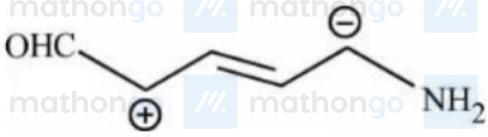
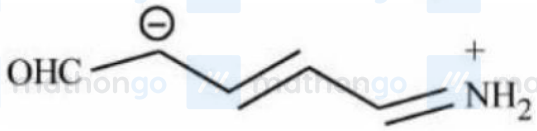
Q1 - 24 January - Shift 1

Increasing order of stability of the resonance structure is :

A. 

B. 

C. 

D. 

(1) C, D, B, A
(2) C, D, A, B
(3) D, C, A, B
(4) D, C, B, A

Space for your notes:

Q2 - 24 January - Shift 2

Given below are two statements, one is labelled as **Assertion A** and the other is labelled as **Reason R**.

Assertion A : Benzene is more stable than hypothetical cyclohexatriene.

Reason R : The delocalized π electron cloud is attracted more strongly by nuclei of carbon atoms.

In the light of the above statements, choose the correct answer from the options given below:

(1) A is true but R is false.

(2) A is false but R is true.

(3) Both A and R are correct and R is the correct explanation of A.

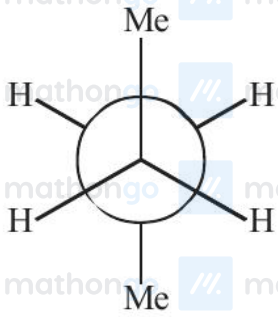
(4) Both A and R are correct but R is NOT the correct explanation of A.

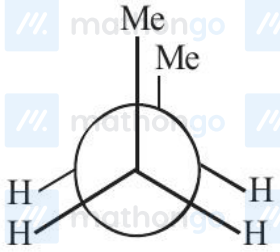
Space for your notes:

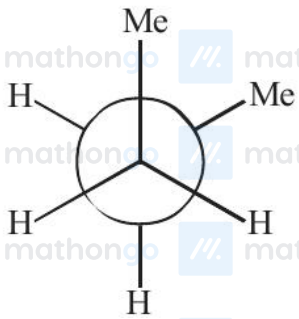
Q3 - 25 January - Shift 1

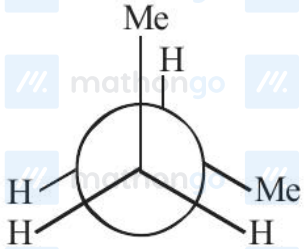
Which of the following conformations will be the most stable ?

Space for your notes:

(1) 

(2) 

(3) 

(4) 

Q4 - 25 January - Shift 1

In sulphur estimation. 0.471 g of an organic compound gave 1.4439 g of barium sulphate.

The percentage of sulphur in the compound is_____(Nearest Integer)

(Given: Atomic mass Ba: 137 u: S: 32 u, O: 16 u)

Space for your notes:

Q5 - 25 January - Shift 2

The isomeric deuterated bromide with molecular formula C_4H_8DBr having two chiral carbon atoms is

(1) 2–Bromo–1–deuterobutane

(2) 2–Bromo–2–deuterobutane

(3) 2–Bromo–3–deuterobutane

(4) 2–Bromo–1–deutero–2–methylpropane

Space for your notes:

Q6 - 25 January - Shift 2

Match List I with List II.

	List I Isomeric pairs		List II Type of isomers
A.	Propanamine and N-Methylethanamine	I.	Metamers
B.	Hexan-2-one and Hexan-3-one	II.	Positional isomers
C.	Ethanamide and Hydroxyethanimine	III.	Functional isomers
D.	o-nitrophenol and p-nitrophenol	IV.	Tautomers

Choose the correct answer from the options given below :-

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

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

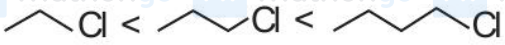
(3) A-II, B-III, C-I, D-IV

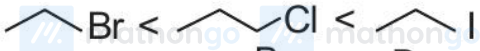
(4) A-III, B-I, C-IV, D-II

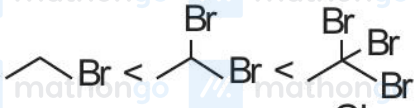
Space for your notes:

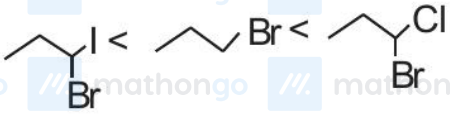
Q7 - 29 January - Shift 1

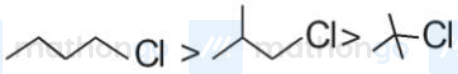
Identify the correct order for the given property for following compounds

(A) Boiling Point: 

(B) Density: 

(C) Boiling Point: 

(D) Density: 

(E) Boiling Point: 

Choose the correct answer from the option given below :-

(1) (B), (C) and (D) only
(2) (A), (C) and (E) only
(3) (A), (C) and (D) only
(4) (A), (B) and (E) only

Space for your notes:

Q8 - 29 January - Shift 1

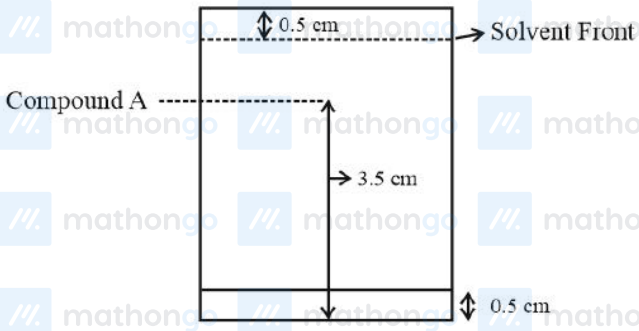
Compound that will give positive Lassaigne's test for both nitrogen and halogen is

(1) $N_2H_4.HCl$
(2) $CH_3NH_2.HCl$
(3) NH_4Cl
(4) $NH_2OH.HCl$

Space for your notes:

Q9 - 29 January - Shift 1

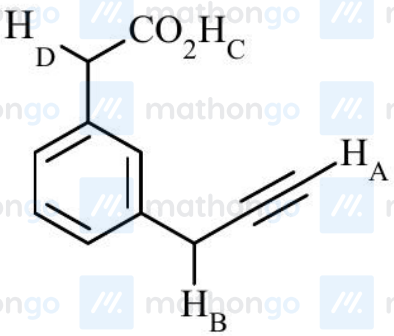
Following chromatogram was developed by adsorption of compound 'A' on a 6 cm TLC glass plate. Retardation factor of the compound 'A' is _____ $\times 10^{-1}$.



Space for your notes:

Q10 - 30 January - Shift 1

What is the correct order of acidity of the protons marked A–D in the given compounds ?



(1) $H_C > H_D > H_B > H_A$

(2) $H_C > H_D > H_A > H_B$

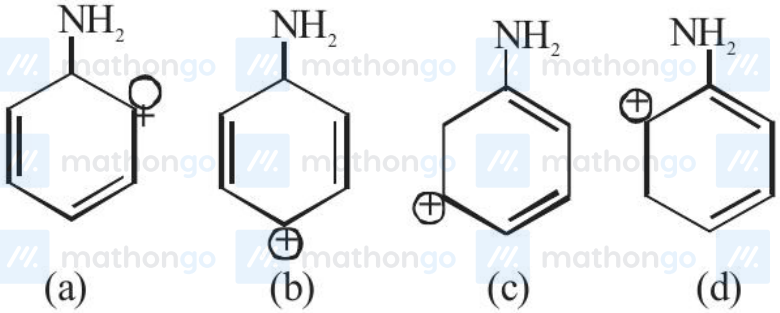
(3) $H_D > H_C > H_B > H_A$

(4) $H_C > H_A > H_D > H_B$

Space for your notes:

Q11 - 30 January - Shift 2

The most stable carbocation for the following is:



(a) (b) (c) (d)

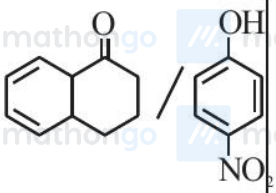
(1) c (2) d

(3) b (4) a

Space for your notes:

Q12 - 31 January - Shift 1

Match items of column I and II

Column I (Mixture of compounds)	Column II (Separation Techniqu
A. H_2O/CH_2Cl_2	i. Crystallization
B. 	ii. Differential solvent extracti
C. Kerosene/Naphthalene	iii. Column chromatography
D. $C_6H_{12}O_6$/NaCl	iv. Fractional Distillation

Correct match is :

(1) A-(iii), B-(iv), C-(ii), D-(i)

(2) A-(i), B-(iii), C-(ii), D-(iv)

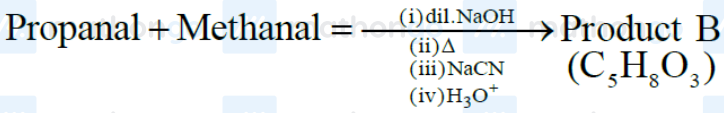
(3) A-(ii), B-(iii), C-(iv), D-(i)

(4) A-(ii), B-(iv), C-(i), D-(iii)

Space for your notes:

Q13 - 31 January - Shift 1

Consider the following reaction



The correct statement for product B is. It is

(1) optically active and adds one mole of bromine

(2) racemic mixture and is neutral

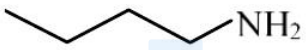
(3) racemic mixture and gives a gas with saturated $NaHCO_3$ solution

(4) optically active alcohol and is neutrall

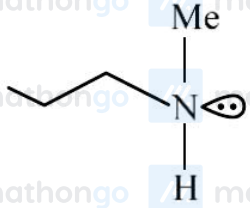
Space for your notes:

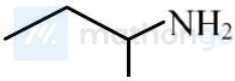
Q14 - 31 January - Shift 2

An organic compound $[A](C_4H_{11}N)$, shows optical activity and gives N_2 gas on treatment with HNO_2. The compound $[A]$ reacts with $PhSO_2Cl$ producing a compound which is soluble in KOH. The structure of A is:

(1) 

(2) 

(3) 

(4) 

Space for your notes:

Q15 - 31 January - Shift 2

In Dumas method for the estimation of N_2, the sample is heated with copper oxide and the gas evolved is passed over :

(1) Ni (2) Copper gauze
(3) Pd (4) Copper oxide

Space for your notes:

Q16 - 31 January - Shift 2

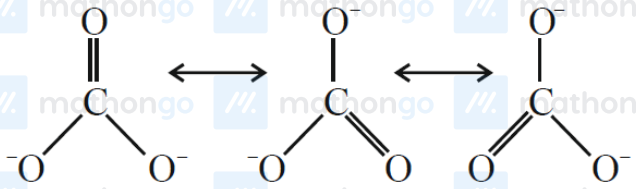
In the following halogenated organic compounds the one with maximum number of chlorine atoms in its structure is :

(1) Chloral (2) Gammaxene
(3) Chloropicrin (4)Freon -12

Space for your notes:

Q17 - 01 February - Shift 1

Resonance in carbonate ion (CO_3^{2-}) is



Which of the following is true?

(1) It is possible to identify each structure individually by some physical or chemical method.

(2) All these structures are in dynamic equilibrium with each other.

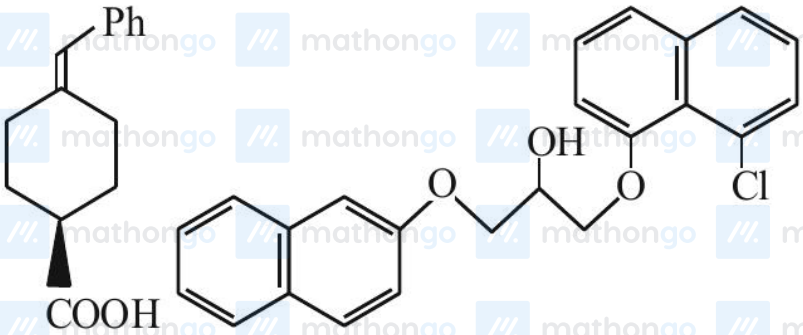
(3) Each structure exists for equal amount of time.

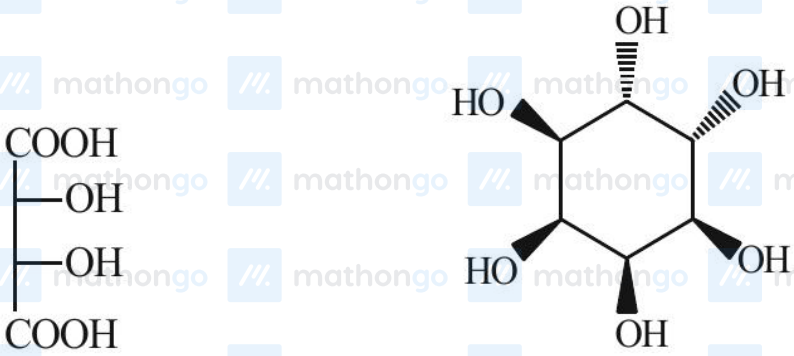
(4) CO_3^{2-} has a single structure i.e., resonance hybrid of the above three structures.

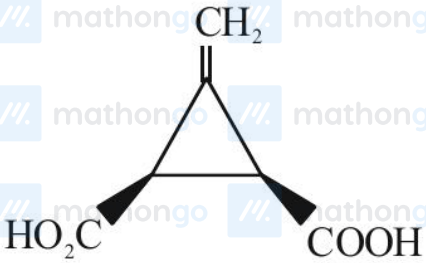
Space for your notes:

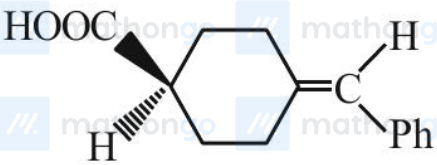
Q18 - 01 February - Shift 1

The total number of chiral compound/s from the following is _____.







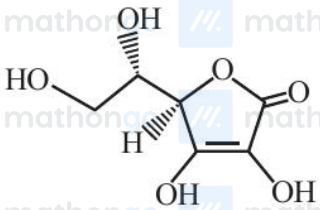


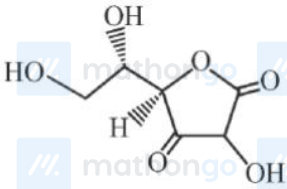
No POS, COS
(Chiral)

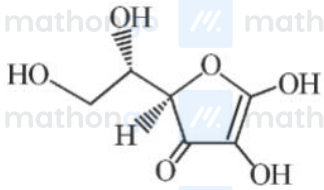
Space for your notes:

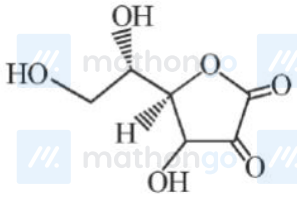
Q19 - 01 February - Shift 2

All structures given below are of vitamin C. Most stable of them is :

(1) 

(2) 

(3) 

(4) 

Space for your notes:

Q20 - 01 February - Shift 2

Given below are two statements :

Statement I : Sulphanilic acid gives esterification test for carboxyl group.

Statement II : Sulphanilic acid gives red colour in Lassigne's test for extra element detection.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) **Statement I** is correct but **Statement II** is incorrect.

(2) Both **Statement I** and **Statement II** are incorrect.

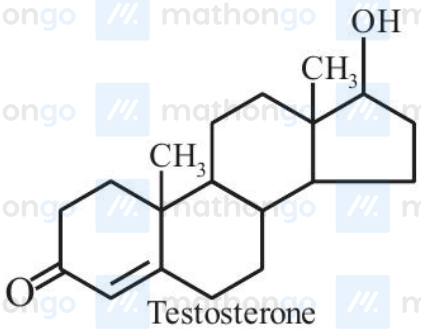
(3) Both **Statement I** and **Statement II** are correct.

(4) **Statement I** is incorrect but **Statement II** is correct.

Space for your notes:

Q21 - 01 February - Shift 2

Testosterone, which is a steroidal hormone, has the following structure.



Testosterone

The total number of asymmetric carbon atom/s in testosterone is

Space for your notes:

Answer Key

(As per Official NTA Key released on 2 Feb)

Q1 (2)	**Q2** (3)	**Q3** (1)	**Q4** (42)
Q5 (3)	**Q6** (4)	**Q7** (2)	**Q8** (2)
Q9 (6)	**Q10** (2)	**Q11** (1)	**Q12** (3)
Q13 (3)	**Q14** (4)	**Q15** (2)	**Q16** (2)
Q17 (4)	**Q18** (2)	**Q19** (1)	**Q20** (4)
Q21 (6)			

Q1 (2)

No option is matching the correct answer

Order should be : C < A < B < D

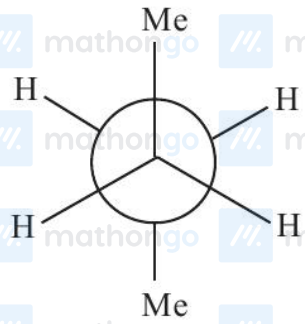
Q2 (3)

Assertion – A : Benzene is more stable than cyclohexatriene **(True)**

Reason – R : Delocalised $\pi-e$ cloud lies B.M.O so more attracted by nuclei of carbon atom.

(True & Correct Explanation)

Q3 (1)

Conformation 

has lowest vanderwaal and torsional strain. Hence it must be most stable.

Q4 (42)

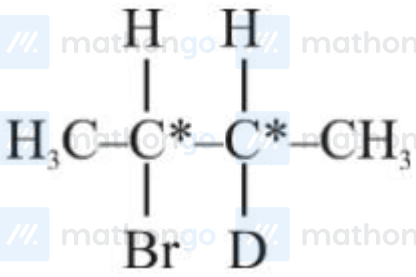
$$\%\text{sulphur} = \frac{32}{233} \times \frac{\text{weight of } BaSO_4 \text{formed}}{\text{weight of organic compound}} \times 10$$

$$= \frac{32}{233} \times \frac{1.4439}{0.471} \times 100$$

$$= 42.10$$

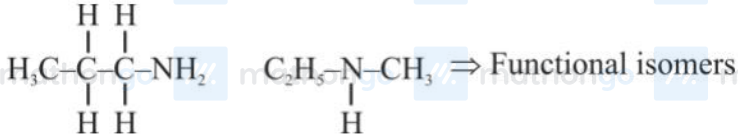
Nearest integer 42

Q5 (3)

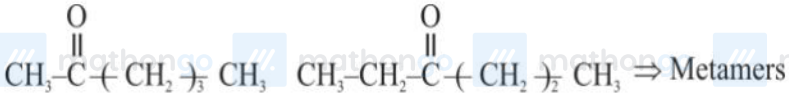


Q6 (4)

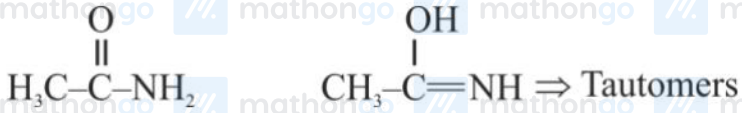
A. Propanamine N–Methylethanamine



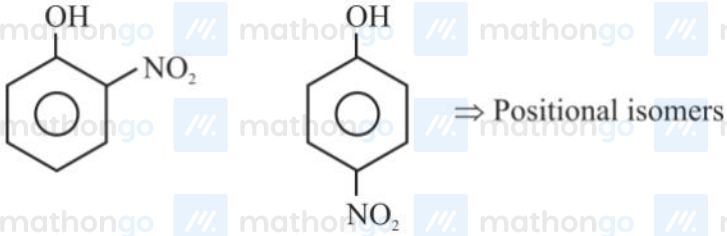
B. Hexan–2–one Hexan–3–one



C. Ethanamide Hydroxyethanimine



D. o–Nitrophenol p–nitrophenol



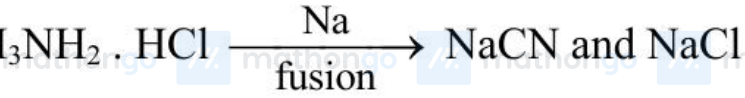
Q7 (2)

Boiling point of alkyl halide increases with increase in size, mass of halogen atom and size of alkyl group

Boiling point of isomeric alkyl halide decreases with increase in branching

Density increases with increase in atomic mass of halogen atom

Q8 (2)



NaCN gives +ve test for nitrogen and

NaCl gives +ve test for halogen

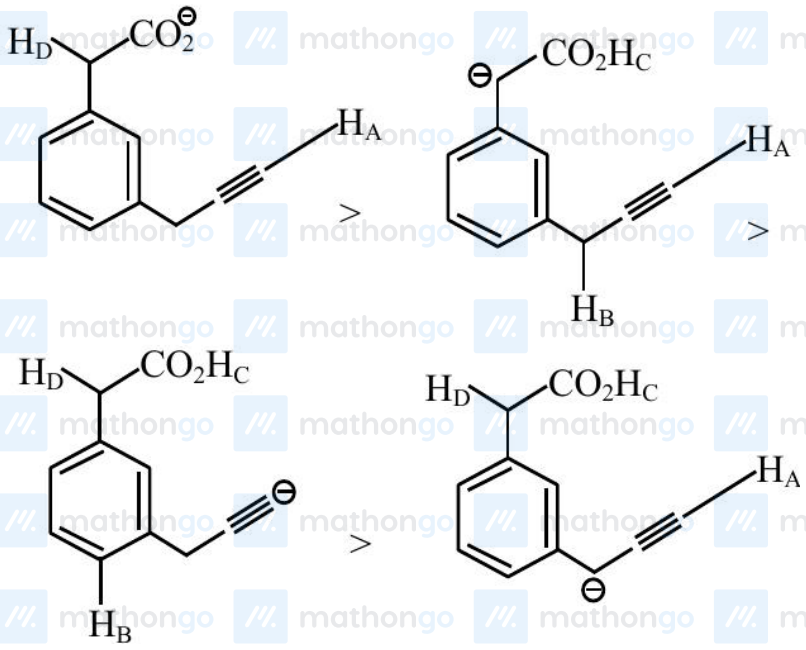
Q9 (6)

$$R_f = \frac{\text{Distance moved by the substance from base line}}{\text{Distance moved by the solvent from base line}}$$

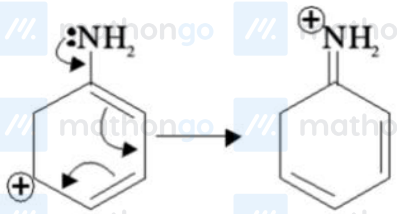
$$= \frac{3.0\ \text{cm}}{5.0\ \text{cm}} = 0.6 \quad \text{or } 6 \times 10^{-1}$$

Q10 (2)

acidity of an acid depends upon the stability of its conjugate base



Q11 (1)

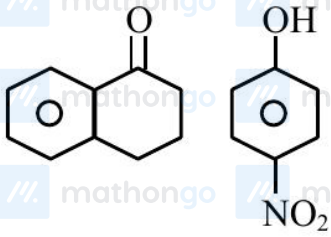


The +M effect of NH_2 is stabilizing the carbocation.

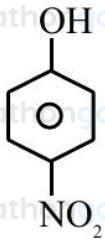
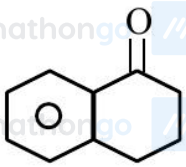
Q12 (3)

A. $H_2O/CH_2Cl_2 \rightarrow$ ii, $CH_2Cl_2 > H_2O$ (density) so they can be separated by differential solvent extraction.

B.



iii. column chromatography

Due to H-bonding in  it can be separated from  by column chromatography.

C. Kerosene / Naphthalene $\rightarrow$ iv. Fractional distillation.

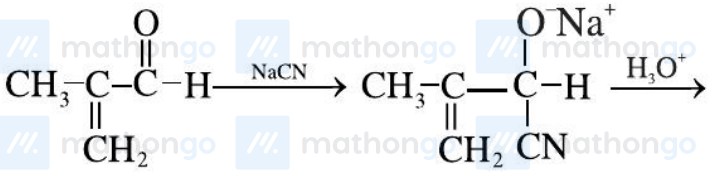
Due to different B.P. of kerosene and Naphthalene it can be separated by fractional distillation.

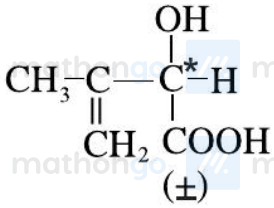
D. $C_6H_{12}O_6/NaCl \rightarrow$ i. Crystallization.

NaCl (ionic compound) can be crystallized.

Q13 (3)

$$CH_3-CH_2-CHO + HCHO \xrightarrow[\Delta]{OH^-}$$





Carboxylic acid will give CO_2 gas, with $NaHCO_3$ solution

Q14 (4)

$C_4H_{11}N$ releases N_2 with HNO_2 i.e. it is primary amine.

After reacting with Hinsberg reagent it forms a compound which is soluble in KOH,

Hence, the amine is primary.

Q15 (2)

Duma's method.

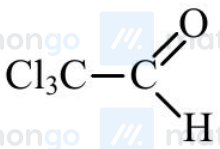
The nitrogen containing organic compound, when heated with CuO in a atmosphere of CO_2, yields free N_2 in addition to CO_2 and H_2O.

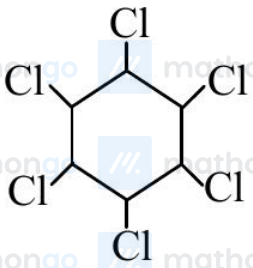
$$C_xH_yN_z + (2x + \frac{y}{2})\,CuO \rightarrow$$

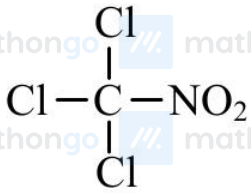
$$x\,CO_2 + \frac{y}{2}H_2O + \frac{z}{2}N_2 + (2x + \frac{y}{2})\,Cu$$

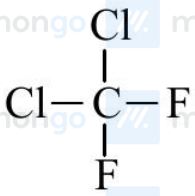
Traces of nitrogen oxides formed, if any, are reduced to nitrogen by passing the gaseous mixture over heated copper gauze.

Q16 (2)

(1) Chloral 

(2) Gammaxene 

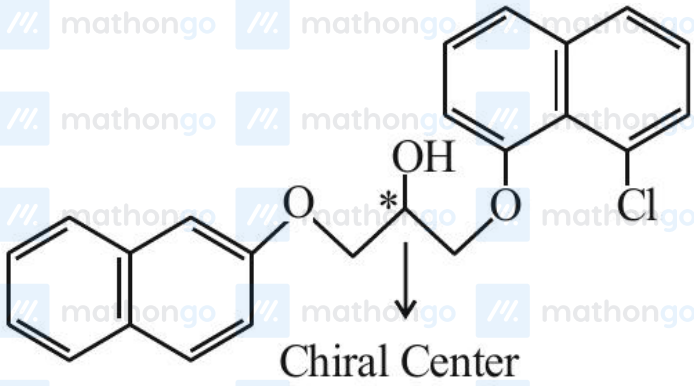
(3) Chloropicrin 

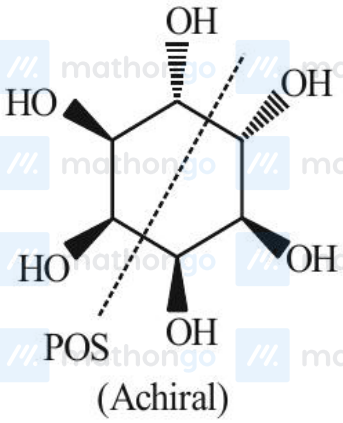
(4) Freon - 12 

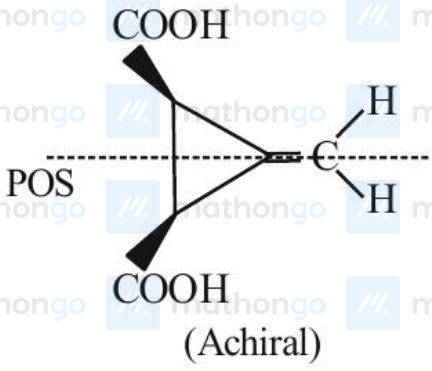
Q17 (4)

Resonating structure are hypothetical and resonance hybrid is real structure which is weighted average of all the resonating structures.

Q18 (2)

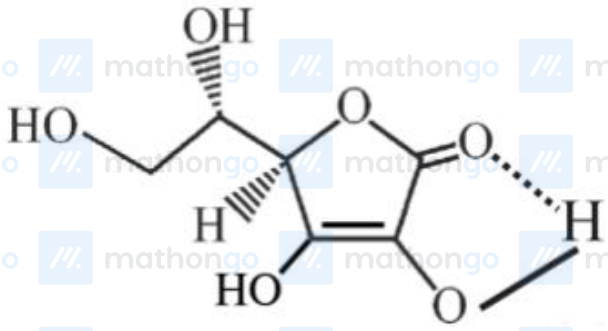




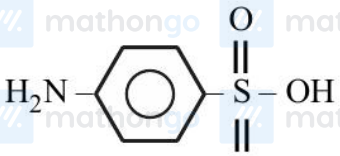


Q19 (1)

H-bonding stabilised vitamin C



Q20 (4)

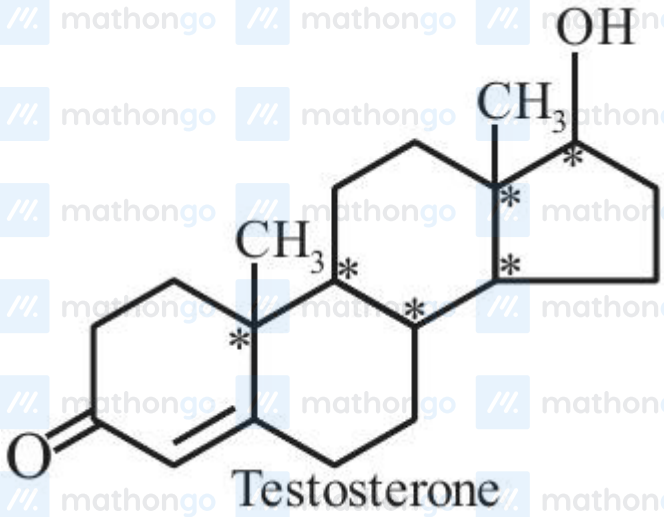


Sulphanilic acid

Does not show esterification test.

Presence of both sulphur and nitrogen give red colour in Lassigne's test.

Q21 (6)



Testosterone