Chemistry Notes

Chapter: Organic Chemistry

Important Multiple Choice Questions:

1) Organic Chemistry is the study of

a) Hydrocarbons
b) Derivatives of hydrocarbons
c) Both a and b
d) None of them

Solution:

- The study of hydrocarbons and their derivatives is called organic chemistry.
- Therefore the answer is both a and b.

2) According to old concept, organic compounds can be derived from

a) Living things
b) Non-living things
c) Both a and b
d) None of them

Solution:

- In the start it was believed that organic compounds can only be derived from living organisms like plants and animals.
- Because at that time not even a single organic compound was derived from non-living source.
- Therefore the answer is living things.

3) According to new concept, organic compounds can be derived from

a) Living things
b) Non-living things
c) Both a and b
d) None of them

- **Solution:**

- In the start it was believed that organic compounds can only be derived from living organisms.
- But after the formation of urea (organic compound) from ammonium thiocyanate (in-organic compound and non-living) this notion was refuted.
- And a new concept was created according to which organic compounds can be derived from both living and non-living things.
- Therefore, the answer is both a and b.

4) In a laboratory first organic compound was synthesized by

a) G.N Lewis
b) Charles
c) Fredrick Wohler
d) Arrhenius

Solution:

- Fredrick Wohler synthesized urea an organic compound, first time in laboratory from ammonium thiocyanate.
- Therefore the answer is Fredrick Wohler.

5) The first organic compound synthesized in laboratory was

a) Carbohydrate
b) Protein
c) Urea
d) None of them

Solution:

- Fredrick Wohler synthesized first time an organic compound (urea) in laboratory.
- Therefore the answer is urea.

6) Urea in laboratory was synthesized from

a) Organic compound
b) In-organic compound
c) Both a and b
d) None of them

Solution:

- Urea in laboratory was synthesized from ammonium thiocyanate which is an in-organic compound e.g.

$$NH_4CNO \text{ ----------} \rightarrow NH_2\text{-}CO\text{-}NH_2$$

- Therefore, the answer is in-organic compound.

7) The inorganic compound from which urea was synthesized in laboratory was

a) Ammonium hydroxide
b) Carbonate
c) Ammonium cyanate
d) Carbide

Solution:

- Urea in laboratory was synthesized from ammonium thiocyanate e.g.

$$NH_4CNO \rightarrow NH_2\text{-}CO\text{-}NH_2$$

- Therefore, the answer is ammonium thiocyanate.

8) Organic compounds composed of carbon and hydrogen only are called

a) Hydrocarbons
b) Derivatives of hydrocarbons
c) In-organic compounds
d) Both a and b

Solution:

- Organic compounds, having only C and H atoms are called hydrocarbons.
- Therefore the answer is Hydrocarbons.

9) Organic compounds having at least one electronegative atom including C and H are called

a) Hydrocarbons
b) Derivatives of hydrocarbons
c) Organic compounds
d) Both b and c

Solution:

- Organic compounds having at least one electronegative atom e.g. O, N, S and F and C and H atoms also are called derivatives of hydrocarbons.
- And we know that hydrocarbons and their derivatives are called organic compounds.
- Therefore the answer is both b and c.

10) The bond most commonly present in organic compounds is

a) Ionic bond
b) Covalent bond
c) Coordinate covalent bond
d) Dipole-dipole interactions

Solution:

- Carbon is present in fourth group of periodic table.
- So, there are four electrons in its outermost electron.
- To complete its octet, carbon requires four another electrons.
- Therefore carbon will complete its octet by sharing four electrons with another atoms.
- And we know that, a bond formed by sharing of electrons between two carbon atoms is called covalent bond.
- Therefore, the answer is covalent bond.

11) In alkanes the carbon atoms are linked together by

a) Single covalent bond
b) Double covalent bond
c) Triple covalent bond
d) All of the above

Solution:

- Alkanes are those organic compounds in which only single covalent bonds are present between carbon atoms.
- Therefore, the answer is single covalent bond.
- A single covalent bond is a bond in which atoms share one pair of electrons.

12) Alkenes can be defined as compounds in which carbon atoms are linked together by at least one

a) Single covalent bond
b) Double covalent bond
c) Triple covalent bond
d) All of the above

Solution:

- Alkenes are those organic compounds in which at least one double covalent bond is present between any two carbon atoms.
- Therefore, the answer is double covalent bond.
- A double covalent bond is a bond in which atoms share two pairs of electron.

13) Alkynes can be defined as compounds in which carbon atoms are linked together by at least one

a) Single covalent bond
b) Double covalent bond
c) Triple covalent bond
d) All of the above

Solution:

- Alkynes are those organic compounds in which at least one triple covalent bond is present between any two carbon atoms.
- Therefore, the answer is triple covalent bond.
- A triple covalent bond is a bond in which atoms share three pairs of electron.

14) The organic compounds are separated from each other in term of classes on the basis of

a) Bonding present between them
b) Color of the compounds
c) Source of the compounds
d) Functional group

Solution:

- A functional group is a single atom or a collection of atoms that describes a compound's physical or chemical characteristics.
- It is a functional group which separates organic compounds into classes or families e.g.
- Carbonyl functional group –CO- containing organic compounds are differentiated as carbonyl family.
- Amine functional group $–NH_2$ containing organic compounds are differentiated as amine's family,
- Oxygen functional group –O- containing organic compounds are differentiated as ether's family.
- Therefore, the answer is functional group.

15) Alcohols can be identified by

a) –OH functional group
b) $–NH_2$ functional group
c) –O- functional group
d) –CO- functional group

Solution:

- Organic compounds in which at least one H atom is replaced with hydroxyl functional group –OH are called alcohols.
- Therefore, the answer is –OH functional group.

16) Amines can be identified by

a) –OH functional group
b) $–NH_2$ functional group
c) –O- functional group
d) –CO- functional group

Solution:

- Organic compounds in which at least one H atom is replaced with amine functional group $–NH_2$ are called amines.
- Therefore, the answer is $–NH_2$ functional group.

17) Ethers can be identified by

a) –OH functional group
b) –COR functional group
c) –O- functional group
d) –X functional group

Solution:

- Organic compounds in which at least one H atom is replaced with oxygen functional group –O- are called ethers.
- Therefore, the answer is –O- functional group.

18) Ketones can be identified by

a) –COOH functional group
b) $–NH_2$ functional group
c) –COH functional group
d) –CO- functional group

Solution:

- Organic compounds in which at least one H atom is replaced with carbonyl functional group –CO- are called ketones.
- Therefore, the answer is –CO- functional group.

19) Aldehydes can be identified by

a) –CO- functional group
b) –COH functional group
c) –X functional group
d) –CN functional group

Solution:

- Organic compounds in which at least one H atom is replaced with aldehyde functional group –COH are called aldehydes.
- Therefore, the answer is –COH functional group.

20) Carboxylic acids can be identified by

a) –CO- functional group
b) –COH functional group
c) –COOH functional group
d) –COOR functional group

Solution:

- Organic compounds in which at least one H atom is replaced with carboxyl functional group –COOH are called carboxylic acids.
- Therefore, the answer is –COOH functional group.

21) Esters can be identified by

a) –COOH functional group
b) –COOR functional group
c) –CONH2 functional group
d) –OH functional group

Solution:

- Organic compounds in which at least one H atom is replaced with ester functional group –COOR are called esters.
- Therefore, the answer is –COOR functional group.

22) Amides can be identified by

a) –NH2 functional group
b) –$CONH_2$ functional group
c) –CN functional group
d) None of them

Solution:

- Organic compounds in which at least one H atom is replaced with amide functional group –$CONH_2$ are called amides.
- Therefore, the answer is –$CONH_2$ functional group.

23) The specialty of aromatic compounds is that they have

a) Lone pair of electrons
b) Alternate single and double bond
c) Dissolve in every type of solvent
d) Their reaction rates are very fast

Solution:

- An organic compound have alternate single and double bonds is called aromatic compound.
- Therefore, the answer is alternate single and double bond.
- The aromatic nature is very special property as it gives stability to aromatic compounds.

24) Aromatic nature gives _____ to organic compounds

a) Color
b) Stability
c) Un-stability
d) Both a and b

Solution:

- An organic compound have alternate single and double bonds is called aromatic compound.
- The aromatic nature is very special property as it gives stability to aromatic compounds.
- Therefore, the answer is stability.

25) Hydrocarbons are

a) Polar in nature
b) Non-polar in nature
c) Both a and b
d) None of them

Solution:

- The hydrocarbons have only C and H atoms and there is very small electronegativity difference between them.
- That's why they are non-polar in nature.
- Therefore, the answer is non-polar in nature.

26) The non-polar nature of hydrocarbons is due

a) High electronegativity difference between C and H
b) Low electronegativity difference between C and H
c) Both a and b
d) None of them

Solution:

- The hydrocarbons have only C and H atoms and there is very small electronegativity difference between them.
- That's why they are non-polar in nature.
- Therefore, the answer is low electronegativity difference between C and H.

27) Derivatives of hydrocarbons are

a) Polar in nature
b) Non-polar in nature
c) Both a and b
d) None of them

Solution:

- Derivatives of hydrocarbons contain at least one electronegative atom.
- So, there will be higher electronegativity difference between C and non-carbon atom (Electronegative atom).
- The enough electronegativity difference between C and non-carbon atom creates polarity in these compounds.
- Therefore, the answer is polar in nature.

28) The polar nature of derivatives of hydrocarbons is due to

a) High electronegativity difference between C and non-carbon atom
b) Low electronegativity difference between C and non-carbon atom
c) Due to same electronegativity
d) None of the above

Solution:

- Derivatives of hydrocarbons contain at least one electronegative atom.
- So, there will be high electronegativity difference between C and non-carbon atom (Electronegative atom).
- The enough electronegativity difference between C and non-carbon atom creates polarity in these compounds.

- Therefore, the answer is high electronegativity difference between c and non-carbon atom.

29) According to like dissolve like rule polar compounds are soluble in

a) Polar solvents
b) Non-polar solvents
c) Both a and b
d) None of them

Solution:

- There is a general rule of solubility, called like dissolve like rule.
- According to this rule polar compounds are soluble in polar solvents.
- And non-polar substances are soluble in non-polar solvents.
- Therefore, the answer is polar solvents.

30) According to like dissolve like rule non-polar compounds are soluble in

a) Polar solvents
b) Non-polar solvents
c) Both a and b
d) None of them

Solution:

- There is a general rule of solubility, called like dissolve like rule.
- According to this rule polar compounds are soluble in polar solvents.
- And non-polar substances are soluble in non-polar solvents.
- Therefore, the answer non-polar solvents.

31) Hydrocarbons (non-polar organic compounds) are soluble in

a) Methanol
b) Ethanol
c) Benzene
d) Both a and b

Solution:

- Hydrocarbons are non-polar in nature
- According to like dissolve like rule, they will dissolve in non-polar solvent like benzene, not in polar solvents like methanol and ethanol.

- Therefore, the answer is benzene.

32) Derivatives of hydrocarbons (polar organic compounds) are soluble in

a) Methanol
b) Ethanol
c) Ether
d) Both a and b

Solution:

- Derivatives of hydrocarbons are polar in nature
- According to like dissolve like rule, they will dissolve in polar solvents like methanol and ethanol, not in non-polar solvent like ether.
- Therefore, the answer is both a and b.

33) Catenation is the property, found in

a) C
b) H
c) O
d) N

Solution:

- Catenation is the self-linkage property found in carbon atom.
- Not in any other atom like, H, O and N.
- Therefore, the answer is C atom.

34) Due to catenation property carbon can form

a) Long chains
b) Short chains
c) Un-stable chains
d) None of them

Solution:

- Catenation is a self-linkage property.
- So, due to this self-linkage carbon form long chains.

- Therefore, the answer is long chains.

35) Isomerism is the phenomenon in which

a) Compounds have same molecular and same structural formula
b) Compounds have different molecular and different structural formula
c) Compounds have same molecular but different structural formula
d) Compounds have different molecular but same structural formula

Solution:

- Isomerism can be defined as the compounds having same molecular formula and different structural formula are called isomers and the phenomenon is called isomerism.
- Therefore, the answer is, compounds have same molecular formula but different structural formula.

36) Which factor is responsible for the diversity of organic compounds

a) Catenation
b) Isomerism
c) Both a and b
d) None of them

Solution:

- Catenation and isomerism are the two factors, responsible for the diversity of organic compounds.
- As in catenation through self-linkage carbon form variety of compounds.
- And in isomerism through different arrangement of atoms, carbon form variety of organic compounds.
- Therefore, the answer is both a and b.

37) In isomerism the structural formulas of the two isomers different, is due to

a) Different molecular formula
b) Different arrangement of atoms
c) Different nature
d) All of them

Solution:

- In isomerism we know that, compounds have same molecular formula but different structural formula.
- The difference in their structural formulas is due to different arrangement of atoms in a compound.
- Therefore, the answer is different arrangement of atoms.

38) Rate of reaction of organic compounds is

a) High
b) Slow
c) Moderate
d) Both a and c

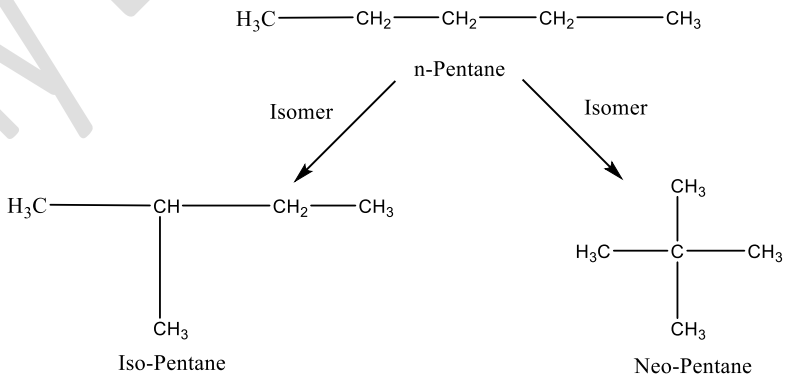
Solution:

- In organic compounds the bond present between atoms is covalent in nature.
- Covalent bond is termed as non-polar and weak bond.
- That's why reaction rates of organic compounds are slow.
- Therefore, the answer is slow.

39) Isomer of normal pentane

a) Iso-pentane
b) Neo-pentane
c) Both a and b
d) None of them

Solution:



- Therefore, the answer is both a and b.

40) According to IUPAC names can be assigned to

a) Alkanes
b) Alkenes
c) Alkynes
d) All of them

Solution:

- International union of pure and applied chemistry assign names to each class of organic compounds either they are alkanes, alkenes or alkynes.
- Therefore, the answer is all of them.

41) In saturated hydrocarbons

a) Single covalent bond present
b) Double covalent bond present
c) Triple covalent bond present
d) Both b and c

Solution:

- The hydrocarbons in which all the carbon atoms are bounded together by single covalent bonds are called saturated hydrocarbons.
- Therefore, the answer is single covalent bond.

42) In unsaturated hydrocarbons

a) Single covalent bond is present
b) Double covalent bond is present
c) Triple covalent bond is present
d) Both b and c

Solution:

- Organic compounds in which at least one double or triple covalent bond is present between any of two carbon atoms, are called un-saturated hydrocarbons.
- Therefore, the answer is both b and c.

43) Alkanes are

a) Saturated hydrocarbons
b) Un-saturated hydrocarbons
c) Both a and b
d) None of the above

Solution:

- The hydrocarbons in which all the carbon atoms are bounded together by single covalent bonds are called saturated hydrocarbons.
- And alkanes are an organic compounds have only single covalent bonds, not double or triple covalent bonds.
- Therefore, the answer is saturated hydrocarbons.

44) Alkenes and alkynes both are

a) Saturated hydrocarbons
b) Un-saturated hydrocarbons
c) Both a and b
d) None of them

Solution:

- Organic compounds in which at least one double or triple covalent bond is present between any of two carbon atoms, are called un-saturated hydrocarbons.
- Alkenes are the organic compounds having at least one double covalent bond between any of two carbons.
- And alkynes are the compounds having at least one triple covalent bond between any of two carbon atoms.
- So, both alkene and alkyne are un-saturated.
- Therefore, the answer is un-saturated hydrocarbons.

45) Condensed structural formula for butane is

a) CH_3-CH_2-CH_3
b) CH_3-CH_2-CH_2-CH_3
c) CH_3-CH_2-CH_2-CH_2-CH_3
d) CH_3-CH_3

Solution:

- Condensed structural formula for butane is CH_3-CH_2-CH_2-CH_3.

- Therefore, the answer is b.

46) CH_3-CH_2-CH_3 is the chemical formula for

a) Ethane
b) Propane
c) Butane
d) Pentane

Solution:

- In CH_3-CH_2-CH_3 three carbon atoms are present.
- For three carbon atom alkane's prefix Prop- and suffix "ane" is used.
- So, the chemical formula given above is the formula of propane.
- Therefore, the answer is b.

47) Which compound is not saturated hydrocarbon?

a) CH_3-CH_3
b) CH_4
c) CH_3-CH=CH_2
d) CH_3-CH_2-CH_3

Solution:

- The compounds in options a, b and d are saturated hydrocarbons.
- Because they have only single covalent bond between carbon atoms.
- They do not have double or triple covalent bond.
- Therefore they all are saturated hydrocarbons according to saturated hydrocarbon's definition.
- While the compound in option c have one double covalent bond between last two carbon atoms.
- This double covalent bond is the indication of un-saturated hydrocarbons.
- Therefore the answer is c.

48) Prefix "But" stands for how many carbon atoms

a) 2
b) 3
c) 4
d) 5

Solution:

- But- is the prefix used for 4 carbon atoms.
- Therefore the answer is 4.
- The prefixes used for carbon atoms number 1 to 10 are listed in the table below.

Prefix	Number of Carbon atoms
Meth-	1
Eth-	2
Prop-	3
But-	4
Pent-	5
Hex-	6
Hept-	7
Oct-	8
Non-	9
Dec-	10

49) Pitch is produced by

a) Coal
b) Coal tar
c) Coal gas
d) Petroleum

Solution:

- Pitch is a waste material left behind after fractional distillation of coal.
- This pitch is used in the construction of roads and roof of buildings.

50) In which of the following compounds, oxygen is attached to two alkyl carbon atoms?

a) Alcohol
b) Phenol
c) Ether
d) Ester

Solution:

- Ether is a derivative of a hydrocarbon in which the oxygen functional group -O- has been substituted for at least one H atom.

- Therefore, in ethers, one alkyl group will be attached to oxygen from the left and the other alkyl group from the right**.**
- Therefore, the answer is ether.

51) Which of the following is an alcohol?

a) CH_3-CH_2-O-CH_2-CH_3
b) CH_3-CH_2-COOH
c) C_6H_5-OH
d) CH_3-CH_2-OH

Solution:

- Alcohols are hydrocarbon derivatives having at least one H atom changed to an -OH group.
- One H replaceable -OH functional group is present in the molecule in option d.
- Therefore, the answer is CH3-CH2-OH.

52) Formic acid contains

a) –OH
b) –CO-
c) –COOH
d) –CHO

Solution:

- Hydrocarbon derivatives called carboxylic acids have at least one H atom changed to a -COOH functional group.
- Formic acid belongs to the family of carboxylic acids and has the functional group -COOH carboxyl.
- Therefore, the answer is –COOH.