

### MCQ FOR FUNCTIONAL GROUP III (ALDEHYDE, KETONE, ACID & DERIVATIVES)

Q.1 Ketones  $\left( R - \overset{\overset{O}{\parallel}}{C} - R' \right)$  can be obtained in one step by (where R and R' are alkyl groups)

- (a) Hydrolysis of esters
- (b) Oxidation of primary alcohols
- (c) Oxidation of secondary alcohols
- (d) Reaction of alkyl halides with alcohols.

Q.2 Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the Presence of

- (a) Two ethylenic double bonds
- (b) A vinyl group
- (c) An isopropyl group
- (d) An acetylenic triple bond.

Q.3 The oxidation of toluene to benzaldehyde by chromyl chloride is called

- (a) Etard reaction
- (b) Riemer-Tiemann reaction
- (c) Wurtz reaction
- (d) Cannizzaro reaction

Q.4 Arrange the following compounds in increasing order of their reactivity in nucleophilic addition reactions.

Ethanal, Propanal, Propanone, Butanone

- (a) Butanone < Propanone < Propanal < Ethanal
- (b) Propanone < Butanone < Ethanal < Propanal
- (c) Propanal < Ethanal < Propanone < Butanone
- (d) Ethanal < Propanal < Propanone < Butanone

Q.5 Which of the following compounds does not react with NaHSO<sub>3</sub>

- (a) HCHO
- (b) C<sub>6</sub>H<sub>5</sub>COCH<sub>3</sub>
- (c) CH<sub>3</sub>COCH<sub>3</sub>
- (d) CH<sub>3</sub>CHO

Q.6 An organic compound (X) with molecular formula C<sub>3</sub>H<sub>6</sub>O is not readily oxidised. On reduction it gives C<sub>3</sub>H<sub>8</sub>O (Y) which reacts with HBr to give a bromide (Z) which is converted to Grignard reagent.

Grignard reagent reacts with (X) to give 2,3-dimethylbutane-2-ol. (X), (Y) and (Z) respectively are

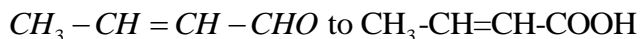
- (a) CH<sub>3</sub>COCH<sub>3</sub>, CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH, CH<sub>3</sub>CH(Br)CH<sub>3</sub>
- (b) CH<sub>3</sub>CH<sub>2</sub>CHO, CH<sub>3</sub>CH=CH<sub>2</sub>, CH<sub>3</sub>CH(Br)CH<sub>3</sub>
- (c) CH<sub>3</sub>COCH<sub>3</sub>, CH<sub>3</sub>CH(OH)CH<sub>3</sub>, CH<sub>3</sub>CH(Br)CH<sub>3</sub>
- (d) CH<sub>3</sub>CH<sub>2</sub>CHO, CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>OH, CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>Br.

Q.7  $R - CH = CH - CHO + NH_2 - \overset{\overset{O}{\parallel}}{C} - NHNH_2 \xrightarrow{H^+} X$

(X) in the above reaction is

- (a)  $R - CH = CH - \overset{\overset{OH}{\mid}}{CH} - NH_2CONH_2$
- (b)  $R - CH = CH - CH = N - NH - \overset{\overset{O}{\parallel}}{C} - NH_2$
- (c)  $R - CH = NH_2CONH_2$
- (d)  $R - CH = CH - \overset{\overset{OH}{\mid}}{CH} - NH_2COCH = NHNH_2$

Q.8 The best oxidising agent for oxidation of



- (a) Baeyer's reagent (b) Tollen's reagent  
(c) Schiff's reagent (d) acidified dichromate.

Q.9 To differentiate between pentan-2-one and pentan-3-one a test is carried out. Which of the following is the correct answer?

- (a) Pentan-2-one will give silver mirror test. (b) Pentan-2-one will give iodoform test.  
(c) Pentan-3-one will give iodoform test. (d) None of these.

Q.10 An organic compound of molecular formula  $C_3H_6O$  did not give a silver mirror with Tollen's reagent but give an oxime with hydroxylamine. It may be

- (a)  $CH_2 = CH - CH_2 - OH$  (b)  $CH_3COCH_3$   
(c)  $CH_3CH_2CHO$  (d)  $CH_2 = CH - OCH_3$

Q.11 Match the column I with column II and mark the appropriate choice.

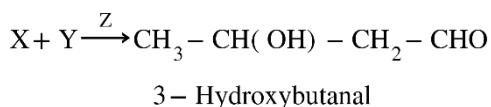
	Column I		Column II
(A)	$\begin{array}{l} \diagdown \\ C=O \end{array} \xrightarrow{LiAlH_4}$	(i)	$-COONa$
(B)	$\begin{array}{l} \diagdown \\ C=O \end{array} \xrightarrow[conc. HCl]{Zn/Hg}$	(ii)	$-COOH$
(C)	$\begin{array}{l} \diagdown \\ C=O \end{array} \xrightarrow{Ag_2O/OH^-}$	(iii)	$\begin{array}{l} \diagup \\ CH_2 \end{array}$
(D)	$\begin{array}{l} \diagdown \\ C=O \end{array} \xrightarrow{NaOX}$	(iv)	$-CH_2O$

- (a) (A) → (i), (B) → (ii), (C) → (iii), (D) → (iv)  
(b) (A) → (iv), (B) → (iii), (C) → (ii), (D) → (i)  
(c) (A) → (ii), (B) → (iv), (C) → (iii), (D) → (i)  
(d) (A) → (iii), (B) → (i), (C) → (ii), (D) → (iv)

Q.12 Which of the following will not give aldol condensation?

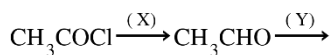
- (a) Phenyl acetaldehyde (b) 2- Methylpentanal  
(c) Benzaldehyde (d) 1- Phenylpropanone

Q.13 Identify (X), (Y) and (Z) in the given reaction.



- |     | X             | Y         | Z         |
|-----|---------------|-----------|-----------|
| (a) | HCHO          | $CH_3CHO$ | KOH       |
| (b) | $CH_3CHO$     | $CH_3CHO$ | NaOH      |
| (c) | $CH_3CH_2OH$  | HCHO      | $H_2SO_4$ |
| (d) | $CH_3CH_2CHO$ | HCHO      | Dry ether |

Q.14 Fill in the reagents for the given conversion



	X	Y	Z
(a)	Pd/BaSO <sub>4</sub>	dil. NaOH	heat
(b)	NaOH	Hydrolysis	heat
(c)	I <sub>2</sub> /NaOH	LiAlH <sub>4</sub>	H <sub>3</sub> O <sup>+</sup>
(d)	CrO <sub>3</sub>	Warm	CO <sub>2</sub>

Q.15 Which of the following compounds will undergo Cannizzaro reaction?

- (a) CH<sub>3</sub>CHO                      (b) CH<sub>3</sub>COCH<sub>3</sub>                      (c) C<sub>6</sub>H<sub>5</sub>CHO                      (d) C<sub>6</sub>H<sub>5</sub>CH<sub>2</sub>CHO

Q.16 Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	Clemmensen reduction	(i)	Conc. KOH
(B)	Rosenmund reduction	(ii)	Zn/Hg + conc. HCl
(C)	Iodoform reaction	(iii)	H <sub>2</sub> /Pd-BaSO <sub>4</sub>
(D)	Cannizzaro reaction	(iv)	NaOH + I <sub>2</sub>

- (a) (A) → (i), (B) → (iii), (C) → (ii), (D) → (iv)  
 (b) (A) → (iii), (B) → (iv), (C) → (i), (D) → (ii)  
 (c) (A) → (ii), (B) → (iii), (C) → (iv), (D) → (i)  
 (d) (A) → (iv), (B) → (i), (C) → (ii), (D) → (iii)

Q.17 Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	$\text{RCOCH}_3 \xrightarrow[\text{HCl}]{\text{Zn-Hg}} \text{RCH}_2\text{CH}_3$	(i)	Wolff-Kishner reduction
(B)	$2\text{C}_6\text{H}_5\text{CHO} \xrightarrow{\text{NaOH}} \text{C}_6\text{H}_5\text{COONa} + \text{C}_6\text{H}_5\text{CH}_2\text{OH}$	(ii)	Clemmensen reduction
(C)	$\text{C}_6\text{H}_6 + \text{CH}_3\text{COCl} \xrightarrow[\text{AlCl}_3]{\text{Anhy.}} \text{C}_6\text{H}_5\text{COCH}_3$	(iii)	Friedel-Crafts reaction
(D)	$\text{C}_6\text{H}_{10}\text{O} \xrightarrow[\text{KOH/ethylene}]{(i)\text{NH}_2\text{NH}_2} \text{C}_6\text{H}_{12} + \text{N}_2$	(iv)	Cannizzaro reaction

- (a) (A) → (ii), (B) → (iv), (C) → (iii), (D) → (i)  
 (b) (A) → (i), (B) → (iii), (C) → (ii), (D) → (iv)  
 (c) (A) → (iii), (B) → (ii), (C) → (i), (D) → (iv)  
 (d) (A) → (iv), (B) → (i), (C) → (ii), (D) → (iii)

Q.18 An organic compound (X) with molecular formula C<sub>9</sub>H<sub>10</sub>O gives positive 2,4-DNP and Tollen's tests.

It undergoes Cannizzaro reaction and on vigorous oxidation it gives. 1,4-benzenedicarboxylic acid

Compound (X) is

- (a) benzaldehyde (b) o-methylbenzaldehyde  
(c) p-ethylbenzaldehyde (d) 2, 2-dimethylhexanal.

Q.19 Which of the following will not yield acetic acid on strong oxidation?

- (a) Butanone (b) Propanone (c) Ethyl ethanoate (d) Ethanol

Q.20 An aromatic compound (X) ( $C_8H_8O$ ) gives positive 2,4-DNP test. It gives a yellow precipitate of

Compound (Y) on reaction with iodine and sodium hydroxide solution. (X) does not give Tollen's test

On oxidation under drastic condition carboxylic acid (Z) ( $C_7H_6O_2$ ) is obtained

(Z) is also formed with (Y) during the reaction. (X),(Y) and (Z) Respectively are

- (a)  $C_6H_5COCH_3$ ,  $CHI_3$ ,  $C_6H_5COOH$  (b)  $CH_3COCH_3$ ,  $CHI_3$ ,  $CH_3COOH$   
(c)  $C_6H_5COCH_3$ ,  $CHI_3$ ,  $CH_3COOH$  (d)  $CH_3CHO$ ,  $CHI_3$ ,  $C_6H_5COOH$

Q.21 Carboxylic acids dimerise due to

- (a) High molecular weight (b) Coordinate bonding  
(c) Intermolecular hydrogen bonding (d) Covalent bonding

Q.22 Which of the following is the correct order of relative strength of acids?

- (a)  $ClCH_2COOH > BrCH_2COOH > FCH_2COOH$  (b)  $BrCH_2COOH > ClCH_2COOH > FCH_2COOH$   
(c)  $FCH_2COOH > ClCH_2COOH > BrCH_2COOH$  (d)  $ClCH_2COOH > FCH_2COOH > BrCH_2COOH$

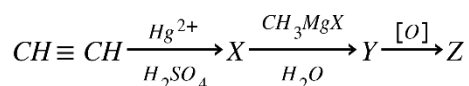
Q.23 What happens when a carboxylic acid is treated with lithium aluminium hydride?

- (a) Aldehyde is formed (b) Primary alcohol is formed  
(c) Ketone is formed. (d) Grignard reagent is formed.

Q.24 Which of the following will not undergo HVZ reaction?

- (a) Propanoic acid (b) ethanoic acid  
(c) 2-Methylpropanoic acid (d) 2,2-Dimethylpropanoic acid

Q.25 In the following sequence of reaction, the final product (Z) is



- (a) Ethanal (b) Propan – 2-ol (c) Propanone (d) Propan – 1- ol

**Directions :** In the following questions, a statement of assertion is following by a statement of reason.

Mark the correct choice as:

- (a) If both assertion and reason are true and reason is the correct explanation of assertion.
- (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (c) If assertion is true but reason is false.
- (d) If both assertion and reason are false.

Q.26 Assertion : In formaldehyde all the four atoms lie in one plane.

Reason : Carbonyl carbon forms a  $\pi$ - bond with oxygen by overlapping of  $p$ - orbitals.

Q.27 Assertion : Acetaldehyde is more reactive than acetone in nucleophilic addition reactions.

Reason : Two alkyl groups in acetone reduce the electrophilicity of the carbon.

Q.28 Assertion :  $\beta$  - Hydrogen atom of carbonyl compounds is acidic in nature.

Reason :  $\beta$  - Hydrogen is directly attached to carbon next to carbonyl carbon.

Q.29 Assertion : Aromatic aldehydes and ketones undergo electrophilic substitution reaction at meta position

Reason : Carbonyl group activates the ring towards electrophilic substitution reactions.

Q.30 Assertion : Phenol and benzoic acid can be distinguished by  $\text{Na}_2\text{CO}_3$  .

Reason : Benzoic acid is stronger acid than phenol, hence reacts with  $\text{Na}_2\text{CO}_3$  .

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## ANSWER KEY

QUE.	ANS.	QUE.	ANS.	QUE.	ANS.
1	C	11	B	21	C
2	B	12	C	22	C
3	A	13	B	23	B
4	A	14	A	24	D
5	B	15	C	25	C
6	C	16	C	26	B
7	B	17	A	27	A
8	B	18	C	28	D
9	B	19	C	29	C
10	B	20	A	30	A