

## FINAL NEET(UG)-2021 EXAMINATION

(Held On Sunday 12<sup>th</sup> SEPTEMBER, 2021)

### CHEMISTRY

### TEST PAPER WITH ANSWER

#### SECTION-A (CHEMISTRY)

51. Given below are two statements:

**Statement I :**

Aspirin and Paracetamol belong to the class of narcotic analgesics.

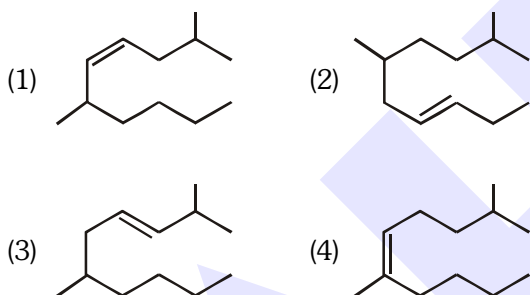
**Statement II :**

Morphine and Heroin are non-narcotic analgesics. In the light of the above statements, choose the **correct** answer from the options given below.

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

**Ans. (2)**

52. The correct structure of 2,6-Dimethyl-dec-4-ene is:



**Ans. (1)**

53.  $\text{BF}_3$  is planar and electron deficient compound. Hybridization and number of electrons around the central atom, respectively are:

- (1)  $sp^3$  and 4
- (2)  $sp^3$  and 6
- (3)  $sp^2$  and 6
- (4)  $sp^2$  and 8

**Ans. (3)**

54. Noble gases are named because of their inertness towards reactivity. Identify an **incorrect** statement about them.

- (1) Noble gases are sparingly soluble in water.
- (2) Noble gases have very high melting and boiling points.
- (3) Noble gases have weak dispersion forces.
- (4) Noble gases have large positive values of electron gain enthalpy.

**Ans. (2)**

55. The molar conductance of NaCl, HCl and  $\text{CH}_3\text{COONa}$  at infinite dilution are 126.45, 426.16 and 91.0  $\text{S cm}^2 \text{mol}^{-1}$  respectively. The molar conductance of  $\text{CH}_3\text{COOH}$  at infinite dilution is.

Choose the right option for your answer.

- (1) 201.28  $\text{S cm}^2 \text{mol}^{-1}$
- (2) 390.71  $\text{S cm}^2 \text{mol}^{-1}$
- (3) 698.28  $\text{S cm}^2 \text{mol}^{-1}$
- (4) 540.48  $\text{S cm}^2 \text{mol}^{-1}$

**Ans. (2)**

56. The right option for the statement "Tyndall effect is exhibited by", is :

- (1) NaCl solution
- (2) Glucose solution
- (3) Starch solution
- (4) Urea solution

**Ans. (3)**

57. The RBC deficiency is deficiency disease of:

- (1) Vitamin  $\text{B}_{12}$
- (2) Vitamin  $\text{B}_6$
- (3) Vitamin  $\text{B}_1$
- (4) Vitamin  $\text{B}_2$

**Ans. (1)**

58. Dihedral angle of least stable conformer of ethane is :

- (1)  $120^\circ$
- (2)  $180^\circ$
- (3)  $60^\circ$
- (4)  $0^\circ$

**Ans. (4)**

59. The **incorrect** statement among the following is :

- (1) Actinoid contraction is greater for element to element than Lanthanoid contraction.
- (2) Most of the trivalent Lanthanoid ions are colorless in the solid state.
- (3) Lanthanoids are good conductors of heat and electricity.
- (4) Actinoids are highly reactive metals, especially when finely divided.

**Ans. (2)**

60. The major product formed in dehydrohalogenation reaction of 2-Bromopentane is Pent-2-ene. This product formation is based on ?

- (1) Saytzeff's Rule
- (2) Hund's Rule
- (3) Hoffmann Rule
- (4) Huckel's Rule

**Ans. (1)**

61. Which one among the following is the correct option for right relationship between  $C_p$  and  $C_v$  for one mole of ideal gas ?

- (1)  $C_p + C_v = R$                       (2)  $C_p - C_v = R$   
(3)  $C_p = RC_v$                         (4)  $C_v = RC_p$

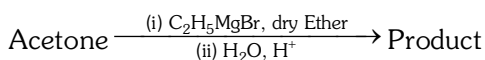
Ans. (2)

62. Which one of the following polymers is prepared by addition polymerisation ?

- (1) Teflon  
(2) Nylon-66  
(3) Novolac  
(4) Dacron

Ans. (1)

63. What is the IUPAC name of the organic compound formed in the following chemical reaction ?



- (1) 2-methyl propan-2-ol  
(2) pentan-2-ol  
(3) pentan-3-ol  
(4) 2-methyl butan-2-ol

Ans. (4)

64. Match List - I with List - II.

List-I	List-II
(a) $\text{PCl}_5$	(i) Square pyramidal
(b) $\text{SF}_6$	(ii) Trigonal planar
(c) $\text{BrF}_5$	(iii) Octahedral
(d) $\text{BF}_3$	(iv) Trigonal bipyramidal

Choose the **correct** answer from the options given below.

- (1) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)  
(2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)  
(3) (a)-(iii), (b)-(i), (c)-(iv), (d)-(ii)  
(4) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

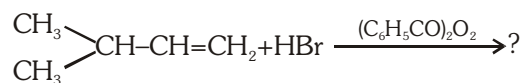
Ans. (1)

65. Which one of the following methods can be used to obtain highly pure metal which is liquid at room temperature ?

- (1) Electrolysis  
(2) Chromatography  
(3) Distillation  
(4) Zone refining

Ans. (3)

66. The major product of the following chemical reaction is:



- (1)  $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH} \\ \diagup \\ \text{CH}_3 \end{array} - \text{CH}_2 - \text{CH}_2 - \text{Br}$   
(2)  $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH} \\ \diagup \\ \text{CH}_3 \end{array} - \text{CH}_2 - \text{CH}_2 - \text{O} - \text{COC}_6\text{H}_5$   
(3)  $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{CH} \\ \diagup \\ \text{CH}_3 \end{array} - \text{CH}(\text{Br}) - \text{CH}_3$   
(4)  $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} \\ \diagup \\ \text{CH}_3 \end{array} - \text{Br} - \text{CH}_2 - \text{CH}_3$

Ans. (1)

67. Tritium, a radioactive isotope of hydrogen, emits which of the following particles ?

- (1) Beta ( $\beta^-$ )  
(2) Alpha ( $\alpha$ )  
(3) Gamma ( $\gamma$ )  
(4) Neutron (n)

Ans. (1)

68. The correct sequence of bond enthalpy of 'C-X' bond is

- (1)  $\text{CH}_3\text{-F} < \text{CH}_3\text{-Cl} < \text{CH}_3\text{-Br} < \text{CH}_3\text{-I}$   
(2)  $\text{CH}_3\text{-F} > \text{CH}_3\text{-Cl} > \text{CH}_3\text{-Br} > \text{CH}_3\text{-I}$   
(3)  $\text{CH}_3\text{-F} < \text{CH}_3\text{-Cl} > \text{CH}_3\text{-Br} > \text{CH}_3\text{-I}$   
(4)  $\text{CH}_3\text{-Cl} > \text{CH}_3\text{-F} > \text{CH}_3\text{-Br} > \text{CH}_3\text{-I}$

Ans. (2)

69. Right option for the number of tetrahedral and octahedral voids in hexagonal primitive unit cell are:

- (1) 8, 4  
(2) 6, 12  
(3) 2, 1  
(4) 12, 6

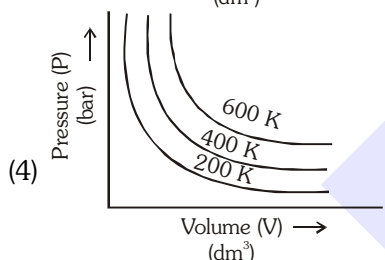
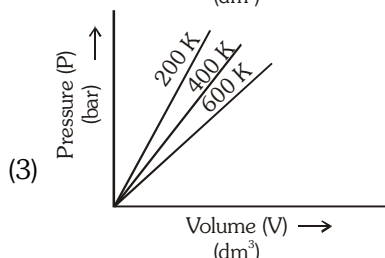
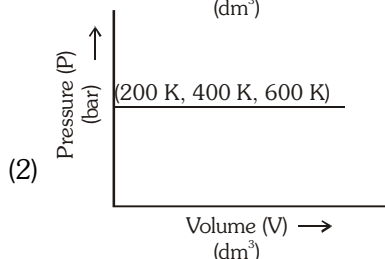
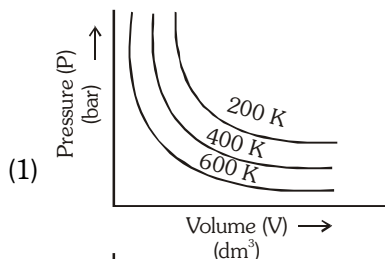
Ans. (4)

70. Which of the following reactions is the metal displacement reaction ? Choose the right option.

- (1)  $2\text{KClO}_3 \xrightarrow{\Delta} 2\text{KCl} + 3\text{O}_2$   
(2)  $\text{Cr}_2\text{O}_3 + 2\text{Al} \xrightarrow{\Delta} \text{Al}_2\text{O}_3 + 2\text{Cr}$   
(3)  $\text{Fe} + 2\text{HCl} \rightarrow \text{FeCl}_2 + \text{H}_2\uparrow$   
(4)  $2\text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{PbO} + 4\text{NO}_2 + \text{O}_2\uparrow$

Ans. (2)

71. Choose the correct option for graphical representation of Boyle's law, which shows a graph of pressure vs. volume of a gas at different temperatures:



Ans. (4)

72. The  $pK_b$  of dimethylamine and  $pK_a$  of acetic acid are 3.27 and 4.77 respectively at T (K). The correct option for the pH of dimethylammonium acetate solution is:

- (1) 8.50
- (2) 5.50
- (3) 7.75
- (4) 6.25

Ans. (3)

73. Among the following alkaline earth metal halides, one which is covalent and soluble in organic solvents is:

- (1) Calcium chloride
- (2) Strontium chloride
- (3) Magnesium chloride
- (4) Beryllium chloride

Ans. (4)

74. The maximum temperature that can be achieved in blast furnace is :

- (1) upto 1200 K
- (2) upto 2200 K
- (3) upto 1900 K
- (4) upto 5000 K

Ans. (2)

75. Ethylene diaminetetraacetate (EDTA) ion is :

- (1) Hexadentate ligand with four "O" and two "N" donor atoms
- (2) Unidentate ligand
- (3) Bidentate ligand with two "N" donor atoms
- (4) Tridentate ligand with three "N" donor atoms

Ans. (1)

76. The following solutions were prepared by dissolving 10 g of glucose ( $C_6H_{12}O_6$ ) in 250 ml of water ( $P_1$ ), 10 g of urea ( $CH_4N_2O$ ) in 250 ml of water ( $P_2$ ) and 10 g of sucrose ( $C_{12}H_{22}O_{11}$ ) in 250 ml of water ( $P_3$ ). The right option for the decreasing order of osmotic pressure of these solutions is :

- (1)  $P_2 > P_1 > P_3$
- (2)  $P_1 > P_2 > P_3$
- (3)  $P_2 > P_3 > P_1$
- (4)  $P_3 > P_1 > P_2$

Ans. (1)

77. **Statement I :**

Acid strength increases in the order given as  $HF \ll HCl \ll HBr \ll HI$ .

**Statement II :**

As the size of the elements F, Cl, Br, I increases down the group, the bond strength of HF, HCl, HBr and HI decreases and so the acid strength increases.

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

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

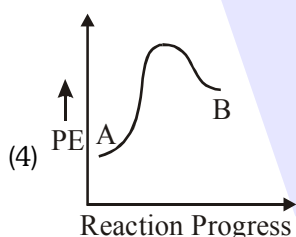
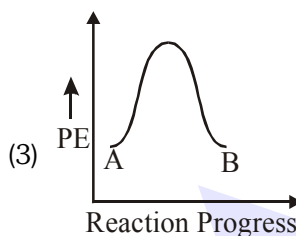
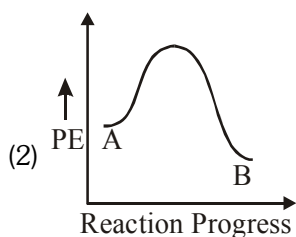
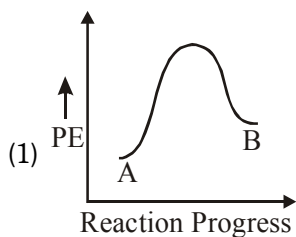
Ans. (1)

78. The structures of beryllium chloride in solid state and vapour phase, are:

- (1) Chain and dimer, respectively
- (2) Linear in both
- (3) Dimer and Linear, respectively
- (4) Chain in both

Ans. (1)

79. For a reaction  $A \rightarrow B$ , enthalpy of reaction is  $-4.2 \text{ kJ mol}^{-1}$  and enthalpy of activation is  $9.6 \text{ kJ mol}^{-1}$ . The correct potential energy profile for the reaction is shown in option.



Ans. (2)

80. Zr ( $Z = 40$ ) and Hf ( $Z = 72$ ) have similar atomic and ionic radii because of :

- (1) belonging to same group
- (2) diagonal relationship
- (3) lanthanoid contraction
- (4) having similar chemical properties

Ans. (3)

81. A particular station of All India Radio, New Delhi, broadcasts on a frequency of 1,368 kHz (kilohertz). The wavelength of the electromagnetic radiation emitted by the transmitter is :

[speed of light  $c = 3.0 \times 10^8 \text{ ms}^{-1}$ ]

- (1) 219.3 m
- (2) 219.2 m
- (3) 2192 m
- (4) 21.92 cm

Ans. (1)

82. An organic compound contains 78% (by wt.) carbon and remaining percentage of hydrogen. The right option for the empirical formula of this compound is [Atomic wt. of C is 12, H is 1]

- (1) CH
- (2) CH<sub>2</sub>
- (3) CH<sub>3</sub>
- (4) CH<sub>4</sub>

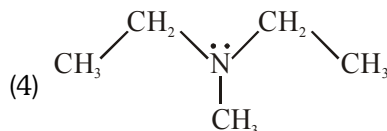
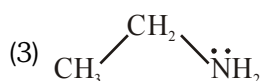
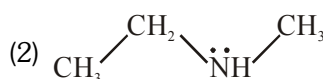
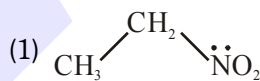
Ans. (3)

83. The compound which shows metamerism is :

- (1) C<sub>5</sub>H<sub>12</sub>
- (2) C<sub>3</sub>H<sub>8</sub>O
- (3) C<sub>3</sub>H<sub>6</sub>O
- (4) C<sub>4</sub>H<sub>10</sub>O

Ans. (4)

84. Identify the compound that will react with Hinsberg's reagent to give a solid which dissolves in alkali :



Ans. (3)

85. The correct option for the number of body centred unit cells in all 14 types of Bravais lattice unit cells is :

- (1) 7
- (2) 5
- (3) 2
- (4) 3

Ans. (4)

SECTION-B

86. Match List-I with List-II

List-I		List-II	
(a)	$[\text{Fe}(\text{CN})_6]^{3-}$	(i)	5.92 BM
(b)	$[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$	(ii)	0 BM
(c)	$[\text{Fe}(\text{CN})_6]^{4-}$	(iii)	4.90 BM
(d)	$[\text{Fe}(\text{H}_2\text{O})_6]^{2+}$	(iv)	1.73 BM

Choose the **correct** answer from the options given below

- (1) (a)-(iv), (b)-(ii), (c)-(i), (d)-(iii)  
 (2) (a)-(ii), (b)-(iv), (c)-(iii), (d)-(i)  
 (3) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)  
 (4) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)

Ans. (4)

87. Choose the correct option for the total pressure (in atm.) in a mixture of 4 g  $\text{O}_2$  and 2 g  $\text{H}_2$  confined in a total volume of one litre at  $0^\circ\text{C}$  is:  
 [Given  $R = 0.082 \text{ L atm mol}^{-1}\text{K}^{-1}$ ,  $T=273\text{K}$ ]

- (1) 2.518 (2) 2.602  
 (3) 25.18 (4) 26.02

Ans. (3)

88.  $\text{CH}_3\text{CH}_2\text{COO}^-\text{Na}^+ \xrightarrow[\text{Heat}]{\text{NaOH} + ?} \text{CH}_3\text{CH}_3 + \text{Na}_2\text{CO}_3$ .

Consider the above reaction and identify the missing reagent/chemical.

- (1)  $\text{B}_2\text{H}_6$  (2) Red Phosphorus  
 (3)  $\text{CaO}$  (4) DIBAL-H

Ans. (3)

89. For irreversible expansion of an ideal gas under isothermal condition, the correct option is :

- (1)  $\Delta U = 0, \Delta S_{\text{total}} = 0$  (2)  $\Delta U \neq 0, \Delta S_{\text{total}} \neq 0$   
 (3)  $\Delta U = 0, \Delta S_{\text{total}} \neq 0$  (4)  $\Delta U \neq 0, \Delta S_{\text{total}} = 0$

Ans. (3)

90. In which one of the following arrangements the given sequence is not strictly according to the properties indicated against it ?

- (1)  $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$  : Increasing acidic strength  
 (2)  $\text{H}_2\text{O} < \text{H}_2\text{S} < \text{H}_2\text{Se} < \text{H}_2\text{Te}$  : Increasing  $\text{pK}_a$  values  
 (3)  $\text{NH}_3 < \text{PH}_3 < \text{AsH}_3 < \text{SbH}_3$  : Increasing acidic character  
 (4)  $\text{CO}_2 < \text{SiO}_2 < \text{SnO}_2 < \text{PbO}_2$  : Increasing oxidizing power

Ans. (2)

91. The molar conductivity of 0.007 M acetic acid is  $20 \text{ S cm}^2 \text{ mol}^{-1}$ . What is the dissociation constant of acetic acid ? Choose the correct option.

$$\left[ \begin{array}{l} \Lambda_{\text{H}^+}^\circ = 350 \text{ S cm}^2 \text{ mol}^{-1} \\ \Lambda_{\text{CH}_3\text{COO}^-}^\circ = 50 \text{ S cm}^2 \text{ mol}^{-1} \end{array} \right]$$

- (1)  $1.75 \times 10^{-4} \text{ mol L}^{-1}$   
 (2)  $2.50 \times 10^{-4} \text{ mol L}^{-1}$   
 (3)  $1.75 \times 10^{-5} \text{ mol L}^{-1}$   
 (4)  $2.50 \times 10^{-5} \text{ mol L}^{-1}$

Ans. (3)

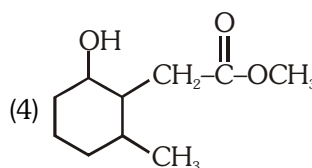
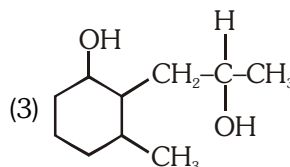
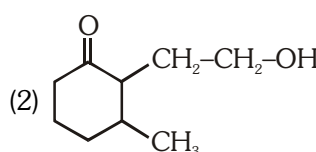
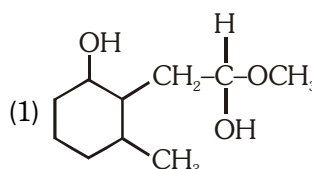
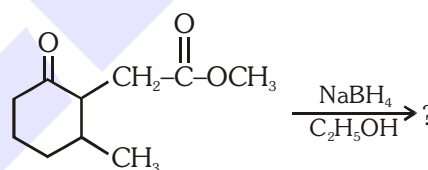
92. The slope of Arrhenius Plot  $\left( \ln k v/s \frac{1}{T} \right)$  of first order reaction is  $-5 \times 10^3 \text{ K}$ . The value of  $E_a$  of the reaction is. Choose the correct option for your answer.

[Given  $R=8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ ]

- (1)  $41.5 \text{ kJ mol}^{-1}$  (2)  $83.0 \text{ kJ mol}^{-1}$   
 (3)  $166 \text{ kJ mol}^{-1}$  (4)  $-83 \text{ kJ mol}^{-1}$

Ans. (1)

93. The product formed in the following chemical reaction is



Ans. (4)

94. Match List-I with List-II.

List-I	List-II
(a) $\xrightarrow[\text{Anhyd. AlCl}_3/\text{CuCl}]{\text{CO, HCl}}$	(i) Hell-Volhard-Zelinsky reaction
(b) $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}_3 + \text{NaOX} \longrightarrow$	(ii) Gattermann-Koch reaction
(c) $\text{R}-\text{CH}_2-\text{OH} + \text{R}'\text{COOH} \xrightarrow{\text{Conc. H}_2\text{SO}_4}$	(iii) Haloform reaction
(d) $\text{R}-\text{CH}_2-\text{COOH} \xrightarrow[\text{(ii) H}_2\text{O}]{\text{(i) X}_2/\text{Red P}}$	(iv) Esterification

Choose the **correct** answer from the options given below.

- (1) (a)-(iv), (b)-(i), (c)-(ii), (d)-(iii)
- (2) (a)-(iii), (b)-(ii), (c)-(i), (d)-(iv)
- (3) (a)-(i), (b)-(iv), (c)-(iii), (d)-(ii)
- (4) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)

Ans. (4)

95. Which of the following molecules is non-polar in nature ?

- (1)  $\text{POCl}_3$
- (2)  $\text{CH}_2\text{O}$
- (3)  $\text{SbCl}_5$
- (4)  $\text{NO}_2$

Ans. (3)

96. From the following pairs of ions which one is not an iso-electronic pair ?

- (1)  $\text{O}^{2-}, \text{F}^-$
- (2)  $\text{Na}^+, \text{Mg}^{2+}$
- (3)  $\text{Mn}^{2+}, \text{Fe}^{3+}$
- (4)  $\text{Fe}^{2+}, \text{Mn}^{2+}$

Ans. (4)

97. The correct option for the value of vapour pressure of a solution at  $45^\circ\text{C}$  with benzene to octane in molar ratio 3 : 2 is :

[At  $45^\circ\text{C}$  vapour pressure of benzene is 280 mm Hg and that of octane is 420 mm Hg. Assume Ideal gas]

- (1) 160 mm of Hg
- (2) 168 mm of Hg
- (3) 336 mm of Hg
- (4) 350 mm of Hg

Ans. (3)

98. Match List-I with List-II :

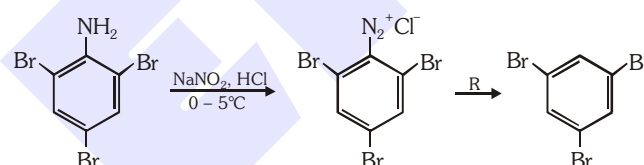
List-I	List-II
(a) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{SO}_3(\text{g})$	(i) Acid rain
(b) $\text{HOCl}(\text{g}) \xrightarrow{h\nu} \dot{\text{O}}\text{H} + \dot{\text{C}}\text{l}$	(ii) Smog
(c) $\text{CaCO}_3 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + \text{H}_2\text{O} + \text{CO}_2$	(iii) Ozone depletion
(d) $\text{NO}_2(\text{g}) \xrightarrow{h\nu} \text{NO}(\text{g}) + \text{O}(\text{g})$	(iv) Tropospheric pollution

Choose the **correct** answer from the options given below.

- (1) (a)-(i), (b)-(ii), (c)-(iii), (d)-(iv)
- (2) (a)-(ii), (b)-(iii), (c)-(iv), (d)-(i)
- (3) (a)-(iv), (b)-(iii), (c)-(i), (d)-(ii)
- (4) (a)-(iii), (b)-(ii), (c)-(iv), (d)-(i)

Ans. (3)

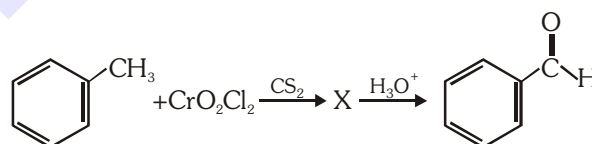
99. The reagent 'R' in the given sequence of chemical reaction is :



- (1)  $\text{H}_2\text{O}$
- (2)  $\text{CH}_3\text{CH}_2\text{OH}$
- (3)  $\text{HI}$
- (4)  $\text{CuCN/KCN}$

Ans. (2)

100. The intermediate compound 'X' in the following chemical reaction is :



- (1)
- (2)
- (3)
- (4)

Ans. (1)

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