and Amylopectin.  
(ii) Nucleoside and Nucleotide.  
(iii) Fibrous protein and Globular protein.

**SECTION - D**

29. A lead storage battery is the most important type of secondary cell having a lead anode and a grid of lead packed with PbO<sub>2</sub> as cathode. A 38% solution of sulphuric acid is used as electrolyte. ( Density = 1.294 g/ml). The battery holds 3.5 L of the acid. During the discharge of the battery the density of H<sub>2</sub>SO<sub>4</sub> falls to 1.193g/ml. (20% H<sub>2</sub>SO<sub>4</sub> by mass) (1+1+1+1)
- (a) Write the reaction taking place at the cathode when the battery is in use.  
(b) During the working of a lead–storage battery, the density of H<sub>2</sub>SO<sub>4</sub> decreases. Which of the following indications is correct ?  
(i) The battery is fully charged.  
(ii) The concentration of H<sub>2</sub>SO<sub>4</sub> increases.  
(iii) The battery is discharging.  
(iv) Water is being converted to acid.

**OR**

What is the molarity of sulphuric acid before discharge ?

- (c) How much electricity in terms of Faraday is required to carry out the reduction of one mole of PbO<sub>2</sub>?
- (d) Write the products of electrolysis when dilute sulphuric acid is electrolysed using platinum electrode.
30. **Read the passage carefully.** (1+2+1)
- Coordination chemistry has applications in catalysis, medicine, and metallurgy, as well as in biological processes and chemical analysis. Key industrial uses include acting as catalysts in polymerization, extracting and purifying metals, and producing pigments and dyes. In medicine, they are used in chelation therapy to treat heavy metal poisoning, in anti-cancer drugs, and as diagnostic imaging agents.

**Based on the information provided above, Answer the following questions:**

I. Why is  $[\text{Fe}(\text{C}_2\text{O}_4)_3]^{3-}$  more stable than  $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ ?

**OR**

Arrange the following complexes in the increasing order of conductivity of their solution

$[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$ ,  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ ,  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ ,  $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$

II.  $\text{CoSO}_4\text{Cl}\cdot 5\text{NH}_3$  exists in two isomeric forms 'A' and 'B'. Isomer 'A' reacts with  $\text{AgNO}_3$  to give white precipitate, but does not react with  $\text{BaCl}_2$ . Isomer 'B' gives white precipitate with  $\text{BaCl}_2$  but does not react with  $\text{AgNO}_3$ .

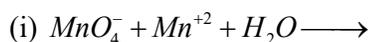
Name the type of isomerism involved and write the IUPAC name of 'A' and 'B'.

III. Why does an aqueous pink solution of cobalt (II) chloride change to deep blue on addition of excess of  $\text{HCl}$ ?

**SECTION - E**

31. (a) A blackish brown coloured solid (A) when fused with alkali metal hydroxides in presence of air, produces a dark green coloured compound (B), which on electrolytic oxidation in alkaline medium gives a dark-purple coloured compound (C). Identify compounds 'A', 'B' and 'C'. Write the reactions involved. (3+1+1)

(b) Complete and balance the reaction.



**OR**

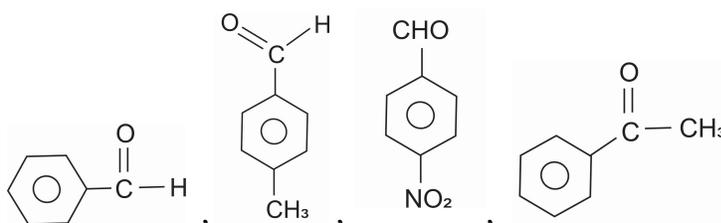
(a) Write the reaction involved for the preparation of  $\text{K}_2\text{Cr}_2\text{O}_7$  from chromite ore. (3+1+1)

(b) What is "Mischmetal"? Give its one use.

(c)  $E^0$  value of  $\text{Mn}^{+3} / \text{Mn}^{+2}$  couple is highly positive as compared to  $\text{Cr}^{+3} / \text{Cr}^{+2}$ . Why?

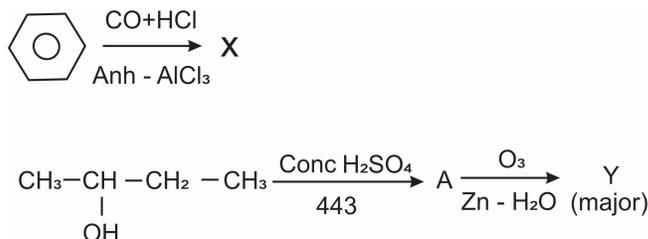
32. (a) X, Y and Z are three organic compounds which show orange red ppt with 2, 4 DNP. X and Y show positive Tollen's test whereas Z does not. X and Z show yellow PPT with  $\text{NaOH}$  and  $\text{I}_2$  but Y doesn't. Z on drastic oxidation gives  $\text{C}_7\text{H}_6\text{O}_2$ . Y is the next homologous series compound of X. (3+1+1)

- (i) Identify X, Y and Z.  
 (ii) Write reaction involved during drastic oxidation of Z.  
 (iii) Write IUPAC name of Y.
- (b) How can you chemically distinguish Pentan-2-one and Pentan-3-one?
- (c) Arrange the following according to increasing order of nucleophilic addition reaction



**OR**

- (a) (2+2+1)



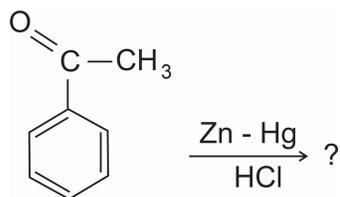
Find X and Y and give a chemical test to distinguish X and Y.

- (b) Explain with reasons.

(i)  $\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$  will show positive Tollen's test.

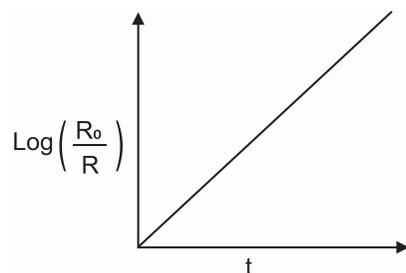
(ii) 2-Methyl propanal although having an  $\alpha$ -hydrogen undergoes Cannizzaro reaction.

- (c) Find the product of the following reaction.



33. (a) Deepak was instructed to prepare ester. So he started to prepare ester from Carboxylic acid and Alcohol in presence of  $\text{H}^+$ . During formation of ester he forgot to remove water and he realised his mistake and found the reaction is already reversed. (2+3)

- (i) What is the order of reversible or reverse reaction?
- (ii) For the reverse reaction if the concentration of both reactants are doubled, how many times the rate of the reaction will change?
- (b) Observe the graph and answer the following question.



- (i) What is the order of the reaction?
- (ii) If slope of the curve =  $2 \times 10^{-4} \text{ min}^{-1}$ , find rate constant.
- (iii) Find half life of the reaction.

**OR**

- (a) The rate of a gaseous reaction doubles when temperature changes from  $27^{\circ}\text{C}$  to  $37^{\circ}\text{C}$ . Calculate the  $E_a$  (activation energy) for this reaction. (3+2)  
 ( $2.303R = 19.15 \text{ JK}^{-1} \text{ mol}^{-1}$ ,  $\log 2 = 0.3010$ )
- (b) A first order reaction is 50% completed in 50 minutes. Calculate the time required for completion of 90% of the reaction.