



# NEET (UG) 2023

## (MANIPUR)

### Questions, Answer Key & Solutions | Subject : Chemistry

Date: 06 June, 2023 | TIME: (12:00 PM to 03:20 PM)

Duration: 200 minutes (03 Hrs. 20 Min.) | Max. Marks: 720

#### Important Instructions:

- The Answer Sheet is inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars on OFFICE Copy carefully with **blue/black** ball point pen only.
- The test is of **3 hours 20 minutes** duration and Test Booklet contains **200** multiple-choice questions (four options with a single correct answer) from **Physics, Chemistry and Biology (Botany and Zoology)**. **50** questions in each subject are divided into **two Sections (A and B)** as per details given below :
  - Section A** shall consist of **35 (Thirty-five)** Questions in each subject (Questions Nos – 1 to 35, 51 to 85, 101 to 135 and 151 to 185). All questions are compulsory.
  - Section B** shall consist of **15 (Fifteen)** questions in each subject (Question Nos - 36 to 50, 86 to 100, 136 to 150 and 186 to 200). In Section B, a candidate needs to **attempt any 10 (Ten) questions out of 15 (Fifteen)** in each subject. **Candidates are advised to read all 15 questions in each subject of Section B** before they start attempting the question paper. In the event of a candidate attempting more than ten questions, **the first ten questions answered by the candidate shall be evaluated.**
- Each question carries **4 marks**. For each correct response, the candidate will get 4 marks. For each incorrect response, **one mark** will be deducted from the total scores. **The maximum marks are 720.**
- Use **Blue/Black Ball Point Pen only** for writing particulars on this page/markings responses on Answer Sheet.
- Rough work is to be done on the space provided for this purpose in the Test Booklet only.
- On completion of the test, the candidate **must hand over the Answer Sheet (ORIGINAL and OFFICE Copy) to the Invigilator** before leaving the Room/Hall. The candidates are allowed to take away this Test Booklet with them.
- The CODE for this Booklet is F6. Make sure that the CODE printed on the Original Copy of the Answer Sheet is the same as that on this Test Booklet.** In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.
- The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your Roll No. anywhere else except in the specified space in the Test Booklet/Answer Sheet.
- Use of white fluid for correction is **NOT** permissible on the Answer Sheet.
- Each candidate must show on-demand his/her Admit Card to the Invigilator.
- No candidate, without special permission of the centre Superintendent or Invigilator, would leave his/her seat.
- The candidates should not leave the Examination Hall without handing over their Answer Sheet to the Invigilator on duty and sign (with time) the Attendance Sheet twice. **Cases, where a candidate has not signed the Attendance Sheet second time, will be deemed not to have handed over the Answer Sheet and dealt with as an Unfair Means case.**
- Use of Electronic/ Manual Calculator is prohibited.
- The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Room/Hall. All cases of unfair means will be dealt with as per the Rules and Regulations of this examination.
- No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.**
- The candidates will write the Correct Test Booklet Code as given in the Test Booklet/Answer Sheet in the Attendance Sheet.
- Compensatory time of one hour five minutes will be provided for the examination of three hours and 20 minutes duration, whether such candidate (having a physical limitation to write) uses the facility of scribe or not.

In case of any ambiguity in translation of any question, English version shall be treated as final.

प्रश्नों के अनुवाद में किसी अस्पष्टता की स्थिति में, अंग्रेजी संस्करण को ही अन्तिम माना जायेगा।

Name of the Candidate (in Capital letters): \_\_\_\_\_

Roll Number: in figures: \_\_\_\_\_

in words: \_\_\_\_\_

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**PART-B : CHEMISTRY**

51. Incorrect set of quantum numbers from the following is:

- (1)  $n = 4, l = 3, m_l = -3, -2, -1, 0, +1, +2, +3, m_s = -1/2$
- (2)  $n = 5, l = 2, m_l = -2, -1, +1, +2, m_s = +1/2$
- (3)  $n = 4, l = 2, m_l = -2, -1, 0, +1, +2, m_s = -1/2$
- (4)  $n = 5, l = 3, m_l = -3, -2, -1, 0, +1, +2, +3, m_s = +1/2$

Ans. (2)

Sol.  $n = 5, l = 2, m_l = -2$  to  $+2$   
 $m_l = -2, -1, 0, +1, +2$   
 $m_s = +1/2$  or  $-1/2$

52. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

**Assertion (A):** Ionisation enthalpy increases along each series of the transition elements from left to right. However, small variations occur.

**Reason (R):** There is corresponding increase in nuclear charge which accompanies the filling of electrons in the inner d-orbitals.

In the light of the above statements, choose the most appropriate answer from the options given below:

- (1) **(A)** is correct but **(R)** is not correct.
- (2) **(A)** is not correct but **(R)** is correct.
- (3) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A)**.
- (4) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A)**.

Ans. (3)

Sol. Both (A) and (R) correct and R is the correct explanation of (A)

NCERT BASED → Chapter d & s-block page no = 221

53. Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

**Assertion (A):** Lithium and beryllium unlike their other respective group members form compounds with pronounced ionic character.

**Reason (R):** Lithium and Magnesium have similar properties due to diagonal relationship.

In the light of the above statements, choose the correct answer from the options given below:

- (1) **(A)** is true but **(R)** is false.
- (2) **(A)** is false but **(R)** is true.
- (3) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
- (4) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.

Ans. (2)

Sol. NCERT BASED anomalous properties of Li and Be

Similarities between Li and Mg due to diagonal Relationship page no. = 304 [NCERT]

54. For a weak acid HA, the percentage of dissociation is nearly 1% at equilibrium. If the concentration of acid is  $0.1 \text{ mol L}^{-1}$ , then the correct option for its  $K_a$  at the same temperature is:

- (1)  $1 \times 10^{-4}$
- (2)  $1 \times 10^{-6}$
- (3)  $1 \times 10^{-5}$
- (4)  $1 \times 10^{-3}$

Ans. (3)

Sol.  $\text{HA} \rightleftharpoons \text{H}^+ + \text{A}^-$

C                    0                    0

C-C $\alpha$             C $\alpha$             C $\alpha$

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$$K_a = \frac{C^2 \alpha^2}{C - C\alpha} \Rightarrow k_a = \frac{C\alpha^2}{1 - \alpha} \dots\dots(i)$$

$$1 \gg \alpha, 1 - \alpha = 1$$

$$k_a = C\alpha^2$$

$$k_a = 0.1 \times (10^{-2})^2 \text{ given that } C = 0.1M, \alpha = 1\% = \frac{1}{100} = 10^{-2}$$

$$k_a = 1 \times 10^{-5}$$

55. The density of 1M solution of a compound 'X' is 1.25g mL<sup>-1</sup>. The correct option for the molality of solution is (Molar mass of compound X=85 g):

- (1) 0.705 m                      (2) 1.208 m                      (3) 1.165 m                      (4) 0.858 m

Ans. (4)

Sol. Relation between molarity (M) and molality (m)

$$\frac{1}{m} = \frac{d}{M} - \frac{m_B}{1000}$$

m = molality

M = molarity

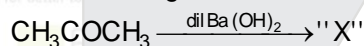
d = density

m<sub>B</sub> = molar mass of solute (g)

$$\frac{1}{m} = \frac{1.25}{1} - \frac{85}{1000} \Rightarrow \frac{1}{m} = \frac{1250 - 85}{1000} = \frac{1165}{1000}$$

$$m = \frac{1000}{1165} \Rightarrow m = 0.858 \text{ m}$$

56. Consider the given reaction:

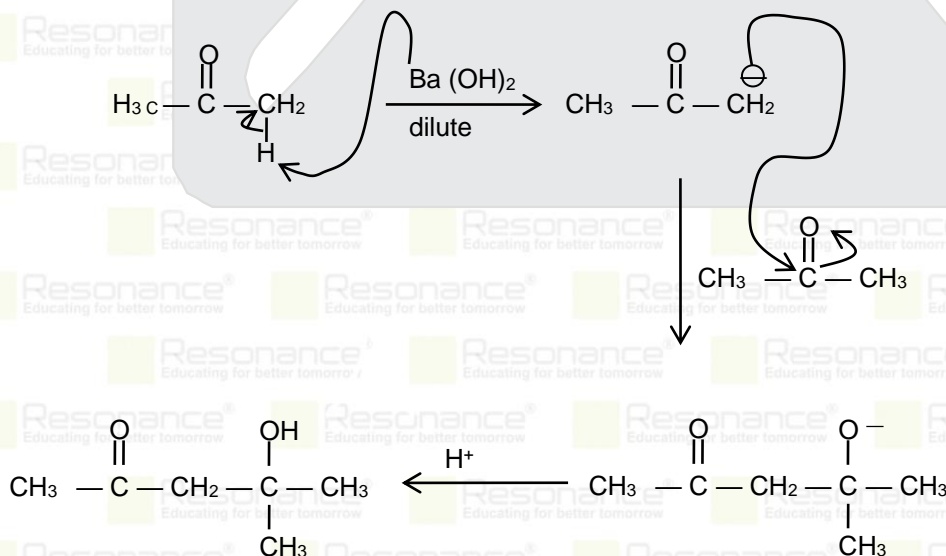


The functional groups present in compound "X" are:

- (1) ketone and double bond                      (2) double bond and aldehyde  
(3) alcohol and aldehyde                      (4) alcohol and ketone

Ans. (4)

Sol. alcohol and ketone



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57. The  $E^\circ$  Values for

$$\text{Al}^+ / \text{Al} = + 0.55 \text{ V and } \text{Ti}^+ / \text{Ti} = -0.34 \text{ V}$$

$$\text{Al}^{3+} / \text{Al} = - 1.66 \text{ V and } \text{Ti}^{3+} / \text{Ti} = + 1.26 \text{ V}$$

Identify the incorrect statement.

- (1) Al is more electropositive than Ti. (2)  $\text{Ti}^{3+}$  is a good reducing agent than  $\text{Ti}^+$ .  
(3)  $\text{Al}^+$  is unstable in solution. (4) Ti can be easily oxidised to  $\text{Ti}^+$  than  $\text{Ti}^{3+}$ .

Ans. (2)

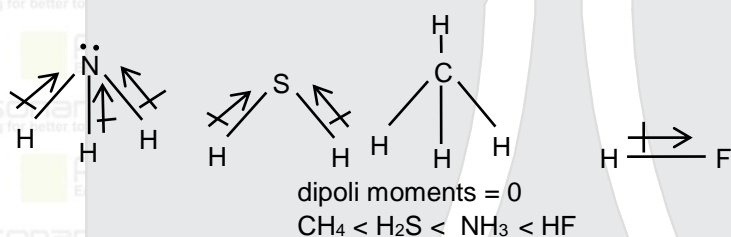
Sol.  $\text{Ti}^{3+}$  is a good oxidising agent than  $\text{Ti}^+$ . (Correct statement)

58. The correct order of dipole moments for molecules  $\text{NH}_3, \text{H}_2\text{S}, \text{CH}_4$  and HF is :

- (1)  $\text{CH}_4 > \text{H}_2\text{S} > \text{NH}_3 > \text{HF}$  (2)  $\text{H}_2\text{S} > \text{NH}_3 > \text{HF} > \text{CH}_4$   
(3)  $\text{NH}_3 > \text{HF} > \text{CH}_4 > \text{H}_2\text{S}$  (4)  $\text{HF} > \text{NH}_3 > \text{H}_2\text{S} > \text{CH}_4$

Ans. (4)

Sol.  $\text{NH}_3, \text{H}_2\text{S}, \text{CH}_4, \text{HF}$



59. Molar conductance of an electrolyte increases with dilution according to the equation:

$$\Lambda_m = \Lambda_m^0 - A\sqrt{c}$$

Which of the following statements are true?

- (A) This equation applies to both strong and weak electrolytes.  
(B) Value of the constant A depends upon the nature of the solvent.  
(C) Value of constant A is same for both  $\text{BaCl}_2$  and  $\text{MgSO}_4$ .  
(D) Value of constant A is same for both  $\text{BaCl}_2$  and  $\text{Mg}(\text{OH})_2$ .

Choose the most appropriate answer from the options given below:

- (1) (A) and (B) only (2) (A), (B) and (C) only  
(3) (B) and (C) only (4) (B) and (D) only

Ans. (4)

Sol.  $\Lambda_m = \Lambda_m^0 - A\sqrt{c}$

$\Rightarrow$  only for Strong Electrolyte

$\Rightarrow$  Value of A depends upon the nature of Solvent

$\Rightarrow$  Value of constant A is same for both  $\text{BaCl}_2$  and  $\text{Mg}(\text{OH})_2$

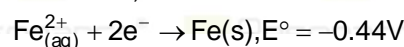
60. Cheilosis occurs due to deficiency of \_\_\_\_\_.

- (1) thiamine (2) nicotinamide (3) pyridoxamine (4) riboflavin

Ans. (4)

Sol. Cheilosis (fissuring at corners of mouth and lips) due to deficiency of Vitamin  $\text{B}_1$  (Riboflavin)

61. The correct value of cell potential in volt for the reaction that occurs when the following two half cells are connected, is



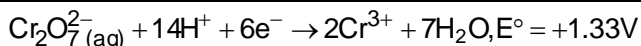
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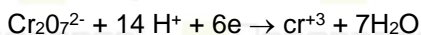
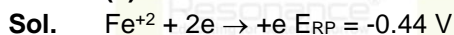
(1) + 1.77 V

(2) + 2.65 V

(3) + 0.01 V

(4) + 0.89 V

Ans. (1)

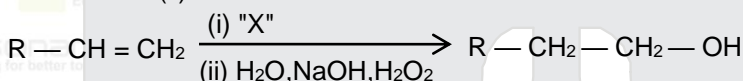
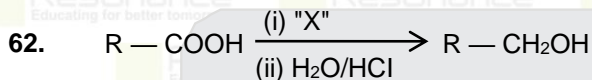


$$E_{\text{RP}} = +1.33\text{V}$$

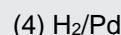
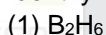
$$E^\circ_{\text{cell}} = E_{\text{RP}}(\text{cathode}) - E_{\text{RP}}(\text{anode})$$

$$= 1.33 - [-0.44]$$

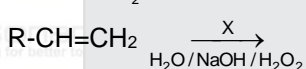
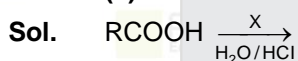
$$= 1.77\text{V} \text{ Ans. (1)}$$



Identify 'X' in above reactions.



Ans. (1)



$\text{LiAlH}_4$  does not reduce alkene.

$\text{NaBH}_4$  does not reduce alkene.

$\text{H}_2/\text{Pd}$  reduce alkene to alkane.

63. For a reaction  $3\text{A} \rightarrow 2\text{B}$

The average rate of appearance of B is given by  $\frac{\Delta[\text{B}]}{\Delta t}$ .

The correct relation between the average rate of appearance of B with the average rate of disappearance of A is given in option:

(1)  $\frac{-\Delta[\text{A}]}{\Delta t}$

(2)  $\frac{-3\Delta[\text{A}]}{2\Delta t}$

(3)  $\frac{-2\Delta[\text{A}]}{3\Delta t}$

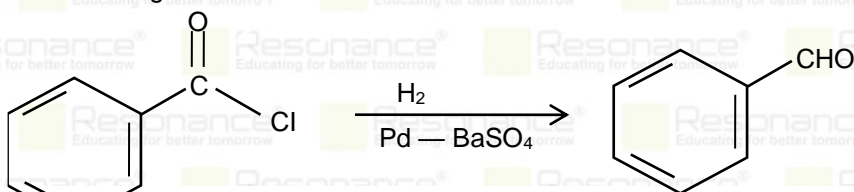
(4)  $\frac{\Delta[\text{A}]}{\Delta t}$

Ans. (3)



$$\frac{\Delta[\text{B}]}{\Delta t} = \frac{-2}{3} \frac{\Delta[\text{A}]}{\Delta t}$$

64. The following conversion is known as:



(1) Stephen reaction

(2) Gattermann-Koch reaction

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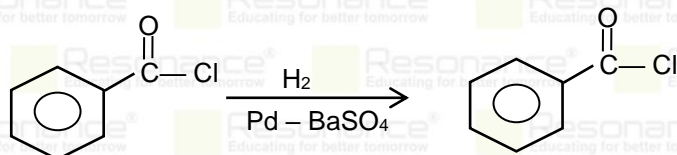
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(3) Etard reaction

(4) Rosenmund reaction

Ans. (4)



Sol.

Name Reaction → Rosenmund Reaction

65. Which amongst the following is used in controlling depression and hypertension?

- (1) Seldane (2) Valium (3) Equanil (4) Prontosil

Ans. (3)

Sol. depression of hypertension Controlled by equine

66. Which one of the following represents all isoelectronic species ?

- (1) Na<sup>+</sup>, Cl<sup>-</sup>, O<sup>-</sup>, NO<sup>+</sup> (2) N<sub>2</sub>O, N<sub>2</sub>O<sub>4</sub>, NO<sup>+</sup>, NO (3) Na<sup>+</sup>, Mg<sup>2+</sup>, O<sup>-</sup>, F<sup>-</sup> (4) Ca<sup>2+</sup>, Ar, K<sup>+</sup>, Cl<sup>-</sup>

Ans. (4)

Sol. isoelectronic species

$$\text{Ca}^{2+} = 18e^{-}$$

$$\text{K}^{+} = 18e^{-}$$

$$\text{Ar} = 18e^{-}$$

$$\text{Cl}^{-} = 18e^{-}$$

67. Given below are two statements:

**Statement I:**

The value of wave function,  $\psi$  depends upon the coordinates of the electron in the atom.

**Statement II:**

The probability of finding an electron at a point within an atom is proportional to the orbital wave function.

In the light of the above statements, choose the correct answer from the options given below

- (1) Statements I is true but Statement II is false  
 (2) Statements I is false but Statement II is true  
 (3) Both Statements I and Statement II are true  
 (4) Both Statements I and Statement II are false

Ans. (1)

Sol. Statement-I true-II is false.

68. The correct van der Waals equation for 1 mole of a real gas is:

$$(1) \left( P + \frac{a}{V^2} \right) (V - b) = RT$$

$$(2) \left( P + \frac{V^2}{a} \right) (V - b) = RT$$

$$(3) \left( P + \frac{an^2}{V^2} \right) (V^2 - nb) = RT$$

$$(4) \left( P + \frac{an^2}{V} \right) (V - nb) = nRT$$

Ans. (1)

Sol.  $\left( P + \frac{n^2 a}{V^2} \right) (V - nb) = nRT.$

$$\left( P + \frac{a}{V^2} \right) (V - b) = RT.$$

$$n = 1$$

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69. The correct option in which the density of argon (Atomic mass = 40) is highest:  
 (1) STP (2) 0°C, 2 atm (3) 0°C, 4 atm (4) 273°C, 4 atm

Ans. (3)

Sol. density max – at ↑ P & ↓ Temp/

70. Which of the following is correctly matched:

- (1) Basic oxides ⇒ In<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, SnO<sub>2</sub> (2) Natural oxides ⇒ CO, NO<sub>2</sub>, N<sub>2</sub>O  
 (3) Acidic oxides ⇒ Mn<sub>2</sub>O<sub>7</sub>, SO<sub>2</sub>, TeO<sub>3</sub> (4) Amphoteric oxides ⇒ BeO, Ga<sub>2</sub>O<sub>3</sub>, GeO

Ans. (3)

Sol. Basic oxide – In<sub>2</sub>O<sub>3</sub>, k<sub>2</sub>O, SnO<sub>2</sub> (amphoteric)

Neutral oxide – CO, NO<sub>2</sub>(acidic). N<sub>2</sub>O<sub>3</sub>

Acidic oxide – Mn<sub>2</sub>O<sub>7</sub>, SO<sub>2</sub>, TeO<sub>3</sub> (all are acidic)

Amphoteric oxide – BeO, Ga<sub>2</sub>O<sub>3</sub>, GeO(acidic)

71. Which of the following is a positively charged sol?

- (1) Methylene blue sol (2) Congo red sol  
 (3) Silver sol (4) Sb<sub>2</sub>S<sub>3</sub> sol

Ans. (1)

Sol. Positively charged sol → Methylene blue sol

Negatively charged sol → Congo red sol, silver sol, Sb<sub>2</sub>S<sub>3</sub> sol

72. Match List – I with List – II

List – I

(Mixtures / Sample)

- (A) Glycerol from spent lye  
 (B) Chloroform + Aniline  
 (C) Fractions of crude oil  
 (D) Aniline + Water

List – II

(Technique used for purification)

- (i) Steam Distillation  
 (ii) Fractional distillation  
 (iii) distillation under reduced pressure  
 (iv) Distillation

Choose the correct answer from the options given below:

- (1) (A) – (iii) , (B) – (iv) , (C) – (ii) , (D) – (i) (2) (A) – (iv) , (B) – (ii) , (C) – (i) , (D) – (iii)  
 (3) (A) – (i) , (B) – (ii) , (C) – (iii) , (D) – (iv) (4) (A) – (i) , (B) – (iii) , (C) – (ii) , (D) – (iv)

Ans. (1)

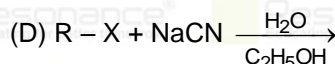
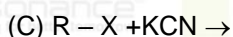
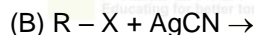
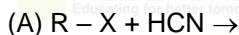
Sol. Glycerol from spent lye → Distillation under reduced pressure

Chloroform + Aniline → Distillation

Fraction of Crude oil → Fractional distillation

Aniline + water → Steam distillation

73. Which amongst the following reactions of alkyl halides produces isonitrile as a major product?



Choose the most appropriate answer from the options given below:

- (1) (D) Only (2) (C) and (D) Only (3) (B) Only (4) (A) and (B) Only

Ans. (3)

Sol. (a)  $R - X + HCN \longrightarrow RCN + HX$

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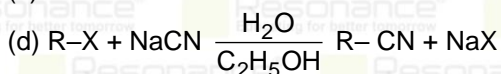
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Since, in AgCN, covalent bond b/w Ag & CN is present Hence, only (b) produces isonitrile as major product

74. Match List – I with List – II

List – I

(Hydride)

(A) NaH

(B) PH<sub>3</sub>

(C) GeH<sub>4</sub>

(D) LaH<sub>2.87</sub>

List – II

(Type of Hydride)

(i) Electron precise

(ii) Saline

(iii) Metallic

(iv) Electron rich

Choose the correct answer from the options given below:

(1) (A) – (iii) , (B) – (iv) , (C) – (ii) , (D) – (i)

(2) (A) – (ii) , (B) – (iii) , (C) – (iv) , (D) – (i)

(3) (A) – (i) , (B) – (iii) , (C) – (ii) , (D) – (iv)

(4) (A) – (ii) , (B) – (iv) , (C) – (i) , (D) – (iii)

Ans. (4)

Sol. Hydride	Type of Hydride
NaH	Saline
PH <sub>3</sub>	electron rich
GeH <sub>4</sub>	electron precise
LaH <sub>2.87</sub>	metallic

75. Which one of the following statements is **incorrect** related to Molecular Orbital Theory?

(1) The  $\pi^*$  antibonding molecular orbital has a node between the nuclei

(2) In the formation of bonding molecular orbital, the two electron waves of the bonding atoms reinforce each other.

(3) Molecular orbital obtained from 2P<sub>x</sub> and 2P<sub>y</sub> orbitals are symmetrical around the bond axis.

(4) A  $\pi$  – bonding molecular orbital has larger electron density above and below the internuclear axis.

Ans. (3)

Sol. Molecular orbitals obtained from 2P<sub>x</sub> and 2P<sub>y</sub> orbitals are unsymmetrical around the bond axis.

76. An acidic buffer is prepared by mixing:

(1) weak acid and it's salt with strong base.

(2) equal volumes of equimolar solutions of weak acid and weak base.

(3) strong acid and it's salt with strong base.

(4) strong acid and it's salt with weak base. (The pK<sub>a</sub> of acid = pK<sub>b</sub> of the base)

Ans. (1)

Sol. An acidic buffer is prepared by weak acid and its salt with strong base.

77. Reagents which can be used to convert alcohols to carboxylic acids, are:

(A) CrO<sub>3</sub>-H<sub>2</sub>SO<sub>4</sub>

(B) K<sub>2</sub>Cr<sub>2</sub>O<sub>7</sub>+H<sub>2</sub>SO<sub>4</sub>

(C) KMnO<sub>4</sub>+KOH/H<sub>3</sub>O<sup>+</sup>

(D) Cu, 573 K

(E) CrO<sub>3</sub>, (CH<sub>3</sub>CO)<sub>2</sub>O

Choose the **most appropriate** answer from the options given below:

(1) (B), (C) and (D) only

(2) (B), (D) and (E) only

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(3) (A), (B) and (C) only

(4) (A), (B) and (E) only

Ans. (3)

Sol. Regents which can be used to convert alcohols to carboxylic acid are

- $\text{CrO}_3 - \text{H}_2\text{SO}_4 \rightarrow$  Jones Reagent
- $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4$
- $\text{KMnO}_4 + \text{KOH}/\text{H}_3\text{O}^+$

(Cu, 573 k) of  $[\text{CrO}_3, (\text{CH}_3\text{CO})_2\text{O}]$  does not oxidise alcohol to carboxylic acid

78. Select the element (M) whose trihalides cannot be hydrolysed to produce an ion of the form  $[\text{M}(\text{H}_2\text{O})_6]^{3+}$ .

(1) Ga

(2) In

(3) Al

(4) B

Ans. (4)

Sol. As B does not have d-orbitals, so its trihalides cannot be hydrolysed to produce an ion of the form  $[\text{M}(\text{H}_2\text{O})_6]^{3+}$

79. The correct option for the rate law that corresponds to overall first order reaction is:

(1) Rate =  $k [\text{A}]^0 [\text{B}]^2$

(2) Rate =  $k [\text{A}] [\text{B}]$

(3) Rate =  $k [\text{A}]^{1/2} [\text{B}]^2$

(4) Rate =  $k [\text{A}]^{-1/2} [\text{B}]^{3/2}$

Ans. (4)

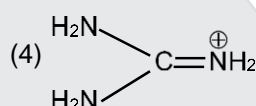
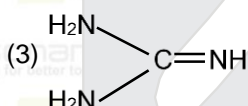
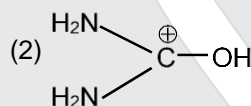
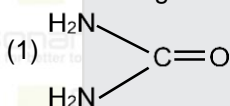
Sol. (1) Rate =  $k [\text{A}]^0 [\text{B}]^2$  , order = 2

(2) Rate =  $k [\text{A}] [\text{B}]$  , order = 2

(3) Rate =  $k [\text{A}]^{1/2} [\text{B}]^2$  , order =  $\frac{1}{2} + 2 = \frac{5}{2}$

(4) Rate =  $k [\text{A}]^{-1/2} [\text{B}]^{3/2}$  , order =  $\frac{-1}{2} + \frac{3}{2} = \frac{2}{2} = 1$

80. Which amongst the following compounds/species is least basic?



Ans. (2)

Sol.  $\begin{array}{l} \text{H}_2\text{N} \\ \diagdown \\ \text{C}^+-\text{OH} \\ \diagup \\ \text{H}_2\text{N} \end{array}$  is least basic as lone pair present on O is involved in delocalization hence least available for donation.

81. Which of the following forms a set of a complex and a double salt, respectively?

(1)  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  and  $\text{CuCl}_2 \cdot 4\text{NH}_3$

(2)  $\text{PtCl}_2 \cdot 2\text{NH}_3$  and  $\text{PtCl}_4 \cdot 2\text{HCl}$

(3)  $\text{K}_2\text{PtCl}_6 \cdot 2\text{NH}_3$  and  $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$

(4)  $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$  and  $\text{NiCl}_2(\text{H}_2\text{O})_4$

Ans. (3)

Sol.  $\text{K}_2\text{PtCl}_6 \cdot 2\text{NH}_3$  – Complex salt as it contains coordination entity (central metal ion  $\text{Pt}^{2+}$  with 2 ligands of  $\text{Cl}_2$  & 2 ligands of  $\text{NH}_3$ )

$\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$  is a double salt – as dissociate completely into simple ion when dissolved in water.

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82. Given below are two statements:

**Statement I:**

High density polythene is formed in the presence of catalyst triethylaluminium and titanium tetrachloride.

**Statement II:**

High density polymers are chemically inert. In the light of the above statements, choose the correct answer from the options given below:

- (1) **Statement I** is correct but **Statement II** is false.  
 (2) **Statement I** is incorrect but **Statement II** is true.  
 (3) Both **Statement I** and **Statement II** are true.  
 (4) Both **Statement I** and **Statement II** are false.

**Ans. (3)**

**Sol.** Both statement I & II are true

High density polythene is formed in the presence of catalyst triethylaluminium and titanium tetrachloride. (Ziegler-natta catalyst)

83. Which amongst the following compounds will show geometrical isomerism?

- (1) Pent-1-ene  
 (2) 2,3-Dimethylbut-2-ene  
 (3) 2-Methylprop-1-ene  
 (4) 3,4-Dimethylhex-3-ene

**Ans. (4)**

**Sol.** 
$$\text{H}_3\text{C}-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}=\text{C}-\text{CH}_2-\text{CH}_3$$

3,4-Dimethylhex-3-ene show geometrical isomerism

84. Given below are two statements:

**Statement I:**

Hydrated chlorides and bromides of Ca, Sr and Ba on heating undergo hydrolysis.

**Statement II:**

Hydrated chlorides and bromides of Be and Mg on heating undergo dehydration.

In the light of the above statements, choose the correct answer from the options given below:

- (1) **Statement I** is correct but **Statement II** is false.  
 (2) **Statement I** is incorrect but **Statement II** is true.  
 (3) Both **Statement I** and **Statement II** are true.  
 (4) Both **Statement I** and **Statement II** are false.

**Ans. (4)**

**Sol. Statement I :-** Hydrated Cl and Br of Ca, Sr, Ba on heating undergo dehydration.

**Statement II :-** Hydrated Chlorides and Bromides of Be and Mg on heating undergo hydrolysis.

85. The correct order for the rate of  $\alpha,\beta$ -dehydrohalogenation for the following compounds is\_\_\_\_\_.



- (1) (i) < (ii) < (iii)      (2) (ii) < (i) < (iii)      (3) (iii) < (ii) < (i)      (4) (ii) < (iii) < (i)






**Ans. (4)**

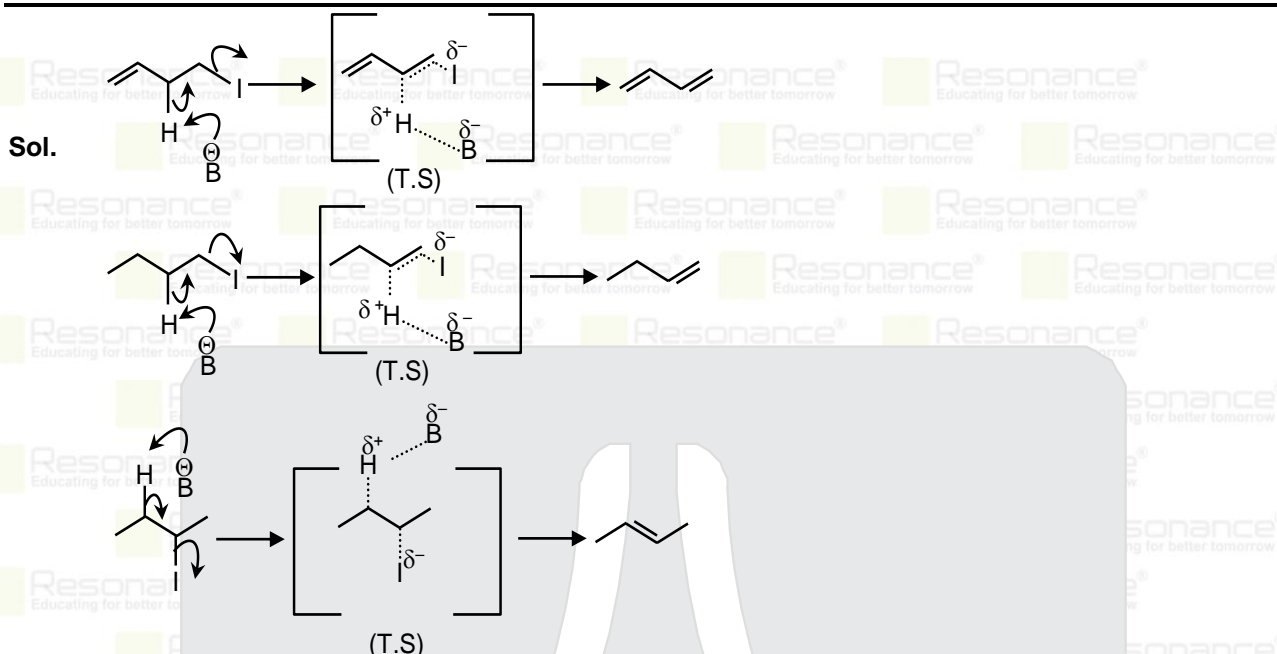
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As T.s and product stability is comparable the order of dehydrohalogenation is the order of stability of alkene formed.

86. How many number of tetrahedral voids are formed in 5 mol of a compound having cubic close packed structure? (Choose the correct option).

(1)  $1.550 \times 10^{24}$       (2)  $3.011 \times 10^{25}$       (3)  $3.011 \times 10^{24}$       (4)  $6.022 \times 10^{24}$

**Ans. (4)**

**Sol.** No of Td void in CCP = 2 x number of atoms in CCP

Z = 4 for CCP

4 atoms → 8 td void

1 atoms → 2 td void

for 5 mole number of Td void =  $5 \times 2 N_A$  atoms

=  $10 \times 6.023 \times 10^{23}$

=  $6.023 \times 10^{24}$

87. Type of isomerism exhibited by compounds

$[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$ ,  $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$ ,  $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$  and the value of coordination number (CN) of central metal ion in all these compounds, respectively is:

(1) Geometrical isomerism, CN=2

(2) Optical isomerism, CN=4

(3) Ionisation isomerism, CN=4

(4) Solvate isomerism, CN=6

**Ans. (4)**

**Sol.** Solvate isomerism, Coordination Number = 6

The no. of water molecules present in coordination sphere & in ionization sphere is different

Coordination number = 6

88. The **correct** sequence given below containing neutral, acidic, basic and amphoteric oxide each, respectively, is:

(1) NO, ZnO, CO<sub>2</sub>, CaO

(2) ZnO, NO, CaO, CO<sub>2</sub>

(3) NO, CO<sub>2</sub>, ZnO, CaO

(4) NO, CO<sub>2</sub>, CaO, ZnO

**Ans. (4)**

**Sol.** NO – Neutral oxides

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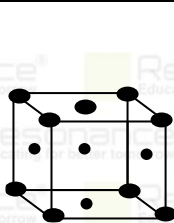
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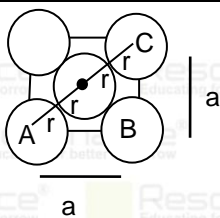
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C.C.P or F.C.C



$$AC = \sqrt{2} a$$

$$4r = \sqrt{2} a$$

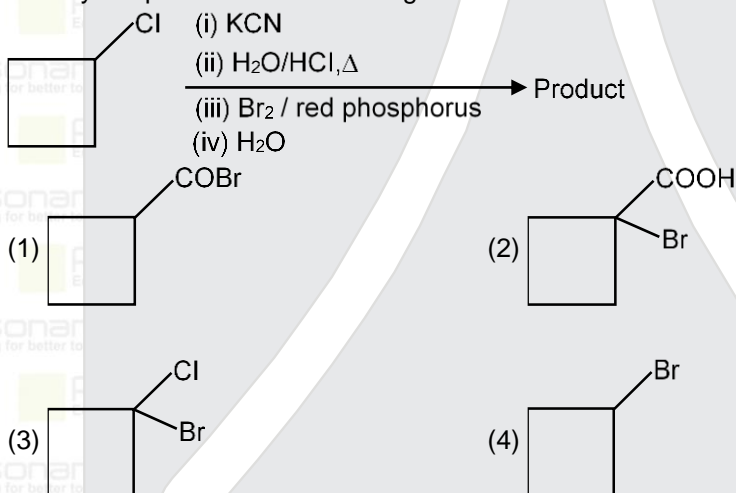
$$a = \frac{4r}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$$

$$a = 2r\sqrt{2}$$

$$a = \frac{4r}{\sqrt{2}}$$

Ans. (4)  $a = 2\sqrt{2} r$

92. Identify the product in the following reaction.



Ans. (2)

Sol. Given Rx<sup>n</sup>

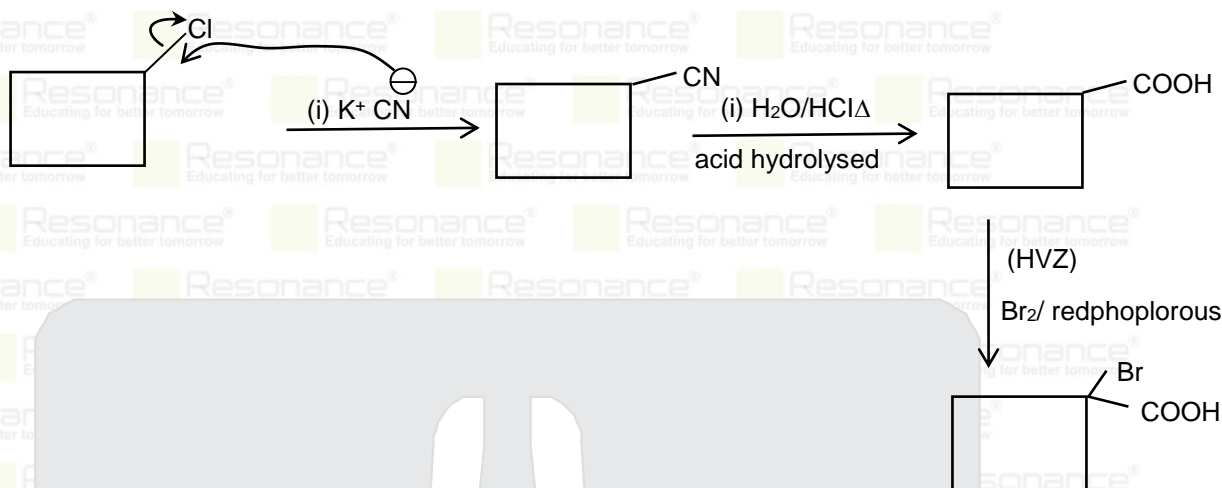
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93. Given below are two statements:

**Statement I:**

In an organic compound, when inductive and electromeric effects operate in opposite directions, the inductive effect predominates.

**Statement II:**

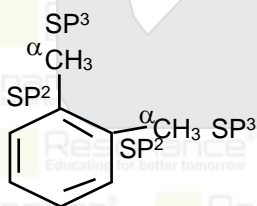
Hyperconjugation is observed in o-xylene. In the light of the above statements, choose the correct answer from the options given below:

- (1) **Statement I** is true but **Statement II** is false.
- (2) **Statement I** is false but **Statement II** is true.
- (3) Both **Statement I** and **Statement II** are true.
- (4) Both **Statement I** and **Statement II** are false.

Ans. (2)

**Sol.** **Statement-I** is false Inductive effect weakest effect and permanent effect but electromeric effect is strongest and temporary effect it's working when reagent coming to near substrate this effect dominant due to  $\pi e^-$  shifting during  $Rx^n$  takes place.

**Statement -II is true**



$\alpha$  carbon have 3  $\alpha$  hydrogen which show hyper conjugation

94. The correct option for a redox couple is:

- (1) Both are oxidised forms involving same element.
- (2) Both are reduced forms involving same element.
- (3) Both the reduced and oxidized forms involve same element.
- (4) Cathode and anode together.

Ans. (3)

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**Sol.** it is a disproportionation reaction.

**95.** Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

**Assertion (A):**

Ionisation enthalpies of early actinoids are lower than for early lanthanoids.

**Reason (R):**

Electrons are entering 5f orbitals in actinoids which experience greater shielding from nuclear charge.

In the light of the above statements, choose the correct answer from the options given below:

- (1) **(A)** is true but **(R)** is false.
- (2) **(A)** is false but **(R)** is true.
- (3) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.
- (4) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.

**Ans. (3)**

**Sol.** Both (A) & (R) are true and (R) is the correct explanation of (A) the ionisation enthalpies of the actinoids are lower than that of the lanthanoids especially in case of early metals due to the more effective shielding of 5f e<sup>-</sup> than 4f e<sup>-</sup>

**96.** Consider the following reaction:

$2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$   $\Delta_r H^\circ = -483.64 \text{ kJ}$ . What is the enthalpy change for decomposition of one mole of water? (Choose the right option).

- (1) 120.9 kJ
- (2) 241.82 kJ
- (3) 18 kJ
- (4) 100 kJ

**Ans. (2)**

**Sol.** 241.82 kJ given  $\text{Rx}^n$

(1)  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{H}_2\text{O}(\text{g})$   $\Delta_r H^\circ = -483.64 \text{ kJ}$  change in enthalpy for reaction of water i.e.

(2)  $2\text{H}_2\text{O}(\text{g}) \rightarrow 2\text{H}_2(\text{g}) + \text{O}_2(\text{g})$   $\Delta_d H^\circ = -\Delta_r H^\circ$  for water decomposition two mole.

(3)  $2\text{H}_2\text{O}(\text{g}) \rightarrow \text{H}_2(\text{g}) + \frac{1}{2}\text{O}_2(\text{g})$   $\Delta_d H^\circ$ ? 1 mole water decomposition

$$\text{Eq (3)} = \frac{\text{Eq(2)}}{2}$$

$$= \frac{-\Delta_r H^\circ}{2}$$

$$= + \frac{483.64}{2} \text{ kJ}$$

$$\Delta_d H^\circ = 241.82 \text{ kJ/mol}$$

**97.** Which statement is not true about photochemical smog?

- (1) Photochemical smog is harmful to humans but has no effect on plants.
- (2) Plants like Pinus, Juniparus can help in reducing the photochemical smog.
- (3) Photochemical smog occurs in warm, dry and sunny climate
- (4) Common components of photochemical smog are ozone, nitric oxide, acrolein, formaldehyde and peroxyacetyl nitrate.

**Ans. (1)**

**Sol.** Not true statement about photochemical smog

(i) Photochemical is harmful to humans but has no effect on plant

Photochemical Smog is harmful to humans as well as plant specially ozone is most toxic in photochemical smog.

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98. Which amongst the following aqueous solutions electrolytes will have minimum elevation in boiling point?

Choose the correct option.

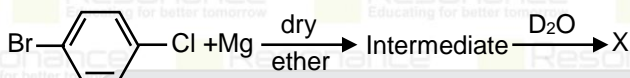
- (1) 0.05 M NaCl      (2) 0.1M KCl      (3) 0.1M MgSO<sub>4</sub>      (4) 1M NaCl

Ans. (1)

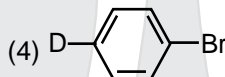
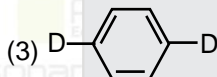
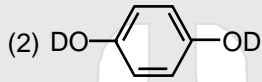
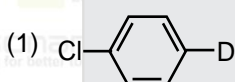
Sol. Minimum elevation in boiling point is 0.05M NaCl → its become in solution 0.05 × 2 = 0.1M

That is minimum no of solute particles so, have minimum elevation in boiling point

99. Identify 'X' in the following reaction.

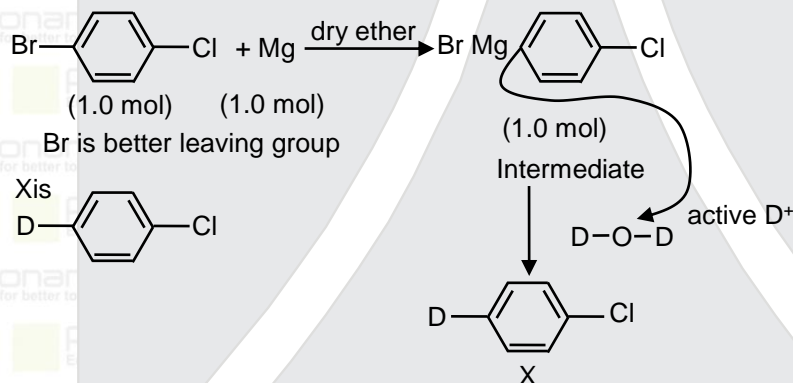


[1.0 mol]      [1.0 mol]

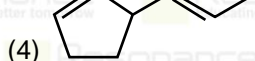
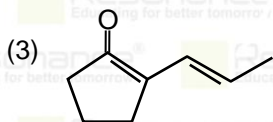
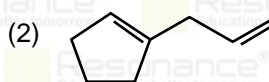
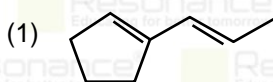
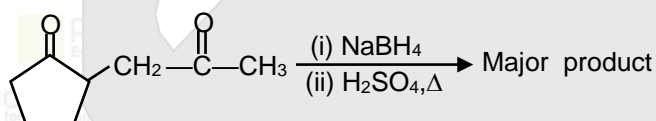


Ans. (1)

Sol. Given R<sup>xn</sup>



100. The major product formed in the following conversion is \_\_\_\_\_.



Ans. (1)

Sol. Major product in the Rxm

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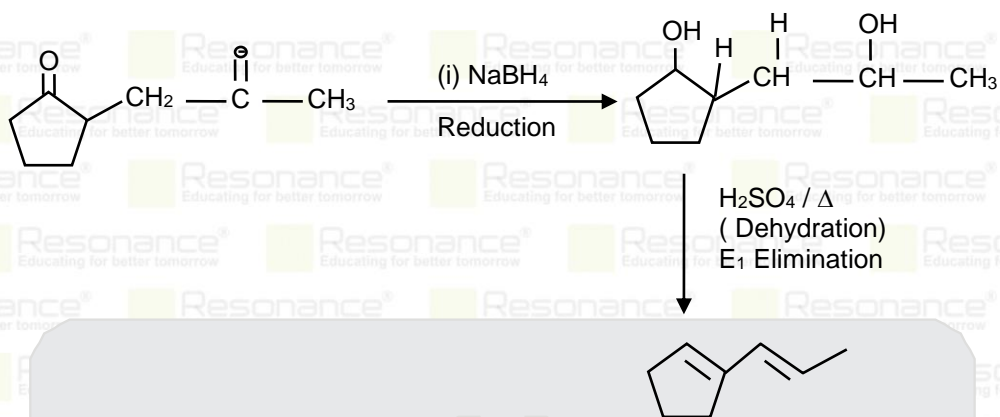
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