

ULTIMATE KCET CRASH COURSE 2026

CHEMISTRY

DPP: 1

General organic chemistry

- Q1** The technique of gas chromatography is suitable for compounds which
- (A) vapourize without decomposition
 - (B) have very low boiling points
 - (C) are soluble in water
 - (D) are liquids
- Q2** Paper chromatography is an example of _____.
- (A) adsorption chromatography
 - (B) column chromatography
 - (C) partition chromatography
 - (D) thin-layer chromatography
- Q3** Separation of two substances by fractional crystallisation depends upon their difference in
- (A) Densities
 - (B) Melting point
 - (C) Solubilities
 - (D) Boiling points
- Q4** The principle involved in gas-liquid chromatography (GLC) is:
- (A) Partition
 - (B) Adsorption
 - (C) Absorption
 - (D) Condensation
- Q5** Sugar containing an impurity of common salt can be purified by crystallization from
- (A) Water
 - (B) Benzene
 - (C) Petroleum ether
 - (D) Ethanol
- Q6** When a solid vapourize directly without melting, the process is called
- (A) Evaporation
 - (B) Sedimentation
 - (C) Sublimation
 - (D) Saponification
- Q7** Which method is used for the separation of volatile liquids and non-volatile impurities?
- (A) Solvent extraction
 - (B) Crystallisation
 - (C) All of these
 - (D) Distillation
- Q8 Assertion (A):** Oils are purified by steam distillation.
- Reason (R):** The compounds which decompose at their boiling points can be purified by steam distillation.
- (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.
- Q9** F cannot be tested by "Lassaigne's test" because
- (A) F- shows high lattice energy
 - (B) F is more electronegative
 - (C) AgF is soluble in H₂O
 - (D) F is highly reactive
- Q10** The Lassaigne's extract of sulphanilic acid may contain _____.
- (A) only NaCN
 - (B) only Na₂S
 - (C) NaCN, Na₂S and NaSCN
 - (D) both NaCN and Na₂S



Q11 The red colour observed on the addition of FeCl_3 in Lassaigne solution indicates the presence of which element?

- (A) Both Nitrogen and Sulphur
(B) Nitrogen
(C) Oxygen
(D) Sulphur

Q12 If 0.2 g of an organic compound on complete combustion produces 0.18 g of water then % of hydrogen in it is:

- (A) 10 (B) 5
(C) 20 (D) 1

Q13 Write the state of hybridisation of carbon in the compound, HCN and shape of the molecule.

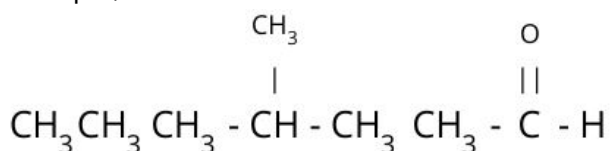
- (A) sp^3 hybridised carbon, trigonal pyramidal
(B) sp^3 hybridised carbon, tetrahedral
(C) sp^3 hybridised carbon, trigonal planar
(D) sp hybridised carbon, linear

Q14 $\sigma_{\text{C}-\text{C}} : 4$; $\sigma_{\text{C}-\text{H}} : 6$; $\pi_{\text{C}-\text{C}} : 1$; $\pi_{\text{C} \equiv \text{C}} : 2$.

These number of σ and π bonds are present in which of the following molecule?

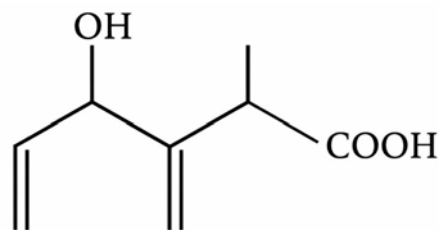
- (A) $\text{CH}_3 = \text{CH} - \text{CH} = \text{CH} - \text{CH}_2$
(B) $\text{CH}_2 = \text{CH} - \text{CH} = \text{CH} - \text{CH}_3$
(C) $\text{CH} \equiv \text{C} - \text{CH} = \text{CH} - \text{CH}_3$
(D) $\text{CH}_2 = \text{C} = \text{CH} - \text{CH}_3$

Q15 Straight or branched chain compounds, for example, the below ones are called



- (A) aliphatic cyclic compounds
(B) closed chain compounds
(C) alicyclic compounds
(D) aliphatic compounds

Q16 IUPAC name of given compound is:



- (A) 4-hydroxy-2-methyl-3-methylene-4-vinylbutanoic acid
(B) None of these
(C) 4-hydroxy-2-methyl-3-methylene-hex-5-enoic acid
(D) 4-hydroxy-3-methylene-hex-5-ene-2carboxylic acid

Q17 In allene (C_3H_4), the type(s) of hybridization of the carbon atoms is (are):

- (A) sp^2 and sp^3
(B) Only sp^2
(C) sp^2 and sp
(D) sp and sp^3

Q18 The compound which has one isopropyl group is

- (A) 2,2-dimethylpentane
(B) 2,2,3-trimethylpentane
(C) 2,2,3,3-tetramethylpentane
(D) 2-methylpentane

Q19 The order of decreasing priority for some functional groups in the naming of an organic compound is:

- (A) $-\text{COCl}$, $-\text{CONH}_2$, $-\text{CN}$, $-\text{HC}=\text{O}$, $>\text{C}=\text{O}$, $-\text{OH}$, $-\text{NH}_2$, $-\text{COOR}$ (R = alkyl group)
(B) $-\text{COOR}$ (R = alkyl group right), $-\text{COCl}$, $-\text{CONH}_2$, $-\text{CN}$, $-\text{HC}=\text{O}$, $>\text{C}=\text{O}$, $-\text{OH}$, $-\text{NH}_2$
(C) $-\text{CN}$, $-\text{HC}=\text{O}$, $>\text{C}=\text{O}$, $-\text{OH}$, $-\text{NH}_2$, $-\text{COOR}$ (R = alkyl group), $-\text{COCl}$, $-\text{CONH}_2$
(D) $-\text{CONH}_2$, $-\text{CN}$, $-\text{HC}=\text{O}$, $>\text{C}=\text{O}$, $-\text{OH}$, $-\text{NH}_2$, $-\text{COOR}$ (R = alkyl group), $-\text{COCl}$

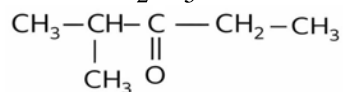


Q20 Which of the following compound has incorrect IUPAC nomenclature :

(A) CH_3CH_2 Ethyl butanoate

– CH_2

– COOC_2H_5

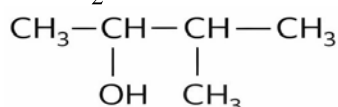


(B) : 2-Methyl pentan-3-one

(C) : CH_3-CH 3-Methyl butanal

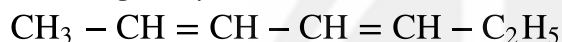
|
 CH_3

– CH_2-CHO



(D) : 2-Methyl butan-3-ol

Q21 The number of geometrical isomers in the following compound is :



(A) 2

(B) 5

(C) 3

(D) 4

Q22 Phenol and benzyl alcohol are

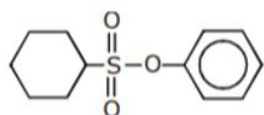
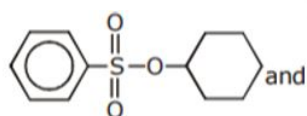
(A) Homologous

(B) Functional isomers

(C) None of these

(D) Position isomers

Q23 Given compound show which type of isomerism?



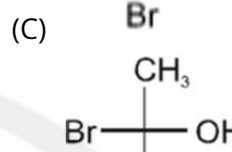
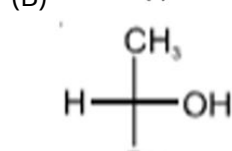
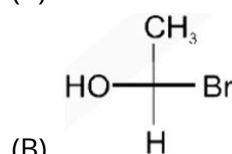
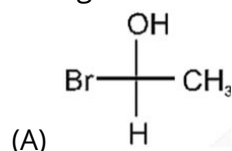
(A) Functional group isomerism

(B) Chain isomerism

(C) Positional isomerism

(D) Metamerism

Q24 Which of the following compound has 'S' configuration?



Q25 O-Cresol & benzyl alcohol are

(A) All of these

(B) Functional isomers

(C) Chain isomers

(D) Position isomers

Q26 $\text{C}_4\text{H}_{10}\text{O}$ represents methoxypropane $\text{CH}_3\text{OC}_3\text{H}_7$ and ethoxyethane $(\text{C}_2\text{H}_5\text{OC}_2\text{H}_5)$:

(A) Functional group isomerism

(B) Stereoisomerism

(C) Metamerism

(D) Position isomerism

Q27 Geometrical isomers and Optical isomers are:

(A) Chain isomers

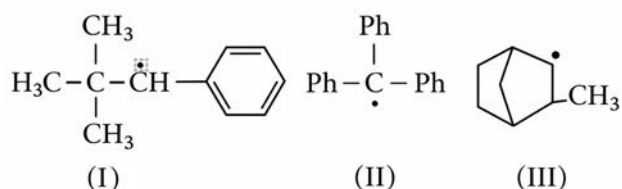
(B) Stereoisomers

(C) Position isomers

(D) Functional isomers



Q28 Consider the following compounds:



Hyperconjugation occurs in _____

- (A) I only (B) III only
(C) I and III (D) II only

Q29 Assertion (A): A free radical is paramagnetic species.

Reason (R): A free radical is formed in the homolytic fission of a covalent bond.

- (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.

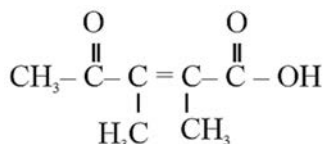
Q30 Tautomerism will be exhibited by

- (A) $(\text{CH}_3)_2\text{NH}$ (B) $(\text{CH}_3)_3\text{CNO}$
(C) R_3CNO_2 (D) RCH_2NO_2

Q31 Hyperconjugation is most useful for stabilizing which of the following carbocations?

- (A) Neopentyl
(B) tert -Butyl
(C) Isopropyl
(D) Ethyl

Q32 IUPAC name of the molecule

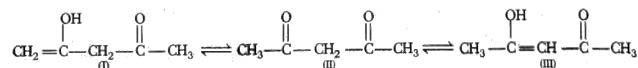


- (A) 4-oxo-2, 3-dimethylpent-2-en-1-oic acid
(B) 3-carboxy-3-methylpent-2-en-3-one
(C) 4-carboxy-3-methylpent-3-en-2-one
(D) 2, 3-dimethyl-4-oxopent-2-en-1-oic acid

Q33 Heterolysis of propane gives

- (A) Methyl and ethyl free radicals
(B) Methyl cation and ethyl anion
(C) Methyl anion and ethyl cation
(D) Methyl and ethyl cations.

Q34 The order of stability of the following tautomeric compounds is



- (A) I > II > III
(B) III > II > I
(C) II > I > III
(D) II > III > I

Q35 Match **List-I** with **List-II**.

	List-I	List-II	
(A)	$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3 + \text{Br}_2 \xrightarrow{h\nu}$	(I)	Electrophilic addition
(B)	$\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3 + \text{Br}_2 \xrightarrow{\text{CCl}_4}$	(II)	Nucleophilic addition
(C)		(III)	Free radical substitution
(D)	$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CHO} + \text{LiAlH}_4 \xrightarrow{\text{H}_2\text{O}}$	(IV)	Electrophilic substitution

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

- (A) A-IV, B-I, C-III, D-IV
(B) A-III, B-II, C-I, D-IV
(C) A-IV, B-II, C-I, D-III
(D) A-III, B-I, C-IV, D-II

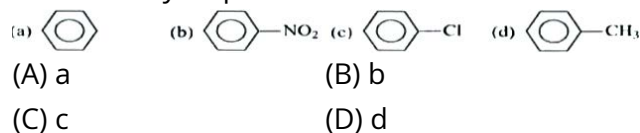


- Q36** Which of the following is true?
 (A) tert-Butoxide is a stronger base as well as stronger nucleophile than ethoxide
 (B) tert-Butoxide is a weaker base but stronger nucleophile than ethoxide
 (C) tert-Butoxide is a stronger base, but weaker nucleophile than ethoxide
 (D) tert-Butoxide and ethoxide are equally strong bases as well as strong nucleophiles

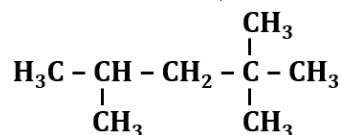
- Q37** Electrophiles are
 (A) Electron loving species
 (B) Electron hating species
 (C) Nucleus loving reagents
 (D) Nucleus hating reagents.

- Q38** 2-Pentene contains
 (A) 15 σ - and one π - bond
 (B) 14 σ - and one π - bond
 (C) 15 σ - and two π - bonds
 (D) 14 σ - and two π - bonds

- Q39** Among the following, compound that can be most readily sulphonated is :



- Q40** In the structure,



the number of carbons are

- (A) One primary, two secondary and one tertiary
 (B) Four primary, one secondary and two tertiary
 (C) One primary, one secondary, one tertiary and one quaternary
 (D) Five primary, one secondary, one tertiary and one quaternary.



Answer Key

Q1 A
Q2 C
Q3 C
Q4 A
Q5 D
Q6 C
Q7 D
Q8 C
Q9 C
Q10 C
Q11 A
Q12 A
Q13 D
Q14 C
Q15 D
Q16 C
Q17 C
Q18 D
Q19 B
Q20 D

Q21 D
Q22 C
Q23 D
Q24 D
Q25 B
Q26 C
Q27 B
Q28 B
Q29 A
Q30 D
Q31 B
Q32 D
Q33 C
Q34 B
Q35 D
Q36 C
Q37 A
Q38 B
Q39 D
Q40 D



Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Liquids that can vapourise without decomposing are suitable for GLC

Video Solution:



Q2 Text Solution:

Paper chromatography is an example of partition chromatography as we use a mobile phase to separate out the components

Video Solution:



Q3 Text Solution:

Separation of two substances by fractional crystallisation depends upon their difference in solubilities. The less soluble ones crystallise out first.

Video Solution:



Q4 Text Solution:

The principle involved in gas-liquid chromatography (GLC) is actually partition. In GLC, the separation of components occurs based on their distribution between a stationary liquid phase and a mobile gas phase. This means that the components partition between the two phases, leading to their separation as they travel through the column.

Video Solution:



Q5 Text Solution:

Sugar dissolves easily in ethanol but NaCl doesn't dissolve that easily. So this sample can be dissolved in ethanol, NaCl can be filtered out, the solution can be left to evaporate to get pure sugar.

Video Solution:



Q6 Text Solution:

Sublimation

Video Solution:



Q7 Text Solution:

Method is used for the separation of volatile liquids and non-volatile impurities.

Video Solution:**Q8 Text Solution:**

Steam distillation is carried out when a solid or liquid, practically insoluble in water, is volatile with steam, but the impurities are non-volatile.

Video Solution:**Q9 Text Solution:**

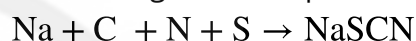
Lassaigne's test involves the formation of a precipitate when a sample is heated with sodium metal and then treated with water. In the case of fluorides, particularly AgF, it is soluble in water, which means it will not form a precipitate. This solubility prevents the detection of fluorine through the typical method used in Lassaigne's test, making option AgF is soluble in H₂O the correct reason why F cannot be tested by this method.

Video Solution:**Q10 Text Solution:**

Sulphanilic acid is p-aminobenzenesulfonic acid [i.e., p-(H₂N - C₆H₄ - SO₃H)]. Thus, NaCN, NaSCN and Na₂S all are formed in the Lassaigne's extract.

Video Solution:**Q11 Text Solution:**

Both Nitrogen and Sulphur

**Video Solution:**

Q12 Text Solution:

To find the percentage of hydrogen in the organic compound, we first need to determine the amount of hydrogen in the water produced. Water (H₂O) has a molar mass of approximately 18 g/mol, and each molecule of water contains 2 hydrogen atoms. From the problem, 0.18 g of water is produced.

The mass of hydrogen in this water can be calculated as follows:

1. Calculate the number of moles of water :

$$\text{Moles of water} = \frac{0.18 \text{ g}}{18 \text{ g/mol}} = 0.01$$

moles

2. Since each mole of water contains 2 moles of hydrogen, the moles of hydrogen is : Moles of hydrogen = 2 × 0.01 = 0.02 moles

3. Now, calculate the mass of hydrogen: Mass of hydrogen = 0.02 moles × 1 g/mol = 0.02 g

4. To find the percentage of hydrogen in the original compound, use the formula:

$$\% \text{ of hydrogen} = \left(\frac{\text{mass of hydrogen}}{\text{mass of compound}} \right) \times 100$$

$$\% \text{ of hydrogen} = \left(\frac{0.02 \text{ g}}{0.2 \text{ g}} \right) \times 100 = 10\%$$

Thus, the percentage of hydrogen in the organic compound is 10%.

Video Solution:**Q13 Text Solution:**

As the C is bonded to N by a triple bond so it is sp hybridized and the molecule is linear in shape.

Video Solution:**Q14 Text Solution:****Video Solution:****Q15 Text Solution:**

The straight and branched chain compounds are known as aliphatic compounds (also called acyclic or open chain compounds).

Video Solution:

Q16 Text Solution:

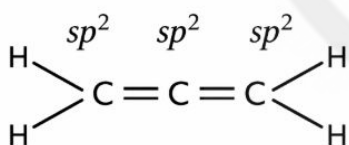
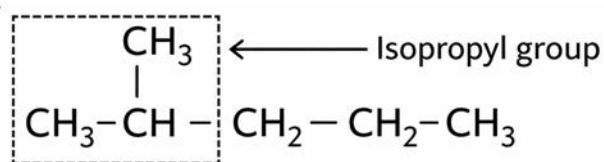
1. The parent compound is identified as a hexenoic acid, indicating it has a six-carbon chain with a double bond and a carboxylic acid functional group.

2. The presence of a hydroxyl group (-OH) and a methyl group (-CH₃) is noted, which are positioned at specific carbon atoms in the chain.

3. The term "methylene" indicates a -CH₂- group that is part of the structure, and its position is specified.

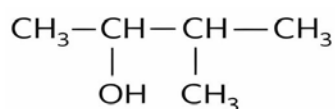
4. The numbering of the carbon chain is done in a way that gives the lowest possible numbers to the functional groups

Considering these points, the IUPAC name will be **4-hydroxy-2-methyl-3-methylene-hex-5-enoic acid**

Video Solution:**Q17 Text Solution:****Video Solution:****Q18 Text Solution:****2-Methylpentane****Video Solution:****Q19 Text Solution:**

COOR (R = alkyl group) > -COCl, > -CONH₂ > -CN > -HC = O > >C = O > -OH, -NH₂ is the decreasing order of priority

Video Solution:

Q20 Text Solution:

:
2-Methyl butan-3-ol is wrong because the numbering of the carbon chain should prioritize the hydroxyl group. The correct naming would be

3-Methyl butan-2-ol

Video Solution:**Q21 Text Solution:**

The total number of geometrical isomers is given as 2^n where n is the number of stereocenters. In this case, the double bonds are the stereocenters and there are 2 double bonds, i.e. $n=2$

no of geometrical isomers are $2^2 = 4$

Video Solution:**Q22 Text Solution:**

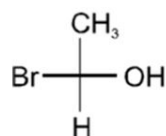
Phenol and benzyl alcohol are not functional isomers because they have different functional groups; phenol has a hydroxyl group directly attached to a benzene ring, while benzyl alcohol has a hydroxyl group attached to a benzyl group.

They are also not homologous because although they differ by a constant unit (like $-\text{CH}_2-$), their functional group is not same they are not position isomers since position isomers involve variations in the position of the same functional group on the same carbon skeleton. Therefore, the correct classification is "none of these."

Video Solution:

Q23 Text Solution:

The type of isomerism as metamerism, which occurs when compounds have the same molecular formula but differ in the arrangement of atoms around a functional group, typically due to variations in the alkyl groups attached to the same functional group. In this case, the compounds in question likely have the same functional group but different carbon skeletons, which is characteristic of metamerism. This distinguishes it from the other types of isomerism listed, such as chain isomerism (different carbon chain arrangements), positional isomerism (different positions of the functional group), and functional group isomerism (different functional groups altogether).

Video Solution:**Q24 Text Solution:**

This configuration is determined by analyzing the arrangement of substituents around the chiral center. In option , the highest priority groups are arranged in a way that, when viewed from the lowest priority group, the sequence of the other groups follows a counterclockwise direction, which corresponds to the 'S' configuration.

Video Solution:**Q25 Text Solution:**

O-cresol and benzyl alcohol are both classified as functional isomers. They have the same molecular formula but differ in the functional groups present. O-cresol contains a hydroxyl group (-OH) attached to a benzene ring, while benzyl alcohol has the hydroxyl group attached to a benzyl group.

Video Solution:

Q26 Text Solution:

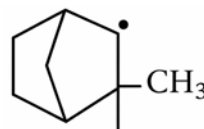
Metamerism arises due to different alkyl chains on either side of the functional group in the molecule. For example, $C_4H_{10}O$ represents methoxypropane ($CH_3OC_3H_7$) and ethoxyethane ($C_2H_5OC_2H_5$).

Video Solution:**Q27 Text Solution:**

They are stereoisomers as they differ in the orientation of atoms in space.

Video Solution:**Q28 Text Solution:**

In alkyl free radicals, the carbon atom having the unpaired electron is sp^2 hybridized. For hyperconjugation to occur, the α -carbon atom with respect to sp^2 hybridized carbon atom should have at least one hydrogen atom. Among the given structures, only (III) has an α -hydrogen atom.



H \longleftarrow α -H atom

Hence, hyperconjugation occurs in structure (III).

Video Solution:**Q29 Text Solution:**

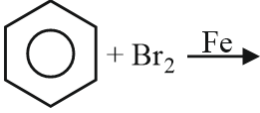
A free radical is an atom or group of atoms that has an unpaired electron and is, therefore, unstable and highly reactive. It is paramagnetic.

Free radical form when a bond forms homolytically and each component gets 1 electron from the bond. This odd electron makes free radicals paramagnetic

Video Solution:

Q35 Text Solution:

(4)

$\begin{array}{l} \text{CH}_3 - \text{CH}_2 \\ - \text{CH}_2 \text{CH}_3 + \text{Br}_2 \\ \xrightarrow{h\nu} \end{array}$	Free radical substitution
$\begin{array}{l} \text{CH}_3 - \text{CH} = \text{CH} \\ - \text{CH}_3 + \text{Br}_2 \xrightarrow{\text{CCl}_4} \end{array}$	Electrophilic addition
	Electrophilic substitution
$\begin{array}{l} \text{CH}_3 - \text{CH}_2 \\ - \text{CH}_2 - \text{CHO} \\ + \text{LiAlH}_4 \xrightarrow{\text{H}_2\text{O}} \end{array}$	Nucleophilic addition

Video Solution:**Q36 Text Solution:**

Nucleophilicity refers to the ability of a species to donate electrons to an electrophile, often a carbon atom, and is influenced by steric hindrance.

The tert-butoxide ion, with three bulky methyl groups surrounding the oxygen atom, experiences significant steric hindrance, making it less effective as a nucleophile.

The ethoxide ion, which has only one ethyl group, is less sterically hindered and thus a stronger nucleophile than tert-butoxide.

Video Solution:**Q37 Text Solution:**

Electro (electron), phile (loving) i.e., Electrophiles are electron loving species.

Video Solution:**Q38 Text Solution:**

No. of σ bonds = 14, No. of π bond = 1

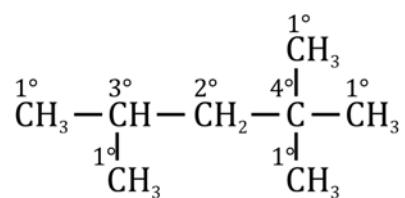
Video Solution:**Q39 Text Solution:**

(4)

$\text{C}_6\text{H}_5\text{CH}_3$ can be most readily sulphonated. due to electron donating nature of $-\text{CH}_3$

Video Solution:

Q40 Text Solution:



Video Solution:



[Android App](#)

| [iOS App](#)

| [PW Website](#)

