HYBRIDISATION & STRUCTURE OF CARBON COMPOUNDS - LEVEL I

1 The correct hybridization states of carbon atoms in the following compound are -

$\overset{1}{C}H_2 = \overset{2}{C}H - \overset{3}{C} \equiv N$

1. C^1= sp , C^2= sp^3 , C^3= sp^2
2. C^1= sp^2 , C^2= sp^3 , C^3= sp^3
3. C^1= sp^2 , C^2= sp^2 , C^3= sp
4. C^1= sp^3 , C^2= sp^3 , C^3 = sp^3

2 The number of σ and π bonds in the molecule CH_2Cl_2 are -

1. 2 = (σ_{C-Cl}) , 1= (σ_{C-H}) , and 1= π
2. 2 = (σ_{C-Cl}) , 2= (σ_{C-H}) , and 0= π
3. 2 = (σ_{C-Cl}) , 1= (σ_{C-H}) , and 1= π
4. 2 = (σ_{C-Cl}) , 1= (σ_{C-H}) , and 1= π

3 $\overset{1}{C}H_2 = \overset{2}{C} = O$

The correct hybridization states of carbon atoms in the above compound are -

1. C_1= sp , C_2= sp^3
2. C_1= sp^2 , C_2= sp
3. C_1= sp^3 , C_2= sp
4. C_1= sp , C_2= sp^2

4 The correct hybridization states of carbon atoms marked as 1,2,3 in the following compound are -

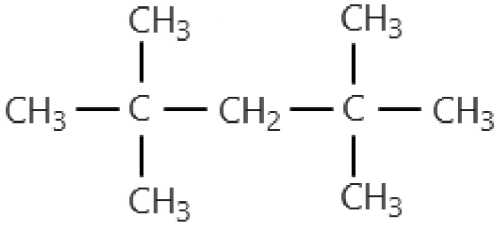
$\overset{1}{C}H_3 - C\,2H = \overset{3}{C}H_2$

1. C_1= sp , C_2= sp^3 , C_3= sp^2
2. C_1= sp^2 , C_2= sp^3 , C_3= sp^3
3. C_1= sp^3 , C_2= sp^2 , C_3= sp^2
4. C_1= sp^3 , C_2= sp^3 , C_3= sp^3

5 The number of σ and π bonds in the molecule C_6H_6 are -

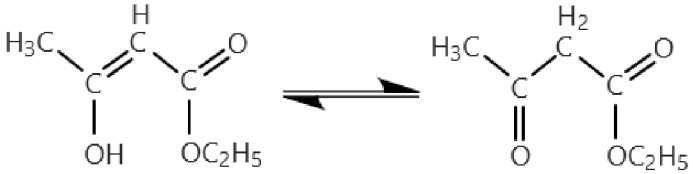
1.	6 C – C sigma (σ C - C) bonds, 5 C–H sigma ((σ C - H) bonds, and 3 C=C pi (π C - C)
2.	6 C – C sigma (σ C - C) bonds, 5 C–H sigma ((σ C - H) bonds, and 2 C=C pi (π C - C)
3.	6 C – C sigma (σ C - C) bonds, 6 C–H sigma ((σ C - H) bonds, and 3 C=C pi (π C - C)
4.	6 C – C sigma (σ C - C) bonds, 6 C–H sigma ((σ C - H) bonds, and 2 C=C pi (π C - C)

6 The number of primary carbon atoms in the following compound are-



1. 6
2. 2
3. 4
4. 3

7 The enolic form of ethyl acetoacetate is given below. The number of sigma and pi bonds in the enolic form of ethyl acetoacetate are -



1. 18 sigma bonds and 2 pi-bonds
2. 16 sigma bonds and 1 pi-bond
3. 9 sigma bonds and 2 pi-bonds
4. 9 sigma bonds and 1 pi-bond

8 The correct hybridization states of carbon atoms in C_6H_6 is/are:

1. sp^2
2. sp
3. sp^3
4. All of the above

9 The cylindrical shape of an alkyne is due to the presence of-
1. Three sigma C-C bonds
2. Three π C-C bonds
3. Two sigma C-C and one π C-C bonds
4. One sigma C-C and two π C-C bonds

10 The $C-H$ bond distance is longer in -
1. C_2H_2
2. C_2H_4
3. C_2H_6
4. $C_2H_2Br_2$

11 The enolic form of acetone contains-
1. 9 sigma bonds, 1 pi bond, and 2 lone pairs of electrons
2. 8 sigma bonds, 2 pi bond, and 2 lone pairs of electrons
3. 10 sigma bonds, 1 pi bond, and 1 lone pair of electrons
4. 9 sigma bonds, 2 pi bond, and 1 lone pair of electrons

12 In the organic compound $CH_2=CH-CH_2-CH_2-C\equiv CH$, the pair of hydridized orbitals involved in the formation of C_2-C_3 bond is-
1. $sp-sp^2$
2. $sp-sp^3$
3. sp^2-sp^3
4. sp^3-sp^3

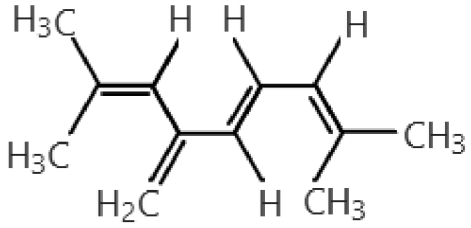
13 The compound that has only sp^3 carbon atom is -
1. HCOOH
2. $(NH_2)_2CO$
3. $(CH_3)_3COH$
4. CH_3CHO

14 The number of tertiary carbon atoms in tertiary butyl alcohol are-
1. 1
2. 2
3. Zero
4. 4

HYBRIDISATION & STRUCTURE OF CARBON COMPOUNDS - LEVEL II

15 The correct order of increasing bond length of C-H, C-O, C-C and C=C is:
1. $C-C<C=C<C-O<C-H$
2. $C-O<C-H<C-C<C=C$
3. $C-H<C-O<C-C<C=C$
4. $C-H<C=C<C-O<C-C$

16 The total number of pi-bond electrons in the following structure are:



1.	4	2.	8
3.	12	4.	16

17 The Cl — C — Cl angles in 1,1,2,2-tetrachloroethene and tetrachloromethane will be about :
1. 120° and 109.5°
2. 90° and 109.5°
3. 109.5° and 90°
4. 109.5° and 120°

18 The number of σ and π bonds in the molecule C_6H_{12} are-
1. 7 = (σ_{C-C}) , 11 = (σ_{C-H}), and 0= π
2. 6 = (σ_{C-C}) , 12 = (σ_{C-H}), and 0= π
3. 12 = (σ_{C-C}) , 6 = (σ_{C-H}), and 1= π
4. 5 = (σ_{C-C}) , 13 = (σ_{C-H}), and 1= π

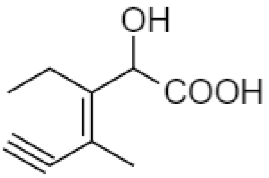
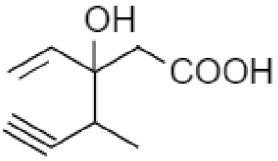
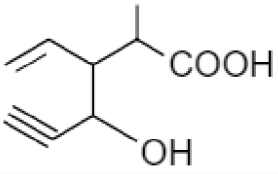
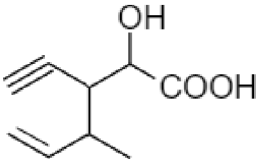
19 The maximum number of carbon atoms arranged linearly in the molecule, $CH_3-C\equiv C-CH=CH_2$, are -
1. 3
2. 4
3. 5
4. 6

20 The C-C bond length of the following molecules are in the order-

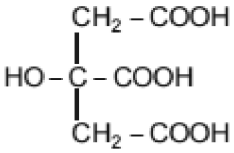
1. $C_2H_6 > C_2H_4 > C_6H_6 > C_2H_2$
2. $C_2H_2 < C_2H_4 < C_6H_6 < C_2H_6$
3. $C_2H_6 > C_2H_2 > C_6H_6 > C_2H_4$
4. $C_2H_4 > C_2H_6 > C_2H_2 > C_6H_6$

NOMENCLATURE - LEVEL I

21 The structure of the compound whose IUPAC name is 3-Ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is:

1.		2.	
3.		4.	

22



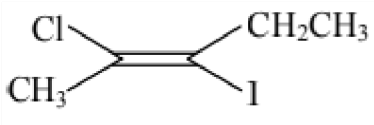
The IUPAC name of the above mentioned compound is -

1. Citric acid
2. 3-Hydroxy pentane-1,5-dioic acid
3. 2-Hydroxypropane-1,2,3-tricarboxylic acid
4. 2-Carboxy-2-hydroxy propane-1,3-dicarboxylic acid

23 The increasing order of +ve I-effect shown by H, CH_3, C_2H_5 and C_3H_7 is-

1. $H < CH_3 < C_2H_5 < C_3H_7$
2. $H > CH_3 < C_2H_5 > C_3H_7$
3. $H < C_2H_5 < CH_3 < C_3H_7$
4. None of the above

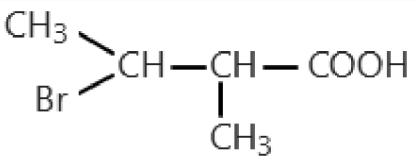
24



The IUPAC name of the above-mentioned compound is:

1. cis-2-Chloro-3-iodo-2-pentene
2. trans-2-Chloro-3-iodo-2-pentene
3. cis-3-Iodo-4-chloro-3-pentene
4. trans-3-Iodo-4-chloro-3-pentene

25



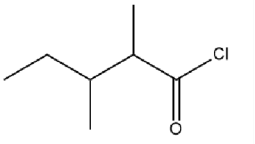
The IUPAC name of the above mentioned compound is -

1. 2–Bromo-3–methylbutanoic acid
2. 2-Methyl-3-bromobutanoic acid
3. 3-Bromo-2-methylbutanoic acid
4. 3-Bromo-2,3-dimethylpropanoic acid.

26 The compound with an isopropyl group is-

1. 2,2,3,3-Tetramethylpentane
2. 2,2-Dimethylpentane
3. 2,2,3-Trimethylpentane
4. 2-Methylpentane

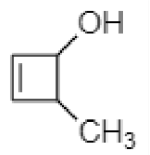
27



The IUPAC name of the above mentioned compound is -

1. 3, 4-Dimethylpentanoyl chloride
2. 1-Chloro-1-oxo-2,3-dimethylpentane
3. 2-Ethyl-3-methylbutanoylchloride
4. 2, 3-Dimethylpentanoyl chloride

28



The IUPAC name of the above mentioned compound is -

1.	3-Methylcyclobut-1-en-2-ol	2.	4-Methylcyclobut-2-en-1-ol
3.	4-Methylcyclobut-1-en-3-ol	4.	2-Methyl cyclobut-3-en-1-ol

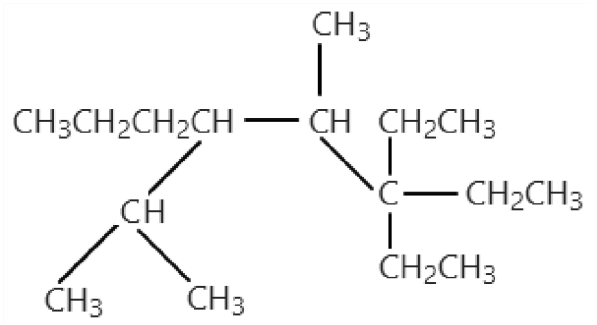
29 The correct IUPAC name, among the following, is-

1.	Prop-3-yn-1-ol	2.	But-4-ol-4-yne
3.	But-3-ol-2-yne	4.	But-3-yn-1-ol

30 The IUPAC name of $CH_3CH{=}CHC{\equiv}CH$ is:

1. Pent - 3 - en - 1 - yne
2. Pent - 2 - en - 4 - yne
3. Pent - 1 - yn - 3 - ene
4. Pent - 4 - yn - 2 – ene

31



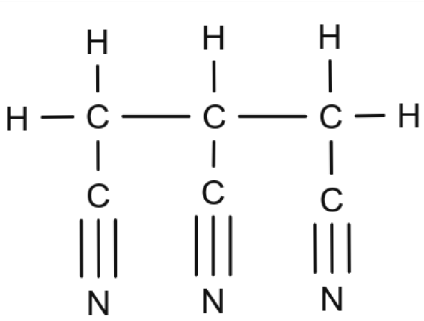
The IUPAC name of the above mentioned compound is -

1. 3,3-Diethyl-4-methyl-5-(methylethyl)octane
2. 3,3-Diethyl-5-isopropyl-4-methyloctane
3. 4-Isopropyl-5-methyl-6,6-diethyloctane
4. 6,6-Diethyl-4-isopropyl-5-methyloctane

32 The general molecular formula, that represents the homologous serious of alkanols is-

1. $C_nH_{2n}O_2$
2. $C_nH_{2n}O$
3. $C_nH_{2n+1}O$
4. $C_nH_{2n+2}O$

33

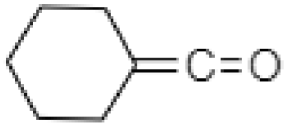


The IUPAC name of the above mentioned compound is -

1. 1,2,3-Tricyanopropane
2. Propane-1,2,3-tricarbonitrile
3. 1,2,3-Cyanopropane
4. Propane Tricarbylamine

NOMENCLATURE - LEVEL II

34



The IUPAC name of the above mentioned compound is -

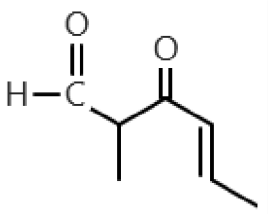
1. Cyclohexylidenemethanone
2. Cyclohexylidemethanone
3. Cyclohexylidenylmethanone
4. Cyclohexdenemethanone

35

The IUPAC name of the above mentioned compound is -

1. Pent-1-en-3-yne
2. Pent-1-ene-4-yne
3. Pent-4-yn-1-ene
4. Pent-1-en-4-yne

36

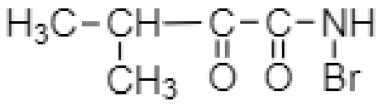


The IUPAC name of the above mentioned compound is -
1. 3-Ket-2-methylhex-4-enal
2. 5-Formylhex-2-en-3-one
3. 5-Methyl-4-oxohex-2-en-5-al
4. 3-Keto-2-methylhex-4-enal

37 Incorrectly matched common name with IUPAC name is-

Common name	IUPAC name
1. Benzalacetophenone	(E)-1,3-Diphenylprop-2-en-1-one
2. Glutaric acid	Pentenedioic acid
3. Adipic acid	Hexane-1,6-dioic acid
4. Pyruvic acid	2-Oxopropanoic acid

38



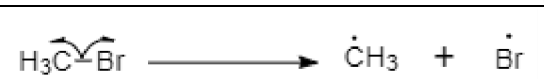
The IUPAC name of the above-mentioned compound is -
1. (N-Bromo)-3-methyl-2-oxobutanamide
2. (N-Bromo)-2-oxo-4-methylbutanamide
3. (N-Bromo)-1,2-dioxo-3-methylbutanamine carboxamide
4. (N-Bromo)-1-oxo-2-methylpropane

39

The IUPAC name of the above mentioned compound is -
1. p-Phenyl diphenyl
2. p-1-biphenyl benzene
3. 1,1',4',1"-terphenyl
4. Terphenyl

BOND CLEAVAGE & ISOMERISM - LEVEL I

40 Covalent bonds can undergo fission in two different ways. The correct representation involving heterolytic fission of $CH_3 - Br$ is

1.	
2.	
3.	
4.	

41 In an S_N1 reaction on chiral center, there is:
1. 100% racemization
2. Inversion is more than retention leading to partial racemization.
3. 100% retention
4. 100% inversion

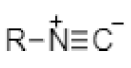
STRUCTURAL ISOMERS - LEVEL I

42 Isomerism exhibited by acetic acid and methyl formate is:
1. Functional
2. Chain
3. Geometrical
4. Central

43 Compounds with $C_4H_{11}N$ as molecular formula can exhibit-
1. Position isomerism
2. Metamerism
3. Functional isomerism
4. All of the above

44 Functional isomer is not possible for -
1. Alcohols
2. Aldehydes
3. Alkyl halides
4. Cyanides

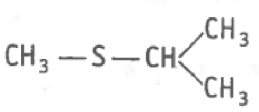
45 Alkyl cyanide *R*-C≡N and alkyl isocyanides



are-
1. Tautomers
2. Metamers
3. Functional isomers
4. Geometrical isomers

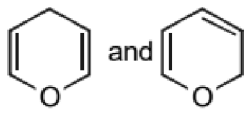
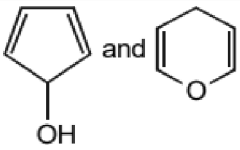
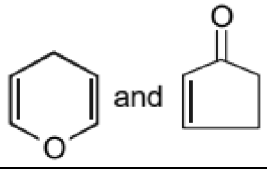
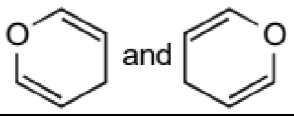
46 An isomer of ethanol is-
1. Methanol
2. Diethyl ether
3. Acetone
4. Dimethyl ether

47 The type of structural isomerism shown by given compounds is-
$CH_3 - S - CH_2 - CH_2 - CH_3$ and



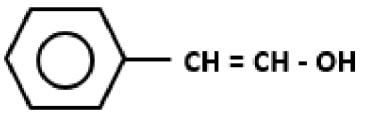
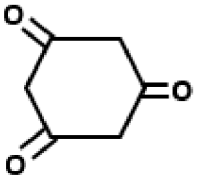
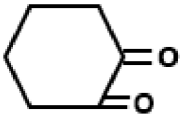
1. Tautomerism
2. Positional isomerism
3. Functional isomerism
4. Ring Chain isomerism

48 The pair of structures that does not represent isomers is -

1.	
2.	
3.	
4.	

49 The number of isomeric structures for C_2H_7N would be:
1. 4
2. 3
3. 2
4. 1

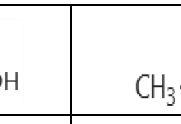
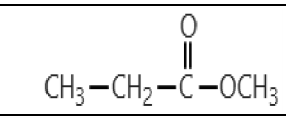
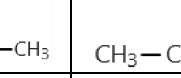
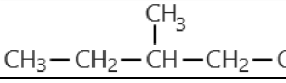
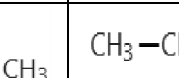
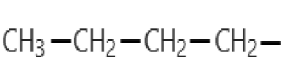
50 Tautomerism is exhibited by:

I.		II.	
III.		IV.	

1. I and II
2. I, III and IV
3. I, II and IV
4. I, II, III and IV

51 The pair that represents chain isomers is-
1. CH_3CHCl_2 and $ClCH_2CH_2Cl$
2. Propyl alcohol and Isopropyl alcohol
3. 2-Methylbutane and Neopentane
4. Diethyl ether and Dipropyl ether

52 The pair that represents chain isomers is :-

1.		
2.		
3.		
4.		

53 The pair among the following that does not contain position isomers is -

1.	$CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-Cl$ and $\underset{\displaystyle OH}{\underset{|}{CH_2}}-CH_2-Cl$
2.	$CH_3-CH_2-CH_2-NH_2$ and $CH_3-\underset{\displaystyle NH_2}{\underset{|}{CH}}-CH_3$
3.	$CH_3-CH_2-CH=CH_2$ and $CH_3-CH=CH-CH_3$
4.	$CH_3-CH_2-CH_2-CH_2-CN$ and $CH_3-CH_2-\underset{\displaystyle CN}{\underset{|}{CH}}-CH_3$

54 The number of possible isomers of the aromatic compound with molecular formula C_7H_8O are :

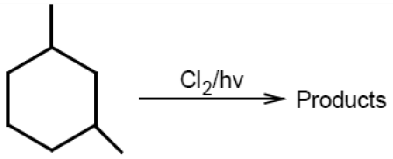
1.	3	2.	5
3.	7	4.	9

STRUCTURAL ISOMERS - LEVEL II

55 The number of primary amines of the formula $C_4H_{11}N$ are :

1.	1	2.	3
3.	4	4.	5

56 Number of monochlorinated products (excluding stereo-isomers) obtained from the given reaction are :



1.	4	2.	5
3.	6	4.	7

57 The total number of isomers of C_4H_8 are-

1.	8	2.	7
3.	6	4.	5

58 The number of chain isomers for C_5H_{12} and C_6H_{14} are, respectively :

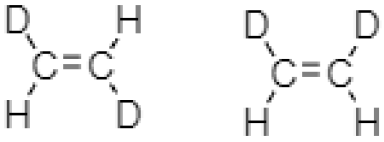
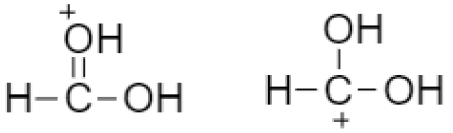
1.	3,3	2.	3,5
3.	4,4	4.	3,4

59 Total isomers for $C_4H_{10}O$ are-

1.	4	2.	5
3.	7	4.	8

STEREO ISOMERS - LEVEL I

60 Geometrical isomerism can be shown by:

1.	
2.	
3.	
4.	

61 Geometrical isomerism is caused by-

1. Restricted rotation around C=C bond.
2. The presence of one asymmetric carbon atom.
3. The different groups attached to the same functional group.
4. None of the above.

62 The compounds that show geometrical isomerism among the following are:

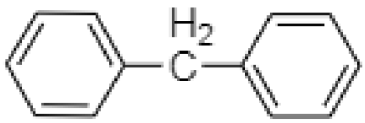
a. 2-Butene
b. Propene
c. 1-Phenylpropene
d. 2-Methylbut-2-ene

1. a, b
2. c, d
3. a, b, c
4. a, c

63 The chiral compound among the following is:
1. 2-Methylpentanoic acid
2. Pentanoic acid
3. 4-Methyl pentanoic acid
4. None of the above

64 But-2-ene exhibits cis-trans isomerism due to-
1. Rotation around $C_3 - C_4$ sigma bond
2. Rotation around $C_1 - C_2$ bond
3. Restricted rotation around C=C bond
4. Rotation around $C_2 - C_3$ double bond

65 The structure of diphenylmethane is given below:



The number of structural isomers possible when one of the hydrogen atom is replaced by a chlorine atom are :
1. 6
2. 4
3. 8
4. 7

66 The optically active compound among the following is-
1. Butane
2. 2-Methyl pentane
3. 4-Methyl pentane
4. 3-Methyl hexane

67 The maximum number of stereoisomers possible for 3-hydroxy-2-methyl butanoic acid is/are :
1. 1
2. 2
3. 3
4. 4

68 Glucose and fructose are-
1. Chain isomers
2. Position isomers
3. Functional isomers
4. Optical isomers

STEREO ISOMERS - LEVEL II

69 The optically active compound among the following is-
1. Glycerine
2. Acetaldehyde
3. Glyceraldehyde
4. Acetone

70 The optically active compound among the following is-
1. Isobutyric acid
2. beta-Chloropropionic acid
3. Propionic acid
4. alpha-Chloropropionic acid

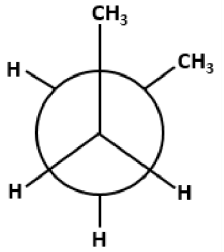
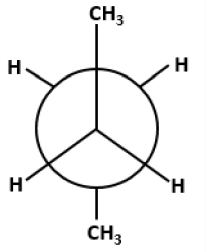
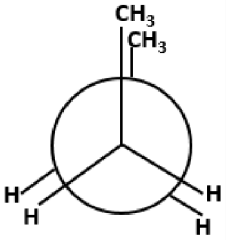
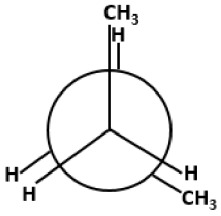
71 Fischer projection indicates-
1. Horizontal substituents above the plane.
2. Vertical substituents above the plane.
3. Both horizontal and vertical substituents below the plane.
4. Both horizontal and vertical substituents above the plane.

72 Total number of isomeric aldehydes and ketones that can exist with the molecular formula $C_5H_{10}O$ are :
1. 5
2. 8
3. 6
4. 7

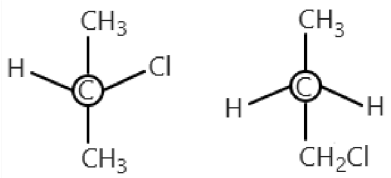
CONFORMATIONAL ISOMERS - LEVEL I

73 The R and S enantiomers of an optically active compound differ in-
1. Their optical rotation of plane-polarized light.
2. Their reactivity with chiral reagents.
3. Their solubility in achiral reagents.
4. Their melting points.

74 The most stable conformation of n-butane among the following is:

1.		2.	
3.		4.	

75 The pair of structures given below represent-



1.	Enantiomers	2.	Position isomers
3.	Conformers	4.	None of the above

NUCLEOPHILE & ELECTROPHILE - LEVEL I

76 The correct statement regarding electrophile is -

1.	Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from another electrophile
2.	Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile
3.	Electrophiles can be either neutral or positively charged species and can form a bond accepting a pair of electrons from a nucleophile
4.	Electrophile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile

77 The most stable carbanion species among the following is-

1. $C\mathrm{Cl}_3^-$
2. CH_3^-
3. $\mathrm{CH}_2\,\mathrm{Cl}^-$
4. CHCl_2^-

78 The incorrect statement among the following for a nucleophile is-

1. Nucleophile is a Lewis acid
2. Ammonia is a nucleophile
3. Nucleophiles attack low electron density sites
4. Nucleophiles are not electron seeking

79 An electrophile among the following is -

1. OH^-
2. NC^-
3. R_3C^-
4. Carbonyl group

80 Electrophilic addition reactions proceed in two steps. The first step involves the addition of an electrophile. The major intermediate formed in the first step is -

$\mathrm{H_3C-HC=CH_2+H^+\rightarrow ?}$

1. 2° carbanion
2. 1° carbocation
3. 2° carbocation
4. 1° carbanion

81 The correct order of the ability of the leaving group is:

1. $\mathrm{OCOC_2H_5 > OC_2H_5 > OSO_2Et > OSO_2CF_3}$
2. $\mathrm{OC_2H_5 > OCOC_2H_5 > OSO_2CF_3 > OSO_2Me}$
3. $\mathrm{OSO_2CF_3 > OSO_2Me > OCOC_2H_5 > OC_2H_5}$
4. $\mathrm{OCOC_2H_5 > OSO_3CF_3 > OC_2H_5 > OSO_2Me}$

82 The species among the following that is not an electrophile is:

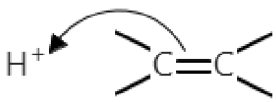
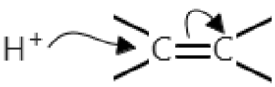
1. BH_3
2. $\overset{\oplus}{H_3O}$
3. $\overset{\oplus}{N}O_2$
4. $\overset{\oplus}{C}l$

NUCLEOPHILE & ELECTROPHILE - LEVEL II

83 Chlorine atom can be classified as -

1. Carbocation
2. Nucleophile
3. Electrophile
4. Carbanion

84 The addition of HCl to an alkene proceeds in two steps. The first step is the attack of H^+ ion on the double bond portion. The same can be shown as-

1.		2.	
3.		4.	All of these are possible

ELECTRON DISPLACEMENT EFFECTS - LEVEL I

85 The effect that can explain the given order of acidity of the carboxylic acids is-

$Cl_3CCOOH > Cl_2CHCOOH > ClCH_2COOH$

1. +I effect
2. -I effect
3. +E effect
4. -E effect

86 $O_2NCH_2CH_2O^-$ is more stable than $CH_3CH_2O^-$ because :

1.	NO_2 shows +I effect
2.	NO_2 shows -I effect
3.	NO_2 decreases the positive charge on the compound
4.	Ethyl group increases positive charge on the compound

87 The effect that makes 2,3–dimethyl-2-butene more stable than 2-butene is-

1. Resonance
2. Hyperconjugation
3. Steric effect
4. Inductive effect

88 Among the following groups maximum –I effect is exerted by:

1. $-C_6H_5$
2. $-(OCH)_3$
3. $-Cl$
4. $-(NO)_2$

89 The most stable carbocation among the following is-

1. $(CH_3)_3\overset{+}{C}CH_2$
2. $(CH_3)_3\overset{+}{C}$
3. $CH_3CH_2\overset{+}{C}H_2$
4. $(CH_3)\overset{+}{C}HCH_2CH_3$

90 The most stable carbocation among the following is-

1. $(CH_3)_3\overset{+}{C}CHCH_3$
2. $CH_3CH_2\overset{+}{C}HCH_2CH_3$
3. $(CH_3)_2\overset{+}{C}CH_2CH_2CH_3$
4. $CH_3CH_2\overset{+}{C}H_2$

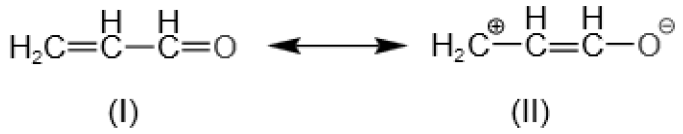
91 The most stable carboxylate ion among the following is-

1. $CH_3-\overset{O}{\overset{\|}{C}}-O^-$
2. $Cl-CH_2-\overset{O}{\overset{\|}{C}}-O^-$
3. $F-CH_2-\overset{O}{\overset{\|}{C}}-O^-$
4. $(F)_2-CH-\overset{O}{\overset{\|}{C}}-O^-$

92 The correct order regarding the electronegativity of hybrid orbitals of carbon is:

1. $sp > sp^2 < sp^3$
2. $sp > sp^2 > sp^3$
3. $sp < sp^2 > sp^3$
4. $sp < sp^2 < sp^3$

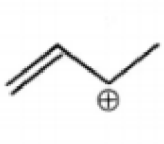
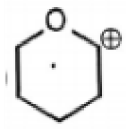
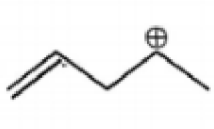
93 Compare the stability of the two resonating structures given below and mark the correct option:



(I) (II)

1. (I) is more stable than (II)
2. (II) is more stable than (I)
3. (I) and (II) both have the same stability
4. None of the above

94 The carbocation among the following that doesn't get stabilized by resonance is :

1.		2.	
3.		4.	

95 Arrange the following groups in order of decreasing -I (inductive) effect :

NO_2, $C(CH_3)_3$, CH_3, OCH_3, Br

1. $NO_2 > Br > OCH_3 > C(CH_3)_3 > CH_3$
2. $NO_2 > Br > OCH_3 > CH_3 > C(CH_3)_3$
3. $NO_2 > OCH_3 > Br > C(CH_3)_3 > CH_3$
4. $NO_2 > OCH_3 > C(CH_3)_3 > Br > CH_3$

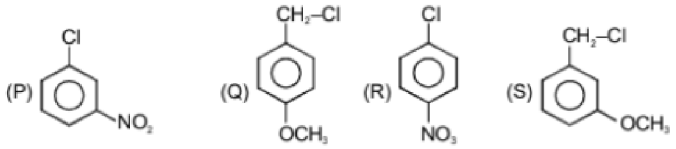
96 The correct order of –I effect is:

1. $-NR_3^+ > -OR > -F$
2. $-F > -NR_3^+ > -OR$
3. $-NR_3^+ > -F > -OR$
4. $-OR > -NR_3^+ > -F$

97 Which of the following carbon marked with asterisk is expected to have greatest positive charge?

1. $*CH_3 - CH_2 - Cl$
2. $*CH_3 - CH_2 - Mg^+ Cl^-$
3. $*CH_3 - CH_2 - Br$
4. $*CH_3 - CH_2 - CH_3$

98 The correct reactivity order towards hydrolysis is-



1.	Q>R>S>P	2.	Q>P>R>S
3.	S>R>Q>P	4.	Q>S>R>P

99 The resonance hybrid structure will not exist for-

a. CH_3OH

b. R - $CONH_2$

c. $CH_3CH = CHCH_2NH_2$

1.	a, and c	2.	a, and b only
3.	only a	4.	b and c only

ELECTRON DISPLACEMENT EFFECTS - LEVEL II

100 The correct order of decreasing stability of the following cations is -

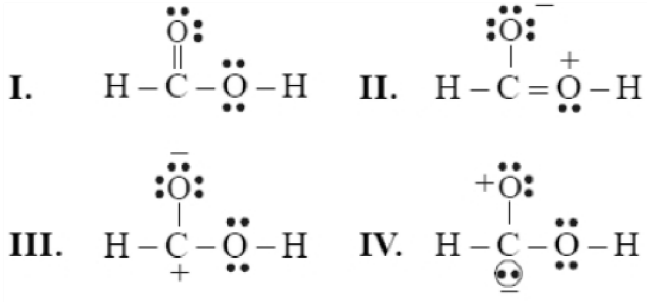
$CH_3 - \overset{\oplus}{C}H - CH_3$ (I)

$CH_3 - \underset{(II)}{\overset{\oplus}{C}H} - OCH_3$

$CH_3 - \underset{(III)}{\overset{\oplus}{C}H} - CH_2 - OCH_3$

1.	II>I>III	2.	I>II>III
3.	II<I<III	4.	I<II<III

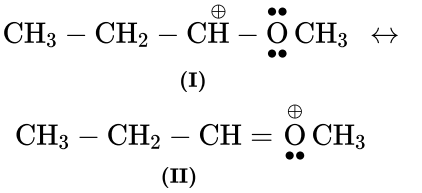
101 Consider the following resonating structures of HCOOH



The order of stability is-

1.	I>II>III>IV	2.	IV>I>II>III
3.	I>III>II>IV	4.	II>I>III>IV

102 The major contributor to the resonance hybrid among the following resonance structures is-

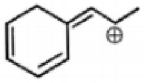


(I)

(II)

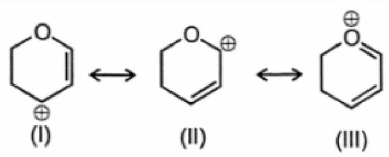
1. I
2. II
3. Both have equal contribution
4. They are not resonance structures

103 The total number of resonating structures (excluded the given structure) formed by the given molecule are :



1.	2	2.	3
3.	4	4.	5

104 The most stable canonical structure among the given structures is/are :



(I) (II) (III)

1.	I	2.	II
3.	III	4.	All are equally stable

105 Alkyl groups act as electron donors when attached to a π system due to-

1. Inductive effect
2. Mesomeric effect
3. Resonance
4. Hyperconjugation

106 The correct order with respect to –I effect of the substituents is-

(R = alkyl)

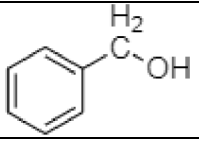
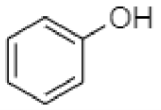
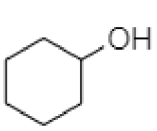
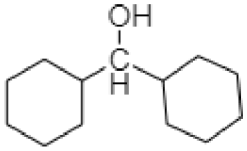
1. $-NH_2 > -OR < -F$
2. $-NR_2 < -OR < -F$
3. $-NH_2 > -OR > -F$
4. $-NR_2 > -OR > -F$

ACIDIC & BASIC CHARACTER - LEVEL I

107 The correct order of acidity among the following is:

1.	$CH_3COOH > BrCH_2COOH > ClCH_2COOH > FCH_2COOH$
2.	$FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$
3.	$BrCH_2COOH > ClCH_2COOH > FCH_2COOH > CH_3COOH$
4.	$FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

108 The most acidic compound among the following is-

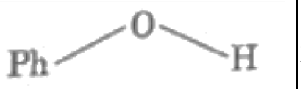
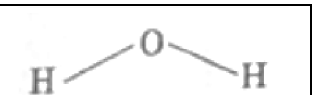
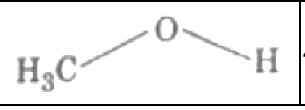
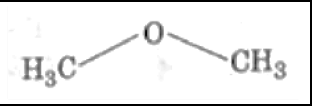
1.		2.	
3.		4.	

109 The correct order of acidity among the following is-

1. $CH_2=CH_2 > CH_3-CH=CH_2 > CH_3C\equiv CH > CH\equiv CH$
2. $CH\equiv CH > CH_3-C\equiv CH > CH_2=CH_2 > CH_3\ CH_3$
3. $CH\equiv CH > CH2=CH2 > CH_3-C\equiv CH > CH_3-CH_3$
4. $CH_3-CH_3 > CH_2=CH_2 > CH_3-C\equiv CH > CH\equiv CH$

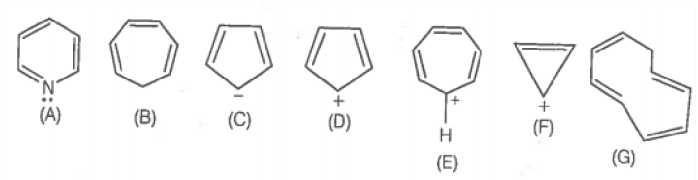
ACIDIC & BASIC CHARACTER - LEVEL II

110 The compound that is most difficult to protonate is:

1.		2.	
3.		4.	

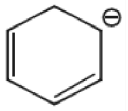
AROMATICITY & POLARITY - LEVEL I

111 The aromatic structure(s) out of given structures is/are-



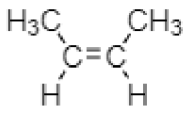
1.	A, C, D, F & G only	2.	A & D only
3.	A, C, E, F only	4.	All are aromatic

112 The aromatic compound among the following is:-

1.		2.	
3.		4.	

113 The hydrocarbons having the lowest dipole moment among the following is-

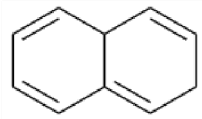
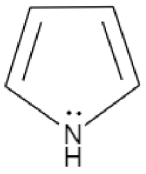
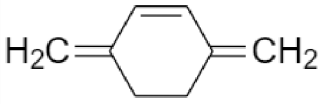
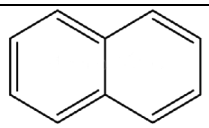
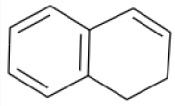
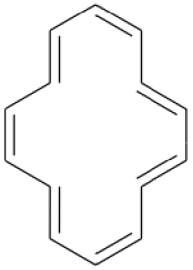
1.



2. $CH_3 - C \equiv C - CH_3$
3. $CH_3\,CH_2\,CH = CH_2$
4. $CH_2 = CH - C \equiv CH$

AROMATICITY & POLARITY - LEVEL II

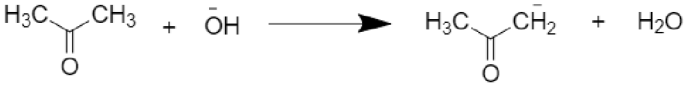
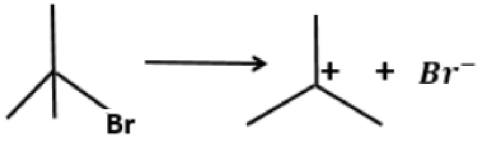
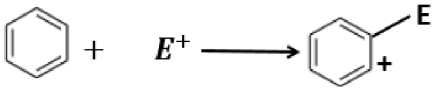
114 The Huckel's rule-based aromaticity is shown by-

(A)		(B)	
(C)		(D)	
(E)		(F)	

1.	A, B, D only	2.	B, D only
3.	B, D, E and F only	4.	A, B, D, E & F only

REACTION INTERMEDIATES ; PREPARATION & PROPERTIES - LEVEL I

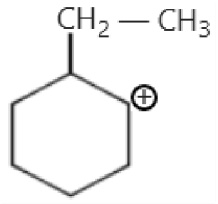
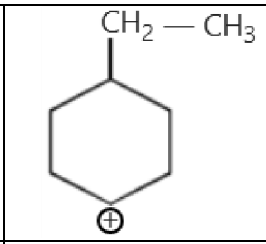
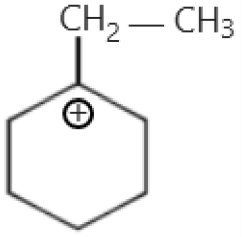
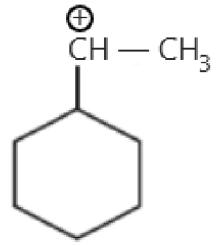
115 Free radical formation will take place in :

1.	
2.	
3.	
4.	

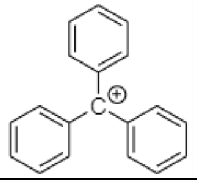
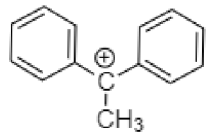
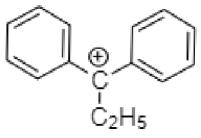
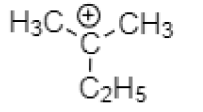
116 The arrangement in decreasing order of stability of $\dot{C}H_3$, $\dot{C}_2H_5$, $(CH_3)_2\dot{C}H$ and $(CH_3)_3\dot{C}$ free radicals is-

1. $\dot{C}H_3 > \dot{C}_2H_5 > (CH_3)_2\dot{C}H > (CH_3)_3\dot{C}$
2. $(CH_3)_3\dot{C} > (CH_3)_2\dot{C}H > \dot{C}_2H_5 > \dot{C}H_3$
3. $\dot{C}_2H_5 > \dot{C}H_3 > (CH_3)_2\dot{C}H > (CH_3)_3\dot{C}$
4. $(CH_3)_3\dot{C} > (CH_3)_2\dot{C}H > \dot{C}H_3 > \dot{C}_2H_5$

117 The most stable carbocation among the following is-

1.		2.	
3.		4.	

118 The most stable carbocation among the following is-

1.		2.	
3.		4.	

119 A tertiary butyl carbocation is more stable than a secondary butyl carbocation because-

1. + R effect of CH_3 groups
2. $-$R effect of $-$ CH_3 groups
3. Hyperconjugation
4. $-$I effect of $-CH_3$ groups

120 The correct statement among the following is -

1. Allyl carbocation (CH_2=CH-CH_2^+) is more stable than propyl carbocation
2. Propyl carbocation is more stable than allyl carbocation
3. Both are equally stable
4. None of the above

121 The species that contains only three pairs of electrons among the following is-

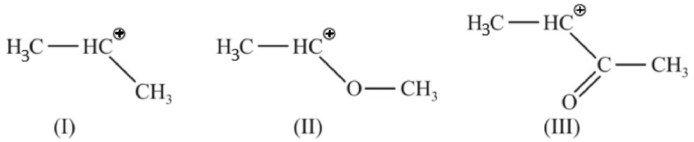
1. Carbocation
2. Carbanion
3. Free radical
4. None of the above

122 A paramagnetic species among the following is-

1. A carbocation
2. A free radical
3. A carbanion ion
4. All of the above

REACTION INTERMEDIATES ; PREPARATION & PROPERTIES - LEVEL II

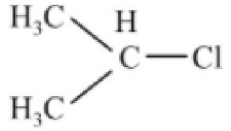
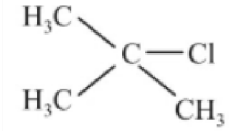
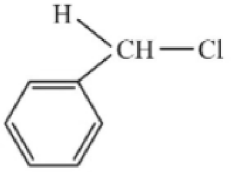
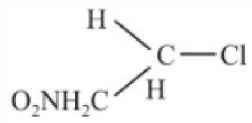
123 The decreasing order of the stability of the given ions is-



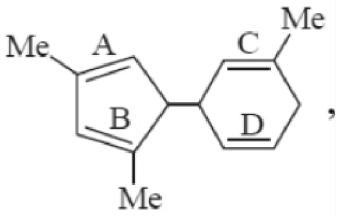
(I) (II) (III)

1. I>II>III
2. II>III>I
3. III>I>II
4. II>I>III

124 The compound that gives the most stable carbonium ion after C- Cl bond ionisation among the following is-

1.		2.	
3.		4.	

125



The double bond in the above mentioned compound that accept proton (H^+) fastest is-

1.	A	2.	B
3.	C	4.	D

TYPES OF REACTION - LEVEL I

126 $\overset{H}{\underset{|}{CH_2}} - \overset{Cl}{\underset{|}{CH_2}} \xrightarrow[alk.]{NaOH} CH_2 = CH_2$

Most probable mechanism for this reaction is-
1. E1
2. E2
3. $E1_{CB}$
4. α elimination

PURIFICATION OF ORGANIC COMPOUNDS - LEVEL I

127 A liquid compound (X) can be purified by steam distillation only if it is:
1. Steam volatile, immiscible with water.
2. Not steam volatile, miscible with water.
3. Steam volatile, miscible with water.
4. Not steam volatile, immiscible with water.

128 Match the type of mixture of compounds in Column I with the technique of separation/purification given in column II.

Column I	Column II
A. Two solids which have different solubilities in a solvent and which do not undergo a reaction when dissolved in it	1. Steam distillation
B. Liquid that decomposes at its boiling point	2. Fractional distillation
C. Steam volatile liquid	3. Crystallisation
D. Two liquids that have boiling points close to each other	4. Distillation under reduced pressure

Codes

	A	B	C	D
1.	3	4	1	2
2.	1	2	3	4
3.	1	4	3	2
4.	4	1	3	2

129 If a liquid compound decomposes at or below its boiling point, then the best method for purification is-
1. Distillation under reduced pressure
2. Azeotropic distillation
3. Gas chromatography
4. Sublimation

130 Paper chromatography is an example of-
1. Partition chromatography
2. Thin layer chromatography
3. Column chromatography
4. Adsorption chromatography

131 Halogen in an organic compound that can be detected by -
1. Duma's method
2. Carius method
3. Kjedahl's method
4. Chromatography

132 The latest technique for isolation, purification and separation of organic compounds is -
1. Crystallisation
2. Distillation
3. Sublimation
4. Chromatography

133 The method that can be used to separate two compounds with different solubilities in a solvent is-
1. Distillation
2. Isolation
3. Fractional crystallization
4. Filtration

134 During the hearing of a court case, the judge suspected that some changes in the documents had been carried out. He asked the forensic department to check the ink used at two different places. The technique that can give the best results is-
1. Column chromatography
2. Solvent extraction
3. Distillation
4. Thin layer chromatography

135 The purification method based on the difference in solubilities of the compound and the impurities in a solvent is -
1. Crystallisation
2. Distillation
3. Chromatography
4. Isolation

PURIFICATION OF ORGANIC COMPOUNDS - LEVEL II

136 The best method used for the separation of naphthalene and benzoic acid from their mixture is -
1. Sublimation
2. Chromatography
3. Crystallisation
4. Distillation

137 In the steam distillation of toluene, the pressure of toluene in the vapour is:

1.	Equal to the pressure of the barometer
2.	Less than the pressure of the barometer
3.	Equal to vapour pressure of toluene in simple distillation
4.	More than the vapour pressure of toluene in simple distillation

138 The principle involved in paper chromatography is
1. Adsorption
2. Partition
3. Solubility
4. Volatility

QUALITATIVE ANALYSIS OF ORGANIC COMPOUNDS - LEVEL I

139 A mixture of calcium sulphate and camphor can be separated by-
1. Filtration
2. Evaporation
3. Sublimation
4. Chromatography

140 A gas among the following that can be absorbed by potassium hydroxide is -
1. Carbon dioxide
2. Silicon dioxide
3. Hydrogen
4. Carbon monoxide

141 The most suitable method used for the separation of 1:1 mixture of ortho and para-nitrophenols is-

1.	Chromatography	2.	Crystallization
3.	Steam distillation	4.	Sublimation

142 Nitric acid is added to sodium extract before adding silver nitrate for testing halogens because:
1. Nitric acid reduces sulphide
2. Nitric acid decomposes NaCN and Na_2S
3. Nitric acid oxidises the organic compound
4. Nitric acid acts as a dehydrating agent

143 In Kjeldahl's method for estimation of nitrogen present in the soil sample, ammonia evolved from 0.75g of sample neutralized 10ml. of 1M H_2SO_4. The percentage of nitrogen in the soil is:

1.	37.33	2.	45.85
3.	25.75	4.	43.13

144

Assertion (A):	CCl_4 doesn't give precipitate of AgCl on heating with $AgNO_3$.
Reason (R):	CCl_4 is a non-polar molecule.

1. **(A)** is true and **(R)** is the correct explanation of **(A)**.
2. **(A)** is true but **(R)** is not the correct explanation of **(A)**.
3. **(A)** is true but **(R)** is false.
4. Both **(A)** and **(R)** are false

145 The Prussian blue colour obtained during the test of nitrogen by Lassaigne's test is due to the formation of-
1. $Fe_4[Fe(CN)_6]_3$
2. $Na_3[Fe(CN)_6]$
3. $Fe(CN)_3$
4. $Na_4[Fe(CN)_5NOS]$

146 0.2 g of an organic compound on complete combustion produces 0.44 g of CO_2. The percentage of carbon is -
1. 50%
2. 60%
3. 70%
4. 80%

147 Lassaigne's test can detect -
1. Nitrogen, Sulphur, Halogens
2. Nitrogen, Cyanides, Sulphur
3. Sodium, Sulphur, Halogens, Phosphorus
4. Nitrogen, Sulphur, Halogens, Phosphorus

148 In sulphur estimation, 0.157 g of an organic compound gave 0.4813 g of barium sulphate. The percentage of sulphur in the compound is-
1. 39.10 %
2. 48.13 %
3. 42.10 %
4. 52. 43 %

QUALITATIVE ANALYSIS OF ORGANIC COMPOUNDS - LEVEL II

149 The acid used for acidification of sodium extract for testing sulphur is-
1. Sulphuric acid
2. Acetic acid
3. Nitric acid
4. Hydrochloric acid

150 Silver sulphate solution is used to separate:
1. Nitrate and bromide
2. Nitrate and chlorate
3. Bromide and iodide
4. Nitrate and nitrite

151 Soda extract is prepared by-
1. Fusing soda and mixture of hydrocarbons, and then extracted with water
2. Dissolving $NaHCO_3$ and mixture of hydrocarbons in dil. HCl
3. Boiling Na_2CO_3 and mixture of hydrocarbons in dil. HCl
4. Boiling Na_2CO_3 and mixture of hydrocarbons in distilled water

152 In Kjeldahl's method of estimation of nitrogen, K_2SO_4 acts as-
1. An oxidizing agent
2. Catalytic agent
3. Hydrolyzing agent
4. Boiling point elevator

QUANTITATIVE ANALYSIS OF ORGANIC COMPOUNDS - LEVEL I

153 In an estimation of sulphur by the carius method, 0.2175 g of the substance gave 0.5825 g of $BaSO_4$. The percentage composition of S in the compound is-
1. 66%
2. 20%
3. 37%
4.82%

154 0.284 g of an organic substance gave 0.287 g AgCl in a carius method for the estimation of halogen. The percentage of Cl in the compound is-
1. 5%
2. 18%
3. 25%
4. 33%

155 0.26 g of an organic compound gave 0.039 g of water and 0.245 g of carbon dioxide on combustion. The percentage of C in the organic compound is-
1. 35%
2. 25%
3. 2%
4. 90%

156 Ether and benzene can be separated by-
1. Filtration
2. Distillation
3. Crystallization
4. Sublimation

157 0.3780 grams of an organic chloro compound gave 0.5740 grams of silver chloride in Carius estimation. % of chlorine present in the compound is -
1. 25%
2. 37.59%
3. 42%
4. 05.70 %

158 The Lassaigne's extract is boiled with conc. HNO_3 while testing for halogens, because it:
1. Helps in the precipitation of AgCl
2. Increases the solubility product of AgCl
3. Increases the concentration of NO_3^- ions
4. Decomposes Na_2S and NaCN, if formed

159 Match Column I with Column II.

Column I	Column II
A. Dumas method	1. $AgNO_3$
B. Kjeldahl's method	2. Silica gel
C. Carius method	3. Nitrogen gel
D. Chromatography	4. Ammonium sulphate

Codes

	A	B	C	D
1.	3	4	1	2
2.	1	2	3	4
3.	1	4	3	2
4.	4	1	3	2

160 The fragrance of flowers is due to the presence of some steam volatile organic compounds called essential oils. These are generally insoluble in water at room temperature but are miscible with water vapor in the vapor phase. A suitable method for the extraction of these oils from the flowers is
1. Distillation
2. Crystallisation
3. Distillation under pressure
4. Steam distillation

161 During estimation of nitrogen present in an organic compound, the ammonia evolved from 0.5 g of the compound in Kjeldahl's estimation of nitrogen, neutralized 10 mL of 1 M H_2SO_4. The percentage of nitrogen in the compound is-
1. 46.0 %
2. 51.0%
3. 56.0%
4. 49.0%

162 An organic compound contains 69% carbon, and 4.8% hydrogen, the remainder being oxygen. The masses of carbon dioxide, and water produced when 0.20 g of this substance is subjected to complete combustion would be respectively -
1. 0.506 g , 0.0864 g
2. 0.906 g , 0.0864 g
3. 0.0506 g , 0.864 g
4. 0.0864 g, 0.506 g

163 The reason why we fuse an organic compound with metallic sodium for testing nitrogen, sulphur, and halogens is -
1. To convert all compounds to their ionic form
2. Sodium reduces the compounds
3. Sodium converts all compounds in their covalent form
4. None of the above

164 A characteristic feature of any form of chromatography is the ___
1. Use of molecules that are soluble in water.
2. Use of inert carrier gas.
3. Calculation of an Rf value for the molecule separated.
4. Use of a mobile and a stationary phase.

165 In Kjeldahl's method, the nitrogen present is estimated as-
1. N_2
2. NH_3
3. NO_2
4 None of the above

QUANTITATIVE ANALYSIS OF ORGANIC COMPOUNDS - LEVEL II

166 0.24 g of an organic compound containing phosphorous gave 0.66 g of $Mg_2P_2O_7$ by the usual analysis. The percentage of phosphorous in the compound is-
1. 77%
2. 72%
3. 87%
4. 60 %

167 In the Carius method, 0.468 grams of an organic sulphur compound gives 0.668 grams of barium sulphate. The percentage of sulphur in the given compound is -
1. 19.59%
2. 25.40%
3. 09.24%
4. 27.59%

168 0.1688 g organic compound when analyzed by the Dumas method yields 31.7 mL of moist nitrogen measured at 14º C, and 758 mm mercury pressure. The % of nitrogen in the organic compound (Aqueous tension at 14 º C =12 mm) is-
1. 30.9%
2. 10%
3. 40%
4. 21.9 %

169 In Duma's method of estimation of nitrogen, 0.35 g of an organic compound gave 55 ml of nitrogen collected at 300 K temperature and 715 mm pressure. The percentage composition of nitrogen in the compound would be-
(Aqueous tension at 300 K = 15 mm)
1. 16.45
2. 17.45
3. 14.45
4. 15.45

170 A compound that does not give a positive test in Lassaigne's test for nitrogen is-
1. Urea
2. *Hydra*zine
3. Azobenzene
4. Phenyl hydrazine

171 The colour of the solution that gets formed by mixing sodium nitroprusside to an alkaline solution of sulfide ions, is-
1. Red
2. Blue
3. Brown
4. Purple