

Organic Chemistry: Some Basic Principles and Techniques

Question 1.

Which among the following statement is not true?

- (a) In liquid, particles are less regularly arranged and are free to move
- (b) Boiling involves breaking up of group of molecules in liquid
- (c) Boiling involves separation of oppositely charged ions
- (d) Thermal energy of particles overcome cohesive forces that hold them

▼ Answer

Answer: (c) Boiling involves separation of oppositely charged ions

Explanation:

Boiling involves separation of oppositely charged ions and makes them as individual ions.

Question 2.

Identify the chiral molecule among the following:

- (a) Isopropyl alcohol
- (b) 2-pentanol
- (c) 1-bromo 3-butene
- (d) Isobutyl alcohol

▼ Answer

Answer: (d) Isobutyl alcohol

Explanation:

Chirality is the condition for a molecule to be optically active and here isobutyl alcohol is the only compound is optically active and hence it is the chiral molecule.

Question 3.

Which element is estimated by Carius method

- (a) Carbon
- (b) Hydrogen
- (c) Halogen
- (d) Nitrogen

▼ Answer

Answer: (c) Halogen

Explanation:

Halogen element is estimated by Carius method

Question 4.

A solution of (+) - 2 - chloro - 2 - phenylethane in toluene racemises slowly in the presence of small amounts of SbCl_5 due to the formation of

- (a) Carbanion
- (b) Carbene
- (c) Free radical
- (d) Carbocation

▼ Answer

Answer: (d) Carbocation

Explanation:

SbCl_5 pulls Cl^- to form SbCl_6^- leaving behind planar $\text{C}_6\text{H}_5-\text{C}^+\text{H}-\text{CH}_3$ carbonium ion. It can be attacked from either side leading to racemic mixture.

Question 5.

Which of the following acids has the smallest dissociation constant?

- (a) $\text{CH}_3\text{CHFCOOH}$
- (b) $\text{FCH}_2\text{CH}_2\text{COOH}$
- (c) $\text{BrCH}_2\text{CH}_2\text{COOH}$
- (d) $\text{CH}_3\text{CHBrCOOH}$

▼ Answer

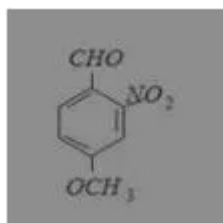
Answer: (c) $\text{BrCH}_2\text{CH}_2\text{COOH}$

Explanation:

$\text{BrCH}_2\text{CH}_2\text{COOH}$ is least acidic or has less K_a i.e., dissociation constant. It is A due to lesser -I effect of Br than F and B Br atom further away from $-\text{COOH}$ group.

Question 6.

What is the correct IUPAC name of



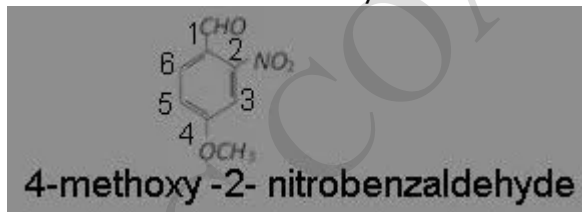
- (a) 4-methoxy-2-nitrobenzaldehyde
- (b) 4-formyl-3-nitro anisole
- (c) 4-methoxy-6-nitrobenzaldehyde
- (d) 2-formyl-5-methoxy nitrobenzene

▼ Answer

Answer: (a) 4-methoxy-2-nitrobenzaldehyde

Explanation:

IUPAC name is 4-methoxy-2-nitrobenzaldehyde



Question 7.

0.5 g of hydrocarbon gave 0.9 g water on combustion. The percentage of carbon in hydrocarbon is

- (a) 75.8
- (b) 80.0
- (c) 56.6
- (d) 28.6

▼ Answer

Answer: (b) 80.0

Explanation:

Percentage% of H = $(2/18) \times [(\text{weight of H}_2\text{O})/(\text{weight of organic compound})] \times 100$

= $(2/18) \times [(0.9)/(0.5)] \times 100 = 20$

Since percentage of hydrogen is 20. Therefore, remaining is carbon i.e. 80 %.

Question 8.

0.92 g of an organic compound was analysed by combustion method. The mass of the U- tube increased by 1.08 g. What is the percentage of hydrogen in the compound?

- (a) 13.04%
- (b) 52.17%
- (c) 65.21%
- (d) 11.30%

▼ Answer

Answer: (a) 13.04%

Explanation:

For Percentage % of H,

$$\begin{aligned} \text{(Percentage \% of H)/(H}_2\text{O)} &= (2/18) \times [(\text{weight} \times \text{H}_2\text{O})/\text{Weight of organic compound}] \times 100 \\ &= (2/18) \times (1.08/0.92) \times 100 \\ &= 13.04 \% \end{aligned}$$

Question 9.

What is the state of hybridisation of carbon in carbanion?

- (a) sp
- (b) sp^2
- (c) sp^3
- (d) sp^2d .

▼ Answer

Answer: (c) sp^3

Explanation:

In carbanion the carbon atom is sp^3 hybridised and the geometry is pyramidal.

Question 10.

An organic compound contains C = 38.8 H = 16 and N = 45.2. Empirical formula of the compound is

- (a) CH_3NH_2
- (b) CH_3CN
- (c) $\text{C}_2\text{H}_5\text{CN}$
- (d) $\text{CH}_2(\text{NH})_2$

▼ Answer

Answer: (a) CH_3NH_2

Question 11.

59 g of an amide obtained from a carboxylic acid, RCOOH , liberated 17 g of ammonia upon heating with alkali. The acid is

- (a) Formic Acid
- (b) Acetic Acid
- (c) Propionic Acid
- (d) Benzoic Acid

▼ Answer

Answer: (b) Acetic Acid

Question 12.

The displacement of electrons in a multiple bond in the presence of attacking reagent is called

- (a) Inductive effect
- (b) Electromeric effect
- (c) Resonance
- (d) Hyper conjugation

▼ Answer

Answer: (b) Electromeric effect

Explanation:

The electromeric effect is a temporary effect brought into play at the requirement of attacking reagent. Electromeric effect refers to a molecular polarizability effect occurring by an intra-molecular electron displacement. It is the temporary effect.

Question 13.

The molecular formula C_5H_{12} contains how many isomeric alkanes?

- (a) 1
- (b) 2
- (c) 3
- (d) 4

▼ Answer

Answer: (c) 3

Explanation:

n-pentane, 2-ethylpropane, and 2-methylbutane are the 3 isomeric alkanes of C_5H_{12} (pentane).

Question 14.

If two compounds have the same empirical formula but different molecular formula they must have

- (a) Different percentage composition
- (b) Different molecular weight
- (c) Same viscosity
- (d) Same vapour density

▼ Answer

Answer: (b) Different molecular weight

Explanation:

If molecular formula is different than molecular weight is also different.

Question 15.

Inductive effect involves

- (a) displacement of σ electrons
- (b) delocalization of n electrons
- (c) delocalization of σ -electrons
- (d) displacement of n -electrons

▼ Answer

Answer: (a) displacement of σ electrons

Explanation:

During inductive effect shifting of σ electrons takes place due to which partial charges are developed on the atom.

$+ \delta'' + \delta' + \delta - \delta$

$C - C - C - C - C$

Question 16.

A gas mixture contains 50% helium and 50% methane by volume. What is the percent by weight of methane in the mixture

- (a) 75%
- (b) 50%
- (c) 80.03%
- (d) 19.97%

▼ Answer

Answer: (c) 80.03%

Explanation:

Given the Solution contains He + CH₄

Their molecular weight = 4 + 16 = 20 % wt of CH₄

= (weight of CH₄)/(Total wt × 100)

= (16/20) × 100

= 80.0

Question 17.

Which of the following physical properties differ for each of a pair of enantiomers?

- (a) solubility in ethanol
- (b) direction of rotation of plane-polarized light
- (c) boiling point and melting point
- (d) index of refraction

▼ Answer

Answer: (b) direction of rotation of plane-polarized light

Explanation:

Enantiomers are equal in all their physical properties except for their optical rotation, as they rotate the plane of polarized light by equal amounts in opposite directions.

Question 18.

The reaction of HCOOH with conc.H₂SO₄ gives which of the following compound?

- (a) CO₂
- (b) CO
- (c) Oxalic Acid
- (d) Acetic acid

▼ Answer

Answer: (b) CO

Question 19.

What is the state of hybridisation of carbon in carbanion?

- (a) sp
- (b) sp²
- (c) sp³
- (d) sp²d.

▼ Answer

Answer: (c) sp³

Explanation:

In carbanion the carbon atom is sp³ hybridised and the geometry is pyramidal.

Question 20.

Which among the following is formed when an alcohol is dehydrated?

- (a) alkane
- (b) alkyne
- (c) alkene
- (d) aldehyde

▼ [Answer](#)

Answer: (c) alkene

Explanation:

In elimination reaction, when protic acids react with alcohol, they lose water molecule to form alkenes.

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