Q1 - 25 July - Shift 1

While estimating the nitrogen present in an organic compound by Kjeldahl's method, the ammonia evolved from 0.25 g of the compound neutralized 2.5 mL of 2 M H_2SO_4. The percentage of nitrogen present in organic compound is ..... .

Space for your notes:

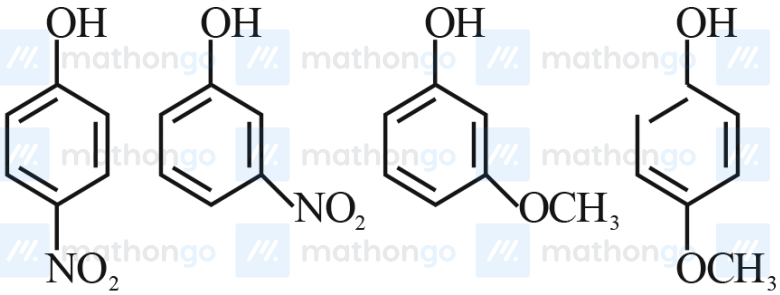
Q2 - 25 July - Shift 1

The number of sp^3 hybridised carbons in an acyclic neutral compound with molecular formula C_4H_5N is :

Space for your notes:

Q3 - 25 July - Shift 2

Arrange the following in decreasing acidic strength.



(A) (B) (C) (D)

(A) A > B > C > D (B) B > A > C > D

(C) D > C > A > B (D) D > C > B > A

Space for your notes:

Q4 - 25 July - Shift 2

The separation of two coloured substances was done by paper chromatography. The distances travelled by solvent front, substance A and substance B from the base line are 3.25 cm. 2.08 cm and 1.05 cm. respectively. The ratio of R_f values of A to B is _____

Space for your notes:

Q5 - 25 July - Shift 2

The total number of monobromo derivatives formed by the alkanes with molecular formula C_5H_{12} is (excluding stereo isomers)_____

Space for your notes:

Q6 - 26 July - Shift 1

$\dot{C}l + CH_4 \rightarrow A + B$

A and B in the above atmospheric reaction step are

(A) C_2H_6 and Cl_2 (B) $\dot{C}HCl_2$ and H_2

(C) $\dot{C}H_3$ and HCl (D) C_2H_6 and HCl

Space for your notes:

Q7 - 26 July - Shift 1

Which technique among the following, is most appropriate in separation of a mixture of 100 mg of p-nitrophenol and picric acid ?

(A) Steam distillation

(B) 2-5 ft long column of silica gel

(C) Sublimation

(D) Preparative TLC (Thin Layer Chromatography)

Space for your notes:

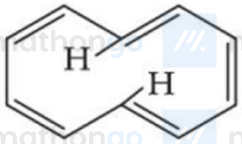
Q8 - 26 July - Shift 1

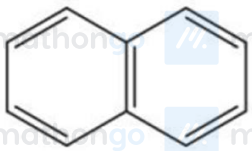
Which of the following compounds is **not** aromatic?

Space for your notes:

(A) 

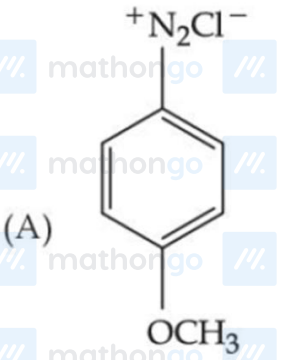
(B) 

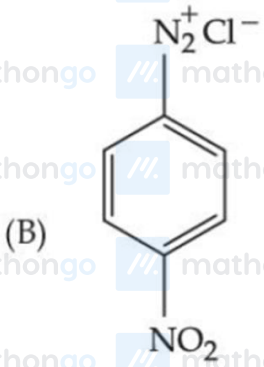
(C) 

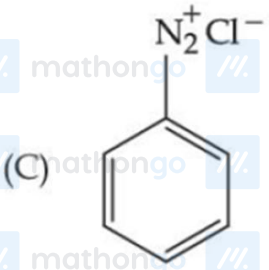
(D) 

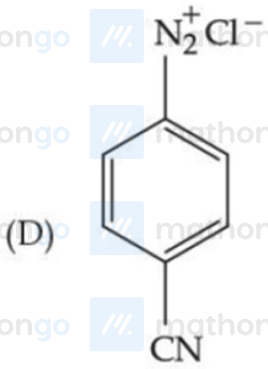
Q9 - 26 July - Shift 1

The correct stability order of the following diazonium salt is









(A) (A) > (B) > (C) > (D)

(B) (A) > (C) > (D) > (B)

(C) (C) > (A) > (D) > (B)

(D) (C) > (D) > (B) > (A)

Space for your notes:

Q10 - 26 July - Shift 2

The correct decreasing order of priority of functional groups in naming an organic compound as per IUPAC system of nomenclature is :

(A) $-COOH > -CONH_2 > -COCl > -CHO$

(B) $-SO_3H > -COCl > -CONH_2 > -CN$

(C) $-COOR > -COCl > -NH_2 > \rangle C = O$

(D) $-COOH > -COOR > -CONH_2 > -COCl$

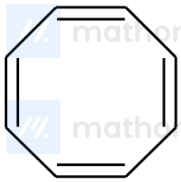
Space for your notes:

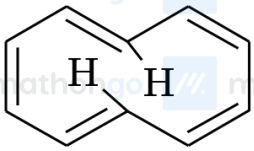
Q11 - 27 July - Shift 1

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

Assertion A : [6] Annulene. [8] Annulene and cis –[10] Annulene, are respectively aromatic, not-aromatic and aromatic.

[6] Annulene 

[8] Annulene 

Cis-[10] Annulene 

Reason R : Planarity is one of the requirements of aromatic systems.

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

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

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

(C) **A** is correct but **R** is not correct.

(D) **A** is not correct but **R** is correct.

Space for your notes:

Q12 - 27 July - Shift 1

In Carius method of estimation of halogen. 0.45 g of an organic compound gave 0.36 g of AgBr. Find out the percentage of bromine in the compound.
(Molar masses : AgBr = 188 g mol^{-1}: Br = 80 g mol^{-1})

(A) 34.04% (B) 40.04%
(C) 36.03% (D) 38.04%

Space for your notes:

Q13 - 27 July - Shift 1

Optical activity of an enantiomeric mixture is +12.6° and the specific rotation of (+) isomer is +30°. The optical purity is____%

Space for your notes:

Q14 - 27 July - Shift 2

Match List-I with List-II

List-I (Mixture)

(A) Chloroform & Aniline

(B) Benzoic acid & Napthalene

(C) Water & Aniline

(D) Napthalene & Sodium chloride

List-II (Purification Process)

(I) Steam distillation

(II) Sublimation

(III) Distillation

(IV) Crystallisation

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

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

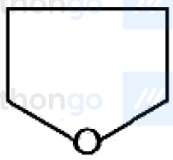
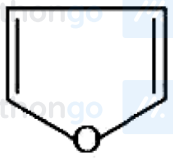
(C) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

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

Space for your notes:

Q15 - 28 July - Shift 1

Match List-I with List-II.

	List-I		List-II
(A)		(I)	Spiro compound
(B)		(II)	Aromatic compound
(C)		(III)	Non-planar Heterocyclic compound
(D)		(IV)	Bicyclo compound

Choose the correct answer from the options given below :

(A) (A) – (II), (B) – (I), (C) – (IV), (D) – (III)

(B) (A) – (IV), (B) – (III), (C) – (I), (D) – (II)

(C) (A) – (III), (B) – (IV), (C) – (I), (D) – (II)

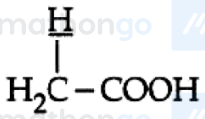
(D) (A) – (IV), (B) – (III), (C) – (II), (D) – (I)

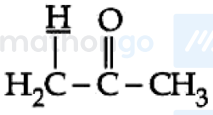
Space for your notes:

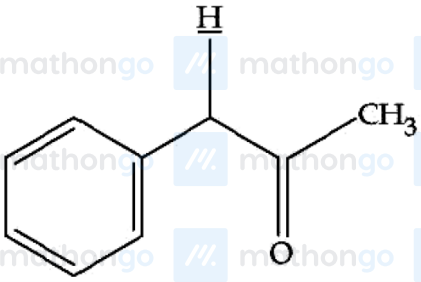
Q16 - 28 July - Shift 1

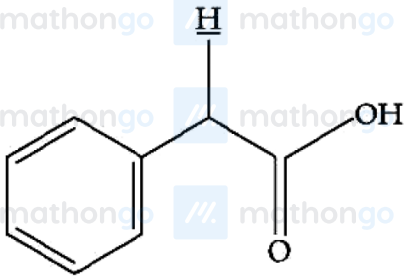
Among the following marked proton of which compound shows lowest pK_a value ?

Space for your notes:

(A) 

(B) 

(C) 

(D) 

Q17 - 28 July - Shift 2

Given below are two statements : One is labelled as **Assertion A** and the other is labelled as **Reason R**

Assertion A : Thin layer chromatography is an adsorption chromatography.

Reason : A thin layer of silica gel is spread over a glass plate of suitable size in thin layer chromatography which acts as an adsorbent.

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

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

(B) Both A and R are true but R is NOT the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

Space for your notes:

Q18 - 28 July - Shift 2

A sample of 0.125 g of an organic compound when analysed by Duma's method yields 22.78 mL of nitrogen gas collected over KOH solution at 280K and 759 mm Hg. The percentage of nitrogen in the given organic compound is ____. (Nearest integer).

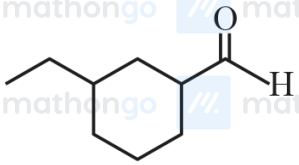
(a) The vapour pressure of water at 280 K is 14.2 mm Hg

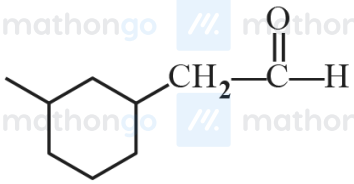
(b) $R = 0.082$ L atm K^{-1} mol^{-1}

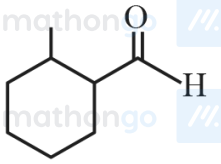
Space for your notes:

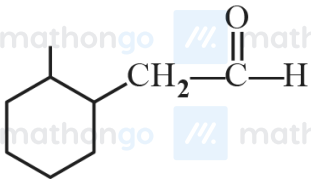
Q19 - 29 July - Shift 2

Correct structure of γ-methylcyclohexane carbaldehyde is :

(A) 

(B) 

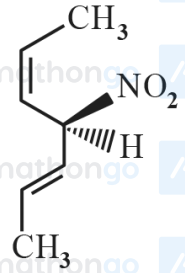
(C) 

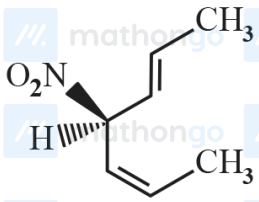
(D) 

Space for your notes:

Q20 - 29 July - Shift 2

Given below are two statements.

Statement I : The compound  is optically active.

Statement II :  is mirror image of above compound A.

In the light of the above statement, choose the **most appropriate** answer from the options given below.

(A) Both Statement I and Statement II are correct

(B) Both Statement I and Statement II are incorrect.

(C) Statement I is correct but Statement II is incorrect.

(D) Statement I is incorrect but Statement II is correct.

Space for your notes:

Answer Key

Q1 (56)	**Q2** (1)	**Q3** (A)	**Q4** (2)
Q5 (8)	**Q6** (C)	**Q7** (D)	**Q8** (C)
Q9 (B)	**Q10** (B)	**Q11** (D)	**Q12** (A)
Q13 (42)	**Q14** (D)	**Q15** (C)	**Q16** (C)
Q17 (A)	**Q18** (22)	**Q19** (A)	**Q20** (C)

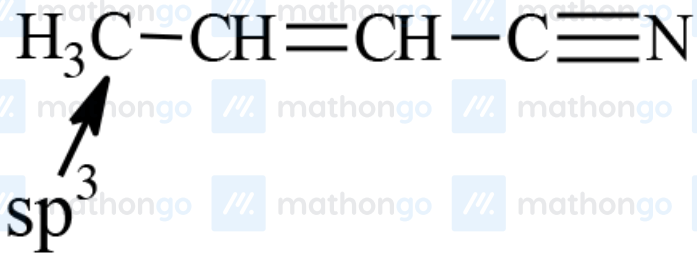
Q1 (56)

$$\%N = \frac{1.4(N_1V_1)}{\text{mass of organic compound}}$$

$$\%N = \frac{1.4(2.5\times2\times2)}{0.25} = 56$$

Q2 (1)

$$DU = 4+1-\left(\frac{5-1}{2}\right) = 3$$



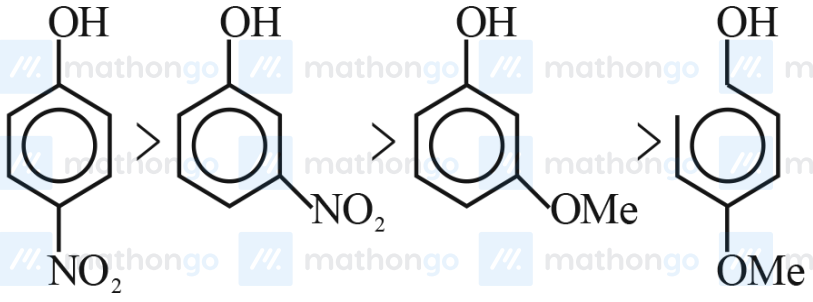
or

$$CH_2 = C = CH = CH = NH$$

Zero sp^3 carbon

Q3 (A)

The correct order of acid strength is

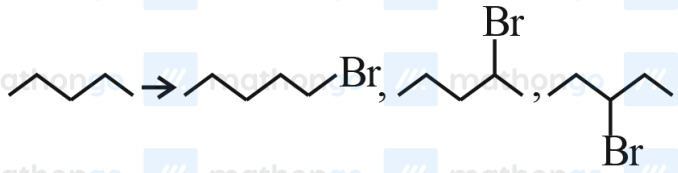


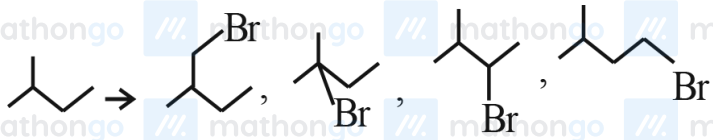
Q4 (2)

$$\frac{R_{F_A}}{R_{F_B}} = \frac{\frac{2.08}{3.25}}{\frac{1.05}{3.25}} = \frac{2.08}{1.05} \simeq 2$$

Q5 (8)

The Alkanes and their monobromodervative are

1. 

2. 

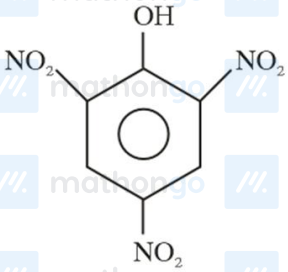
3. 

Q6 (C)

$$\dot{C}l + CH_4 \longrightarrow \dot{C}H_3 + HCl$$

Q7 (D)

Shows inter molecular H-bonding



Shows intra molecular H-bonding

Solvent polarity has been related to R_f value of nitrocompounds.

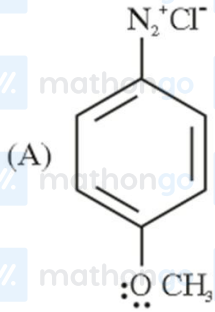
100 mg p-nitrophenol and picric acid have different R_f value on silica gel plate

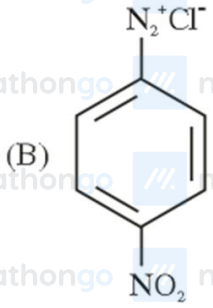
$\therefore$ Preparative TLC is best to separate 100 mg of para nitrophenol and picric acid

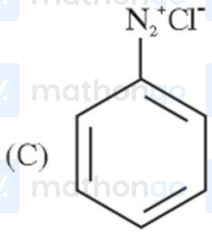
Q8 (C)

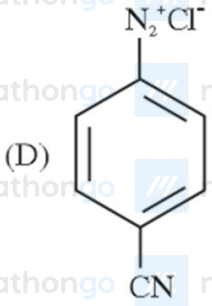
[10] Annulene, although follow $(4n + 2)\pi$ electron rule, but it is non-aromatic due to its non planar nature. It is nonplanar due to repulsion of C – H bonds present inside the ring.

Q9 (B)

(A) 
(+ M group)

(B) 
(– M & – I group)

(C) 

(D) 
(– M & – I group)

Since diazonium ion is a cation hence it is stabilized by electron donating groups and destabilized by electron withdrawing group.

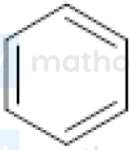
Hence Stability order should be A > C > D > B.

Q10 (B)

$$—SO_3H > —COCl > —CONH_2 > —CN$$

Q11 (D)

Assertion A : Not correct , Reason R : correct

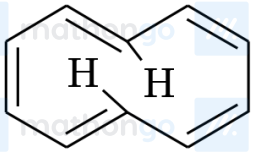

Arom atic

[6] – annulene


Not aromatic


- Not aromatic

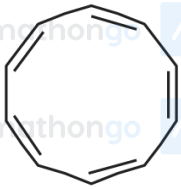
[8] – annulene



- Not aromatic

[10] – annulene

In [10] –Annulene – the hydrogen atoms in the 1 and 6 position interfere with each other and force the molecule out of planarity



all -cis(10)annulene

If this annulene with five cis double bonds were planar, each internal angle would be 144°. Since a normal double bond has bond angle of 120°, this would be from ideal. This compound can be made but it does not adopt a planar conformation and therefore is not aromatic even though it has ten π electrons.

Q12 (A)

Mass of organic compound = 0.45 gm

Mass of AgBr obtained = 0.36 gm

$$\therefore \text{ Moles of AgBr} = \frac{0.36}{188}$$

$$\therefore \text{ Mass of Bromine} = \frac{0.36}{188} \times 80 = 0.1532\text{gm}$$

$$\therefore \text{ \% Br in compound} = \frac{0.1532}{0.45} \times 100 = 34.04\%$$

Q13 (42)

$$\text{\% optical purity} = \frac{\text{observed rotation of mixture} \times 100}{\text{rotation of pure enantiomer}}$$

$$= \frac{+12.6^\circ}{+30^\circ} \times 100 = 42$$

Q14 (D)

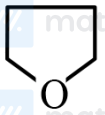
(A) Chloroform + Aniline → (III) Distillation

(B) Benzoic acid + Napthalene → (IV) Crystallisation

(C) Water + Aniline → (I) Steam distillation

(D) Napthalene + Sodium chloride →(II) Sublimation

Q15 (C)


: Non-planar heterocyclic Compound

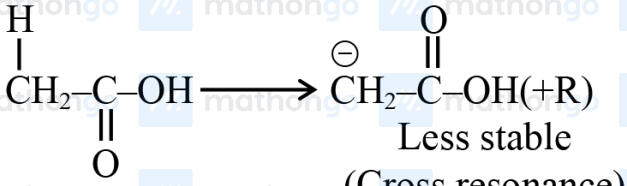

: Bicyclo Compound


: Spiro Compound


: Aromatic Compound

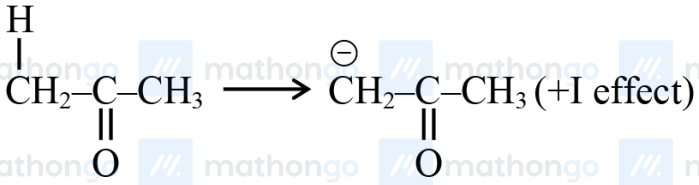
Q16 (C)

(A)

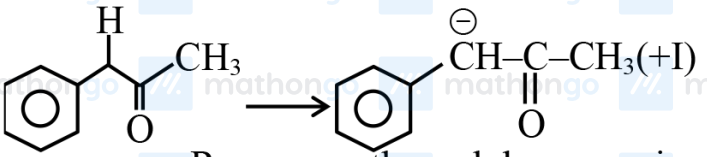


Less stable
(Cross resonance)

(B)



(C)



(most acidic)

Resonance through benzene ring (most stable)

So it has least pK_a value.

Q17 (A)

Theory based

Thin layer chromoatography (TLC) is another type of adsorption chromatography, which involve sepration of substance of a mixture ovel a thin layer of an adsorbent coated on glass plate.

A thin layer (about 0.2 mm thick) of an adsorbent (silica gel) or (Alumina) in spread overa glass plate of suitable size. Hence Assertion (A) is correct and Reason (R) is correct explanation of (A)

Q18 (22)

$V = 22.78$ ml, $T = 280$ K

$P_{total} = 759$ mmHg

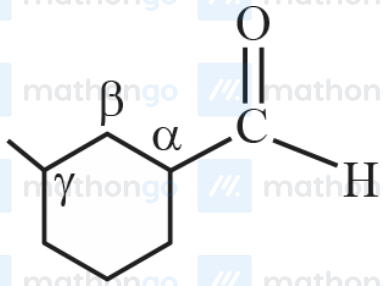
$$P_{N_2} = 759 - 14.2 = 744.8 \text{mmHg}$$

$$n_{N_2} = \frac{744.8 \times 22.78}{760 \times 1000 \times 0.082 \times 280} = 0.00097$$

$$W_{\text{Nitrogen}} = 0.02716$$

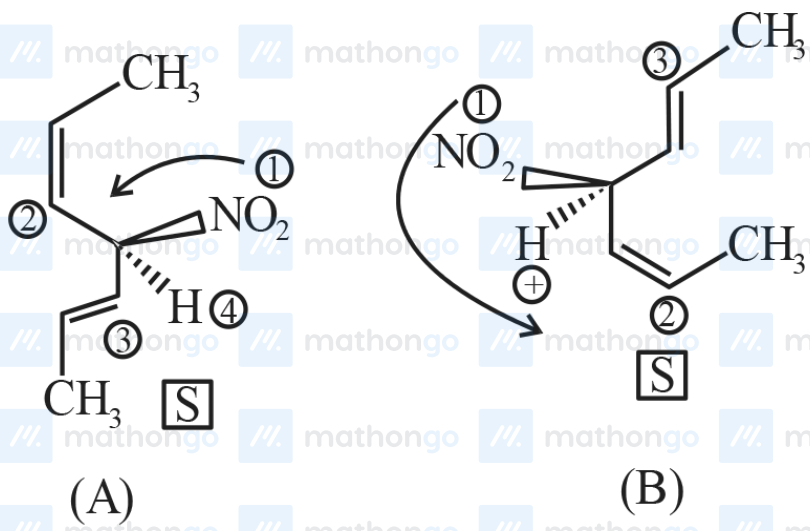
$$\%N = \frac{0.02716}{0.125} \times 1000 = 21.728$$

Q19 (A)



γ-methyl cyclohexane carbaldehyde

Q20 (C)



Having same configuration.