

ENTRANCE TEST – 2020
MDCAT – CHEMISTRY

TEST # 01 UHS TOPIC – 1 (Organic Chemistry)

TOPIC: FUNDAMENTAL CHEMISTRY

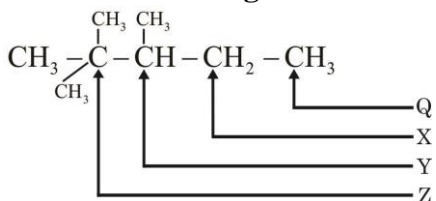
Q.51 **Which one of the following is incorrect prefix for functional group in poly-functional organic compounds?

Opt.	Functional group	Prefix
A)	– OH	Hydroxyl –
B)	– CN	Cyano –
C)	– SH	Mercapto –
D)	– NH ₂	Amino –

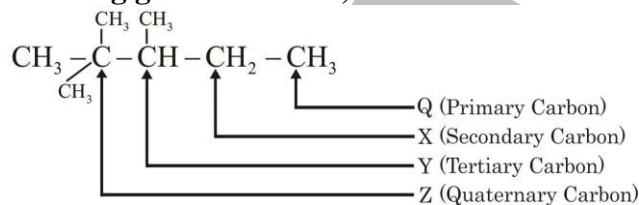
Answer Explanation: (A) It is incorrect statement

Correct statement is as follow:

Opt.	Functional group	Prefix
A)	– OH	Hydroxy –

Q.52 **Consider the following structure of alkane:

Which of the following letters denotes tertiary carbon?

- A) Q C) Y
 B) X D) Z

Answer Explanation: (C)
In the following given structure, the letter Y indicates tertiary carbon.

Classification of carbon atoms

Opt.	Letter	Letter Stands for (Definition)
A)	Q	A carbon atom attached to other one (or no other) carbon atom is called primary carbon (1° carbon ; 1° = primary)
B)	X	A carbon atom attached to other two carbon atoms is called secondary carbon (2° carbon ; 2° = secondary)
C)	Y	A carbon atom attached to other three carbon atoms is called tertiary carbon (3° carbon ; 3° = tertiary)
D)	Z	A carbon atom attached to other four carbon atoms is called quaternary carbon (4° carbon ; 4° = quaternary)

Other information:
Nomenclature guidelines:

In the common system of naming alkanes, the following prefixes are encountered very often.

Memories their meaning:

Prefixes	Meaning of the Prefixes
n –	Alkane is unbranched
iso –	Alkane contains $(\text{CH}_3)_2\text{CH}$ – and no other branches
neo –	Alkane contains $(\text{CH}_3)_3\text{C}$ – and no other branches

Q.53 **Consider the following statements for a functional group.

- I. It serves as a basis for nomenclature of organic compounds
- II. It serves to classify organic compounds into different classes
- III. It is a site of chemical reaction

Which of the above statement is/are correct for a functional group?

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

Answer Explanation: (D)

All the statements given for a functional group are correct.

- It serves as a basis for nomenclature of organic compounds
- It serves to classify organic compounds into different classes
- It is a site of chemical reaction

Q.54 **According to which of the following theories, organic compounds can only be obtained from living organisms (plants and animals).

- A) Lewis theory
B) Lowry- Bronsted theory
C) Vital force theory
D) Arrhenius theory

Q.55 **Identify the correct statement:

- A) Cracking involves chemical break down of long chain higher hydrocarbons into smaller molecules only
B) Reforming involves conversion of straight chain alkanes into branched chain alkanes and aromatic hydrocarbons only
C) Both 'A' and 'B'
D) Neither 'A' nor 'B'

Answer Explanation: (C)

Both statements are correct such as

- Cracking involves chemical break down of long chain higher hydrocarbons into smaller molecules only
- Reforming involves conversion of straight chain alkanes into branched chain alkanes and aromatic hydrocarbons only

Q.56 **Branching tends to make an alkane more _____ and thus the boiling point _____.

- A) Symmetric, decreases
B) Symmetric, increases
C) Asymmetric, decreases
D) Asymmetric, increases

Answer Explanation: (C)

Branching tend to make an alkane more asymmetric and thus the boiling point decreases.

Q.57 **Which of the following is incorrect name for the derivatives of carboxylic acids?

Opt.	Formula	Common name	IUPAC name
A)	CH_3COCl	Acetyl chloride	Ethanoyl chloride
B)	HCOOCH_3	Methyl formate	Methyl methanoate
C)	CH_3CONH_2	Propionamide	Propanamide
D)	$(\text{CH}_3\text{CO})_2\text{O}$	Acetic anhydride	Ethanoic anhydride

Answer Explanation: (C)

It is incorrect statement. In fact the correct statement is as fallow:

C)	CH_3CONH_2	Acetamide	Ethanamide
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Q.58 **The major source of organic compounds is/are:

- A) Coal
B) Petroleum and natural gas
C) Minerals
D) Both A and B

Answer Explanation: (D)

The major source of organic compounds are:

- Coal (source of major aromatic compounds)
- Petroleum (major source of saturated hydrocarbons)
- Natural gas (mixture of methane, ethane, propane and butane)

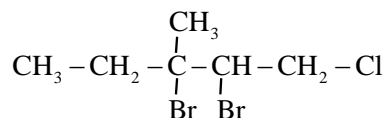
Q.59 Identify the incorrect statement about electrophile?

- A) It is a reagent which accepts an electron pair in reaction
 B) The name electrophile means electron loving
 C) It is denoted by E⁺
 D) It attacks a region of low charge density in the substrate molecule

Answer Explanation: (D) It is incorrect statement.

- Correct statement is as follow.
- It attacks a region of high charge density in the substrate molecule.

Q.60 Consider the following structure of halo-alkane:

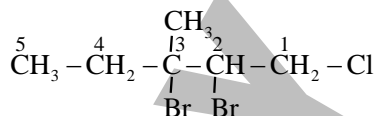


The correct name of above structure according to IUPAC is:

- A) 2,3-Dibromo-1-chloro-3-methylpentane
 B) 3,4-Dibromo-5-chloro-3-methylpentane
 C) 3,4-Dibromo-1-chloro-3-methylpentane
 D) 3-Methyl-2,3-dibromo-2-chloropentane

Answer Explanation: (A)

The correct name of given structure according to IUPAC is
2,3-Dibromo-1-chloro-3-methylpentane

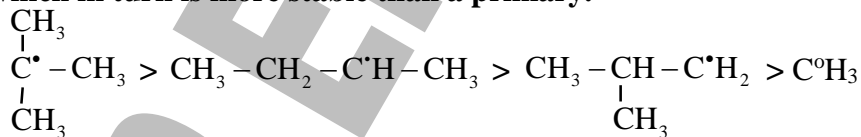


Q.61 Which of the following is the most stable alkyl free radical?

- A) C[•]H₃ C) $\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}^{\bullet}} - \text{CH}_3$
 B) CH₃ - CH₂ - C[•]H - CH₃ D) CH₃ - $\overset{\text{CH}_3}{\text{CH}} - \text{C}^{\bullet}\text{H}_2$

Answer Explanation: (C)

Stability order: A tertiary free radical is more stable than a secondary, which in turn is more stable than a primary.



Q.62 Which of the following is the structure of benzoyl group?

- A) $\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel} \text{C} -$ C) $\text{C}_6\text{H}_5 - \text{CH} -$
 B) $\text{C}_6\text{H}_5 - \text{CH}_2 -$ D) $\text{C}_6\text{H}_5 -$

Answer Explanation: (A)

Options	Structure of aryl radical	Name
A)	$\text{C}_6\text{H}_5 - \text{CO} -$	Benzoyl
B)	$\text{C}_6\text{H}_5 - \text{CH}_2 -$	Benzyl
C)	$\text{C}_6\text{H}_5 - \overset{\text{O}}{\parallel} \text{C} -$	Benzal
D)	$\text{C}_6\text{H}_5 -$	Phenyl

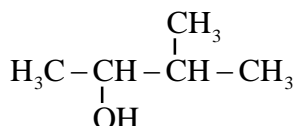
Q.63 The correct order of priority in poly-functional groups is:

- A) Carboxylic acid, aldehyde, ketone, alcohol
- B) Aldehyde, ketone, carboxylic acid, alcohol
- C) Alcohol, aldehyde, ketone, carboxylic acid
- D) Carboxylic acid, alcohol, aldehyde, ketone

Answer Explanation: (A)

The correct order of priority in poly-functional groups is as follow:
Carboxylic acid, aldehyde, ketone, alcohol.

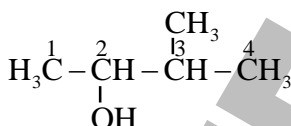
Q.64 The correct name according to IUPAC of the given structure is:



- A) 3-Methylbutan-2-ol
- B) 3-Methyl-1-butanol
- C) 2-Methylbutan-3-ol
- D) 2-Methyl-1-butanol

Answer Explanation: (A)

The correct formula according to IUPAC of the given structure is
3-Methylbutan-2-ol.



Q.65 Which of the following is a strong electrophile?

- A) Cl^-
- B) Cl^+
- C) Cl_2
- D) Cl

Answer Explanation: (B)

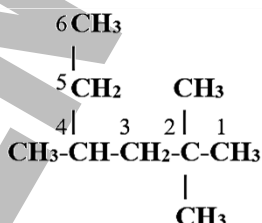
Opt.	Species	Name
A)	Cl^-	Chloride ion
B)	Cl^+	Chrolonium ion
C)	Cl_2	Chlorine molecule
D)	Cl	Symbol for chlorine element

Q.66 The IUPAC name of $\text{CH}_3-\text{CH}(\text{C}_2\text{H}_5)-\text{CH}_2-\text{C}(\text{CH}_3)_2-\text{CH}_3$ is:

- A) 2,2-Dimethyl-4-ethylpentane
- B) 2,3-Dimethyl-4-ethylpentane
- C) 2,2,4-Trimethylhexane
- D) 2,4-Dimethyl-2-ethylpentane

Answer Explanation: (C)

The IUPAC name of $\text{CH}_3-\text{CH}(\text{C}_2\text{H}_5)-\text{CH}_2-\text{C}(\text{CH}_3)_2-\text{CH}_3$ is
2,2,4-Trimethylhexane



Q.67 Which of the following is not organic compound?

- A) Urea
- B) Ammonium cyanate
- C) Glucose
- D) Alcohol

Q.68 Which of the following is a alicyclic compound?

- A) Naphthalene
- B) Cyclohexene
- C) Neopentane
- D) Pyridine

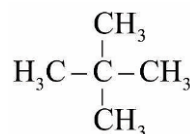
Answer Explanation: (B)

Cyclohexene is a alicyclic compound

A) Naphthalene



C) Neopentane



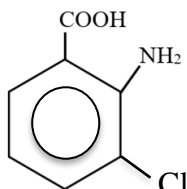
B) Cyclohexene



D) Pyridine



Q.69 Consider the following structural formula.

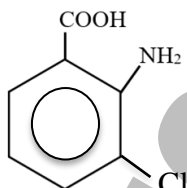


The correct name according to IUPAC is:

- A) 5-Amino-4-chlorobenzoic acid
B) 6-Amino-5-chlorobenzoic acid
C) 2-Amino-3-chlorobenzoic acid
D) 2-Amino-4-carboxytoluene

Answer Explanation: (C)

The correct name according to IUPAC of the given structure is 2-Amino-3-hydroxybenzoic acid.



Q.70 Which of the following is comparatively weaker nucleophile?

- A) CH_3^- C) OH^-
B) NH_2^- D) F^-

Answer Explanation: (D)

- Nucleophilicity decreases along the period of the periodic table; as the electronegativity of elements increase.

CH_3^-	NH_2^-	OH^-	F^-
SiH_3^-	H_2P^-	HS^-	Cl^-

Q.71 All of the following show functional group isomerism EXCEPT:

- A) Alcohol and ether C) Ester and acid anhydride
B) Aldehyde and Ketone D) Carboxylic acid and ester

Answer Explanation: (C)

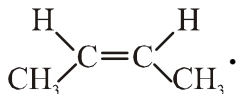
Opt.	Class of organic compounds	Type of structural isomerism shown
A)	Alcohol and ether ($\text{C}_2\text{H}_6\text{O}$) ($\text{C}_2\text{H}_5\text{OH}$ and CH_3OCH_3)	Functional group isomerism
B)	Aldehyde and ketone ($\text{C}_3\text{H}_6\text{O}$) $\text{CH}_3\text{CH}_2\text{CHO}$ and CH_3COCH_3	Functional group isomerism
C)	Ester and acid anhydride (RCOOR) and ($\text{RCO})_2\text{O}$	Do not show type of structural isomerism
D)	Carboxylic acid and ester ($\text{C}_2\text{H}_4\text{O}_2$) CH_3COOH and HCOOCH_3	Functional group isomerism

Q.72 The cis-isomerism is shown by:



Answer Explanation: (C)

The cis-isomerism is shown by



Reason:

- Similar group on the same side of carbon-carbon double bond.
- Polar molecule
- Unsymmetrical
- Greater boiling point than trans isomer
- Low melting point than trans isomer

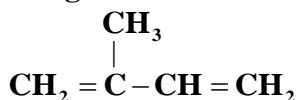
Q.73 A free radical is:

- A) Non-existing
B) Diamagnetic
C) Short lived
D) Fairly stable

Answer Explanation: (C)

- Free radicals are obtained as a result of homolytic fission
e.g. $A-B \rightarrow A^\bullet + \bullet B$.
- They are usually initiated by heat, light or organic peroxides
- They are electrically neutral
- They have unpaired electron
- They are short lived
- They are extremely reactive
- Reaction which proceed via the intermediate formation of free radicals often take place very rapidly

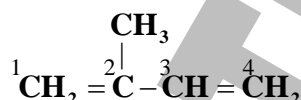
Q.74 The correct IUPAC name of the given structure is:



- A) 2-Methyl-1,3-butadiene
B) 3-Methyl-1,2-butadiene
C) 4-Methyl-1,3-butadiene
D) 1-Methyl-1,3-butadiene

Answer Explanation: (A)

The correct IUPAC name of the given structure is 2-Methyl-1,3-butadiene.



Q.75 The type of isomerism which arises due to the difference in the nature of carbon chain is called:

- A) Chain isomerism
B) Metamerism
C) Functional group isomerism
D) Tautomerism

Answer Explanation: (A)

The type of isomerism which arises due to the difference in the nature of carbon chain is called chain isomerism.

e.g. n-heptane ($\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$) and isopentane ($\text{CH}_3 - \text{CH}_2 - \underset{\text{CH}_3}{\text{CH}} - \text{CH}_3$) are chain isomers of each other.

Q.76 Such compounds which possess the same structural formula, but differ with respect to the positions of the identical groups in space are called:

- A) Geometric isomerism
B) Functional group isomerism
C) Tautomerism
D) Metamerism





Answer Explanation: (A)

Such compounds which possess the same structural formula, but differ with respect to the positions of the identical groups in space are called geometric isomerism.

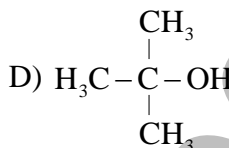
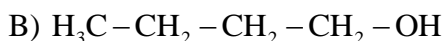
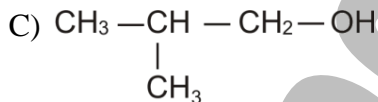
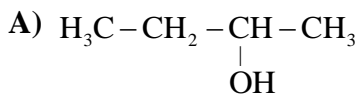
Q.77 Which of the following is not heterocyclic compound?

- A) Pyrrole
B) Furan
C) Aniline
D) Thiophene

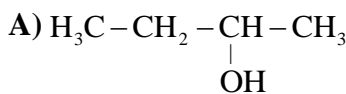
Answer Explanation: (C)

Opt.	Name	Structure	Opt.	Name	Structure
A)	Pyrrole		C)	Aniline	
B)	Furan		D)	Thiophene	

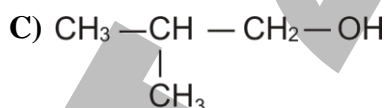
Q.78 Butan-2-ol has correct structure according to IUPAC:



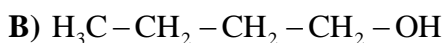
Answer Explanation: (A)



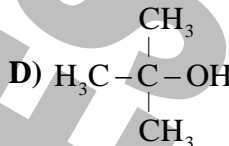
**2-Butanol
(Butan-2-ol)**



**(2-Methyl-1-propanol)
(2-Methylpropan-1-ol)**

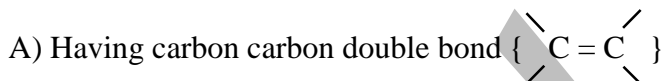


**1-Butanol
(Butan-1-ol)**



**(2-Methyl-2-propanol)
(2-Methylpropan-2-ol)**

Q.79 Mark the incorrect statement for cis-trans isomerism?



B) Different groups are attached with carbon carbon containing double bond

C) **Double bond involves free rotation**

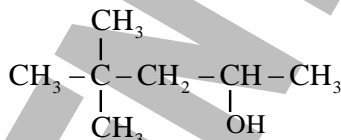
D) In cis form similar groups lie on the same side of double bond

Answer Explanation: (C)

It is incorrect statement. Correct statement is given below:

Cis-trans isomerism arises due to restricted rotation around a carbon carbon double bond.

Q.80 Consider the following structure of an alcohol:



The correct name of the above structure according to IUPAC is:

A) 4,4-Dimethylpentan-2-ol

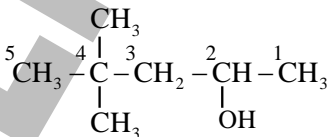
C) 2,2-Dimethylpentan-2-ol

B) 2-Hydroxy-4,4-dimethylpentane

D) 2,2-Dimethyl-1-pentanol

Answer Explanation: (A)

The correct name of the given structure according to IUPAC is 4,4-Dimethylpentan-2-ol (4,4-Dimethyl-2-pentanol).



Q.81 Which of the following does not show geometric isomerism?

A) $\text{H}_3\text{C}-\text{CH}=\text{CBr}_2$

C) $\text{CH}_3-\text{CBr}=\text{CBr}-\text{CH}_3$

B) $\text{H}_3\text{C}-\text{CH}=\text{CH}-\text{CH}_3$

D) $\text{CH}_3-\text{CH}=\text{CH}-\text{CH}_2-\text{CH}_3$

Answer Explanation: (A)

It does not follow condition of geometric isomerism while other show geometric isomerism.

Q.82 Which of the following is incorrect statement about the class of organic compounds?

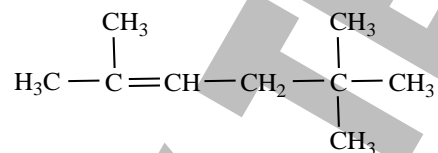
Opt.	Class of organic compounds	Definition
A)	Acyclic	It is a type of compounds which contains an open chain of carbon atoms
B)	Alicyclic	It is a type of homocyclic compounds which contains a ring of only four or more carbon atoms
C)	Aromatic	It is a type of carbocyclic compounds which contains at least one benzene ring
D)	Heterocyclic	It is a type of compounds in which the ring consists of atoms of more than one kind

Answer Explanation: (B)

It is incorrect statement. Correct statement is given below:

Opt.	Class of organic compounds	Definition
B)	Alicyclic	It is a type of homocyclic compounds which contains a ring of only three or more carbon atoms

Q.83 Consider the following structural formula:

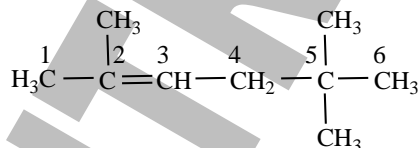


The correct name of the above structure according to IUPAC is:

- A) 2,5,5-Trimethyl-2-hexene
 B) 2,2,5-Trimethyl-4-hexene
 C) 2,5,2-Trimethyl-5-hexene
 D) 2,5,5-Trimethyl-5-hexene

Answer Explanation: (A)

The correct name of the given structure according to IUPAC is 2,5,5-Trimethyl-2-hexene.



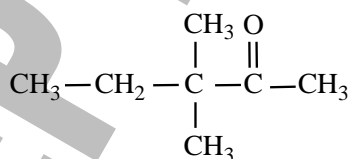
Q.84 Which of the following cannot show metamerism?

- A) Ethoxyethane
 B) Butanone
 C) 3-pentanone
 D) Methyl propanoate

Answer Explanation: (B)

Butanone ($\text{CH}_3\text{COCH}_2\text{CH}_3$) cannot show metamerism. Because it cannot show unequal distribution of carbon atoms on either side of the functional group.

Q.85 Consider the following structural formula of ketone:



The correct name according to IUPAC is

- A) 3,3-Dimethyl-2-pentanone
 B) 3,3-Dimethyl-4-pentanone
 C) 3,3-Dimethyl-2-hexanone
 D) 3,3-Dimethyl-4-heptanone

Answer Explanation: (A)

The correct name of the given structure according to IUPAC is 3,3-Dimethyl-2-pentanone:

