

Questions with Answer Keys

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Q1 - 2024 (01 Feb Shift 1)

Given below are two statements:

Statement (I) : Aminobenzene and aniline are same organic compounds.

Statement (II) : Aminobenzene and aniline are different organic compounds.

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

- (1) Both Statement I and Statement II are correct
- (2) Statement I is correct but Statement II is incorrect
- (3) Statement I is incorrect but Statement II is correct
- (4) Both Statement I and Statement II are incorrect

Q2 - 2024 (01 Feb Shift 1)

Ionic reactions with organic compounds proceed through:

- (A) Homolytic bond cleavage
- (B) Heterolytic bond cleavage
- (C) Free radical formation
- (D) Primary free radical
- (E) Secondary free radical

Choose the correct answer from the options given below:

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

Q3 - 2024 (01 Feb Shift 1)

In Kjeldahl's method for estimation of nitrogen, CuSO_4 acts as :

- (1) Reducing agent
- (2) Catalytic agent

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(3) Hydrolysis agent

(4) Oxidising agent

Q4 - 2024 (01 Feb Shift 1)

Number of optical isomers possible for 2 - chlorobutane _____

Q5 - 2024 (01 Feb Shift 2)

The set of meta directing functional groups from the following sets is:

(1) $-\text{CN}$, $-\text{NH}_2$, $-\text{NHR}$, $-\text{OCH}_3$ (2) $-\text{NO}_2$, $-\text{NH}_2$, $-\text{COOH}$, $-\text{COOR}$ (3) $-\text{NO}_2$, $-\text{CHO}$, $-\text{SO}_3\text{H}$, $-\text{COR}$ (4) $-\text{CN}$, $-\text{CHO}$, $-\text{NHCOCH}_3$, $-\text{COOR}$

Q6 - 2024 (01 Feb Shift 2)

Lassaigne's test is used for detection of :

(1) Nitrogen and Sulphur only

(2) Nitrogen, Sulphur and Phosphorous Only

(3) Phosphorous and halogens only

(4) Nitrogen, Sulphur, phosphorous and halogens

Q7 - 2024 (01 Feb Shift 2)

Which among the following has highest boiling point?

(1) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$ (2) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2 - \text{OH}$ (3) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CHO}$ (4) $\text{H}_5\text{C}_2 - \text{O} - \text{C}_2\text{H}_5$

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Q8 - 2024 (01 Feb Shift 2)

The functional group that shows negative resonance effect is:

- (1) $-\text{NH}_2$
- (2) $-\text{OH}$
- (3) $-\text{COOH}$
- (4) $-\text{OR}$

Q9 - 2024 (01 Feb Shift 2)

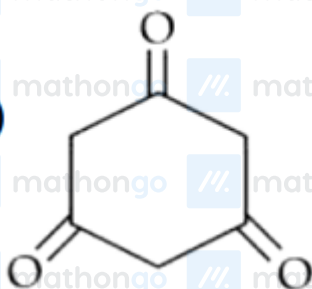
Following Kjeldahl's method, 1 g of organic compound released ammonia, that neutralised 10 mL of $2\text{M}\text{H}_2\text{SO}_4$. The percentage of nitrogen in the compound is _____ %.

Q10 - 2024 (27 Jan Shift 1)

Highest enol content will be shown by :



(1)



(2)

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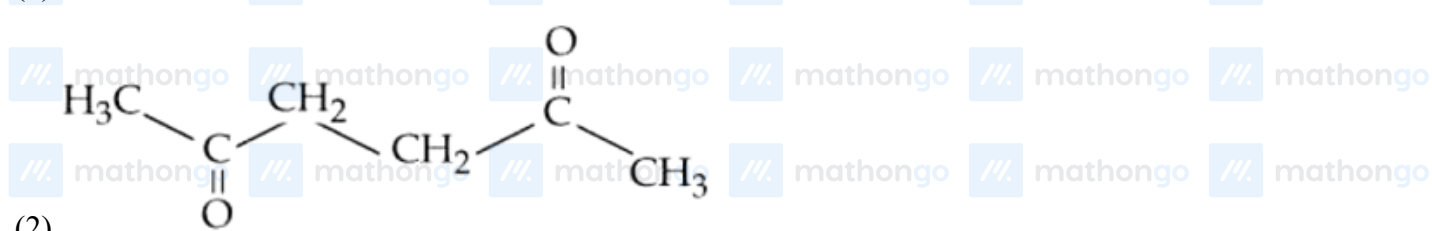
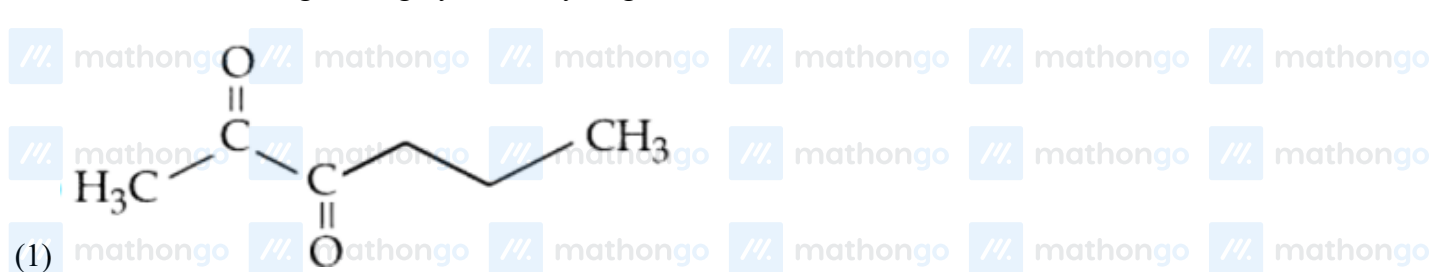
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Q11 - 2024 (27 Jan Shift 1)

Which of the following has highly acidic hydrogen?

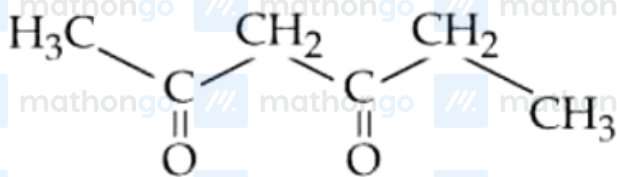


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(4)

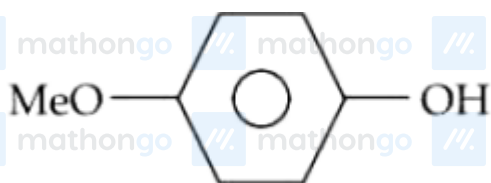
Q12 - 2024 (27 Jan Shift 1)

The ascending order of acidity of $-\text{OH}$ group in the following compounds is :

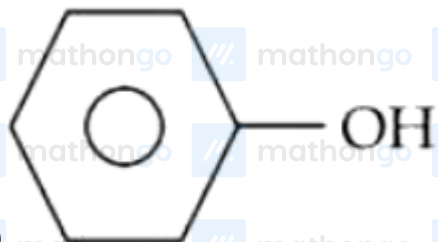
(A) Bu - OH



(B)



(C)



(D)



(E)

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Choose the correct answer from the options given below :

(1) (A) < (D) < (C) < (B) < (E)

(2) (C) < (A) < (D) < (B) < (E)

(3) (C) < (D) < (B) < (A) < (E)

(4) (A) < (C) < (D) < (B) < (E)

Q13 - 2024 (27 Jan Shift 1)



Cyclohexene

is _____ type of an

organic compound.

(1) Benzenoid aromatic

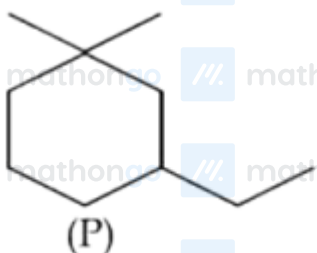
(2) Benzenoid non-aromatic

(3) Acyclic

(4) Alicyclic

Q14 - 2024 (27 Jan Shift 1)

IUPAC name of following compound (P) is:



(1) 1-Ethyl-5, 5-dimethylcyclohexane

(2) 3-Ethyl-1,1-dimethylcyclohexane

(3) 1-Ethyl-3, 3-dimethylcyclohexane

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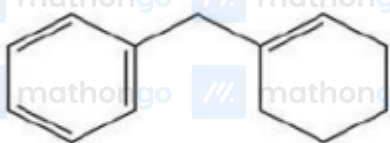
(4) 1,1-Dimethyl-3-ethylcyclohexane

Q15 - 2024 (27 Jan Shift 1)

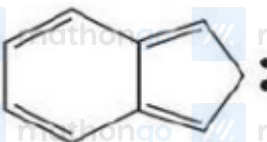
Among the given organic compounds, the total number of aromatic compounds is



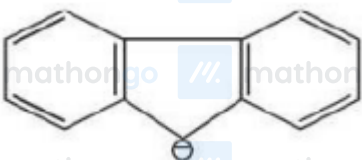
(A)



(B)



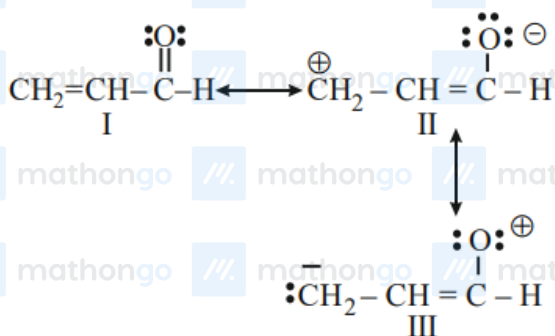
(C)



(D)

Q16 - 2024 (27 Jan Shift 2)

The order of relative stability of the contributing structure is



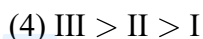
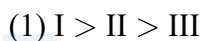
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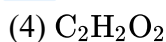
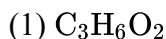
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Choose the correct answer from the options given below:



Q17 - 2024 (27 Jan Shift 2)

The molecular formula of second homologue in the homologous series of mono carboxylic acids is



Q18 - 2024 (27 Jan Shift 2)

The technique used for purification of steam volatile water immiscible substance is:

(1) Fractional distillation

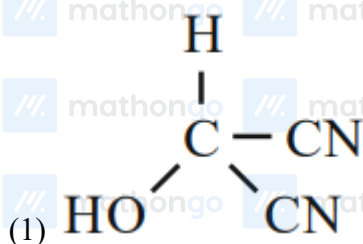
(2) Fractional distillation under reduced pressure

(3) Distillation

(4) Steam distillation

Q19 - 2024 (27 Jan Shift 2)

Bond line formula of $HOCH(CN)_2$ is:



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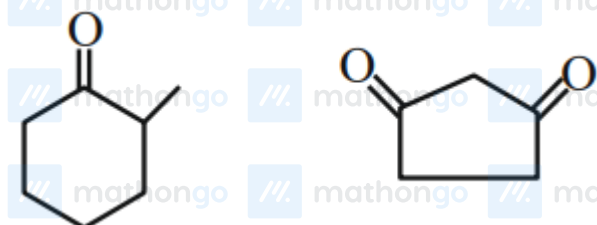
Q20 - 2024 (27 Jan Shift 2)

The incorrect statement regarding conformations of ethane is:

- (1) Ethane has infinite number of conformations
- (2) The dihedral angle in staggered conformation is 60°
- (3) Eclipsed conformation is the most stable conformation.
- (4) The conformations of ethane are interconvertible to one-another.

Q21 - 2024 (27 Jan Shift 2)

Total number of compounds with Chiral carbon atoms from following is _____

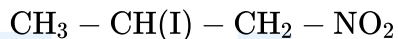
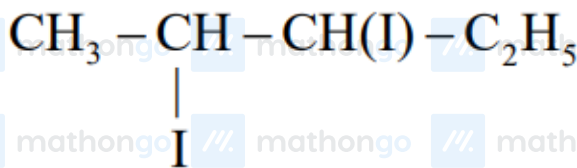


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Q22 - 2024 (29 Jan Shift 1)

The difference in energy between the actual structure and the lowest energy resonance structure for the given compound is

- (1) electromeric energy
- (2) resonance energy
- (3) ionization energy
- (4) hyperconjugation energy

Q23 - 2024 (29 Jan Shift 1)

Appearance of blood red colour, on treatment of the sodium fusion extract of an organic compound with FeSO_4 in presence of concentrated H_2SO_4 indicates the presence of element/s

- (1) Br
- (2) N
- (3) N and S
- (4) S

Q24 - 2024 (29 Jan Shift 1)

The interaction between π bond and lone pair of electrons present on an adjacent atom is responsible for

- (1) Hyperconjugation
- (2) Inductive effect
- (3) Electromeric effect

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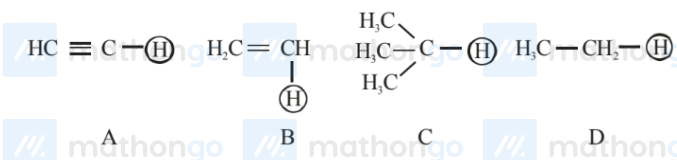
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(4) Resonance effect

Q25 - 2024 (29 Jan Shift 2)

The ascending acidity order of the following H atoms is

(1) $C < D < B < A$ (2) $A < B < C < D$ (3) $A < B < D < C$ (4) $D < C < B < A$

Q26 - 2024 (29 Jan Shift 2)

Match List I with List II

List I (Compound)		List II (pK _a value)	
A.	Ethanol	I.	10.0
B.	Phenol	II.	15.9
C.	m-Nitrophenol	III.	7.1
D.	p-Nitrophenol	IV.	8.3

Choose the correct answer from the options given below :-

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

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

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

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

Q27 - 2024 (29 Jan Shift 2)

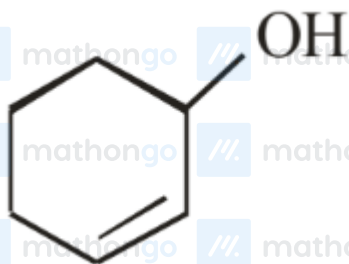
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According to IUPAC system, the compound



is named as

- (1) Cyclohex-1-en-2-ol
- (2) 1-Hydroxyhex-2-ene
- (3) Cyclohex-1-en-3-ol
- (4) Cyclohex-2-en-1-ol

Q28 - 2024 (29 Jan Shift 2)

Chromatographic technique/s based on the principle of differential adsorption is/are

- A. Column chromatography
- B. Thin layer chromatography
- C. Paper chromatography

Choose the most appropriate answer from the options given below:

- (1) B only
- (2) A only
- (3) A & B only
- (4) C only

Q29 - 2024 (29 Jan Shift 2)

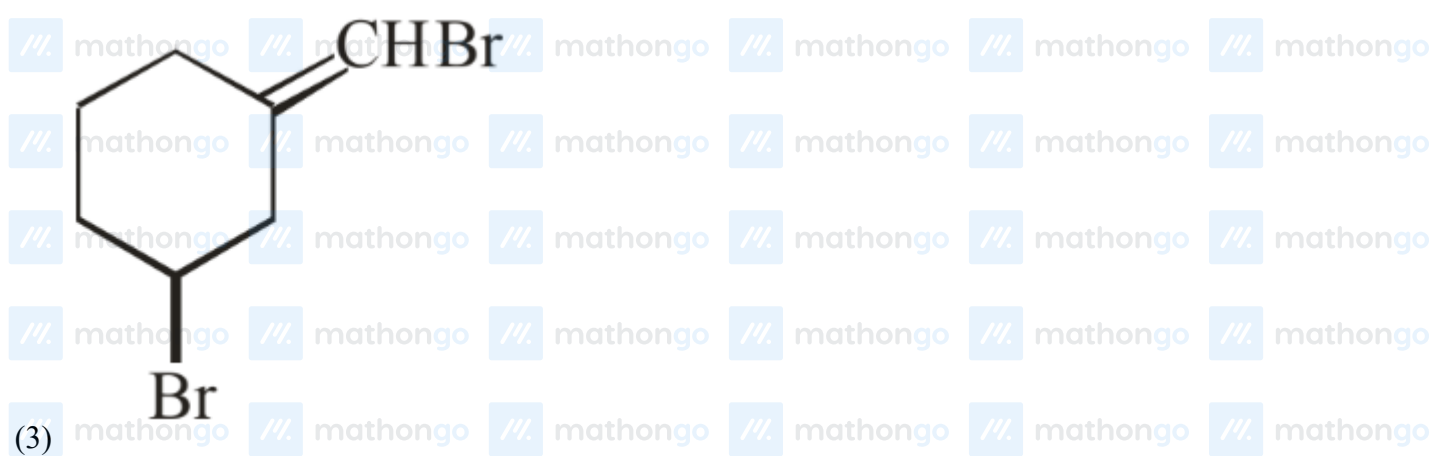
Which one of the following will show geometrical isomerism?

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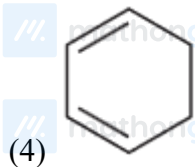
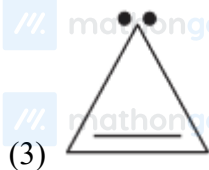
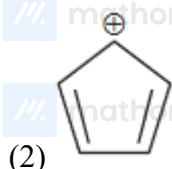
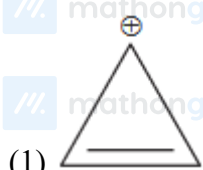
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(4)

Q30 - 2024 (30 Jan Shift 1)

Which of the following molecule/species is most stable?



Q31 - 2024 (30 Jan Shift 1)

Example of vinylic halide is

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Q32 - 2024 (30 Jan Shift 1)

Structure of 4-Methylpent-2-enal is



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Q33 - 2024 (30 Jan Shift 1)

Given below are two statements one is labeled as Assertion (A) and the other is labeled as Reason (R).

Assertion (A): $\text{CH}_2 = \text{CH} - \text{CH}_2 - \text{Cl}$ is an example of allyl halide

Reason (R): Allyl halides are the compounds in which the halogen atom is attached to sp^2 hybridised carbon atom.

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

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

Q34 - 2024 (30 Jan Shift 1)

On a thin layer chromatographic plate, an organic compound moved by 3.5 cm, while the solvent moved by 5 cm. The retardation factor of the organic compound is _____ $\times 10^{-1}$

Q35 - 2024 (30 Jan Shift 2)

Which among the following purification methods is based on the principle of "Solubility" in two different solvents?

- (1) Column Chromatography
- (2) Sublimation
- (3) Distillation
- (4) Differential Extraction

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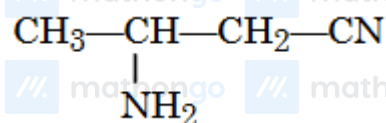
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Q36 - 2024 (30 Jan Shift 2)

IUPAC name of following compound is



(1) 2-Aminopentanenitrile

(2) 2-Aminobutanenitrile

(3) 3-Aminobutanenitrile

(4) 3-Aminopropanenitrile

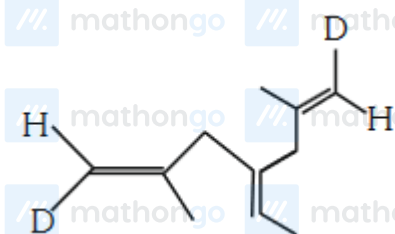
Q37 - 2024 (30 Jan Shift 2)

The correct stability order of carbocations is

(1) $(\text{CH}_3)_3\text{C}^+ > \text{CH}_3-\overset{+}{\text{C}}\text{H}_2 > (\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > \overset{+}{\text{C}}\text{H}_3$ (2) $\overset{+}{\text{C}}\text{H}_3 > (\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > \text{CH}_3-\overset{+}{\text{C}}\text{H}_2 > (\text{CH}_3)_3\overset{+}{\text{C}}$ (3) $(\text{CH}_3)_3\overset{+}{\text{C}} > (\text{CH}_3)_2\overset{+}{\text{C}}\text{H} > \text{CH}_3-\overset{+}{\text{C}}\text{H}_2 > \overset{+}{\text{C}}\text{H}_3$ (4) $\overset{+}{\text{C}}\text{H}_3 > \text{CH}_3-\overset{+}{\text{C}}\text{H}_2 > \text{CH}_3-\overset{+}{\underset{\text{CH}_3}{\text{C}}}\text{H} > (\text{CH}_3)_3\overset{+}{\text{C}}$

Q38 - 2024 (30 Jan Shift 2)

Number of geometrical isomers possible for the given structure is/are _____



Q39 - 2024 (31 Jan Shift 1)

A species having carbon with sextet of electrons and can act as electrophile is called

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(1) carbon free radical

(2) carbanion

(3) carbocation

(4) pentavalent carbon

Q40 - 2024 (31 Jan Shift 1)

'Adsorption' principle is used for which of the following purification method?

(1) Extraction

(2) Chromatography

(3) Distillation

(4) Sublimation

Q41 - 2024 (31 Jan Shift 1)

Given below are two statements:

Statement I: IUPAC name of $\text{HO} - \text{CH}_2 - (\text{CH}_2)_3 - \text{CH}_2 - \text{COCH}_3$ is 7-hydroxyheptan-2-one.

Statement II: 2-oxoheptan-7-ol is the correct IUPAC name for above compound.

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.

Q42 - 2024 (31 Jan Shift 1)

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Match List I with List II

	LIST I (Technique)		LIST II (Application)
A.	Distillation	I.	Separation of glycerol from spent-lye
B.	Fractional distillation	II.	Aniline - Water mixture
C.	Steam distillation	III.	Separation of crude oil fractions
D.	Distillation under reduced pressure	IV.	Chloroform-Aniline

Choose the correct answer from the options given below:

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

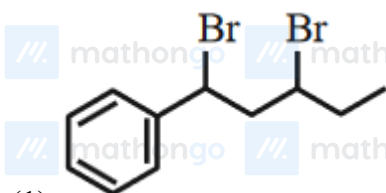
(2) A-IV, B-III, C-II, D-I

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

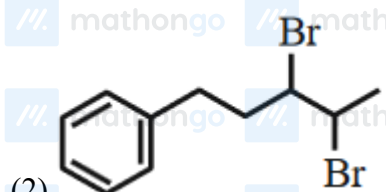
(4) A-II, B-III, C-I, D-IV

Q43 - 2024 (31 Jan Shift 2)

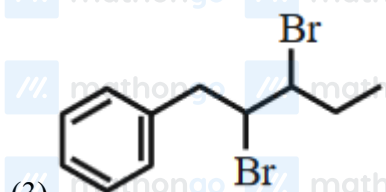
Identify structure of 2,3-dibromo-1-phenylpentane.



(1)



(2)



(3)

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(4) /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

Q44 - 2024 (31 Jan Shift 2) /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

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 vapour in vapour phase. A suitable method for the extraction of these oils from the flowers is _____

(1) crystallisation /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

(2) distillation under reduced pressure /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

(3) distillation /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

(4) steam distillation /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

/// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

/// mathongo /// mathongo /// mathongo /// mathongo /// mathongo /// mathongo

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Q1 (2) mathongo /// matho **Q2** (3) mathongo **Q3** (2) mathongo /// ma **Q4** (2) mathongo

Q5 (3) mathongo /// ma **Q6** (4) mathongo **Q7** (2) mathongo /// ma **Q8** (3) mathongo

Q9 (56) thongo /// ma **Q10** (2) mathongo **Q11** (4) mathongo /// ma **Q12** (4) mathongo

Q13 (4) thongo /// ma **Q14** (2) mathongo **Q15** (3) mathongo /// ma **Q16** (1) mathongo

Q17 (2) thongo /// ma **Q18** (4) mathongo **Q19** (4) mathongo /// ma **Q20** (3) mathongo

Q21 (5) thongo /// ma **Q22** (2) mathongo **Q23** (3) mathongo /// ma **Q24** (4) mathongo

Q25 (1) thongo /// ma **Q26** (4) mathongo **Q27** (4) mathongo /// ma **Q28** (3) mathongo

Q29 (3) thongo /// ma **Q30** (1) mathongo **Q31** (1) mathongo /// ma **Q32** (4) mathongo

Q33 (1) thongo /// ma **Q34** (7) mathongo **Q35** (4) mathongo /// ma **Q36** (3) mathongo

Q37 (3) thongo /// ma **Q38** (4) mathongo **Q39** (3) mathongo /// ma **Q40** (2) mathongo

Q41 (1) thongo /// ma **Q42** (2) mathongo **Q43** (3) mathongo /// ma **Q44** (4) mathongo

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Solutions

MathonGo

Q1

Aniline is also known as amino benzene.

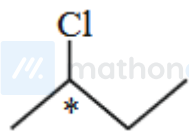
Q2

Heterolytic cleavage of Bond lead to formation of ions.

Q3

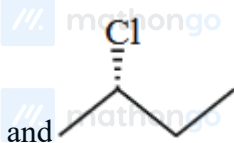
Kjeldahl's method is used for estimation of Nitrogen where CuSO_4 acts as a catalyst.

Q4

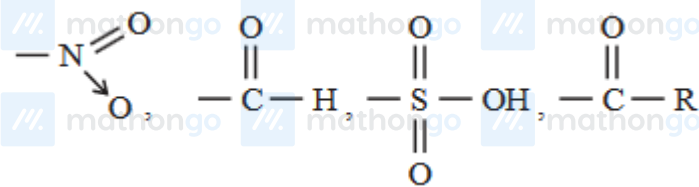


There is one chiral centre present in given compound.

So, Total optical isomers = 2



Q5

All are $-\text{M}$, Hence meta directing groups.

Q6

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Solutions

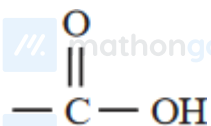
MathonGo

Lassaigne's test is used for detection of all element N, S, P, X.

Q7

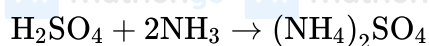
Due to H-bonding boiling point of alcohol is High.

Q8



shows $-R$ effect, while rest 3 groups shows $+R$ effect via lone pair.

Q9



Millimole of $\text{H}_2\text{SO}_4 \rightarrow 10 \times 2$

So Millimole of $\text{NH}_3 = 20 \times 2 = 40$

Organic $\rightarrow \text{NH}_3$

Compound 40 Millimole

\therefore Mole of N = $\frac{40}{1000}$

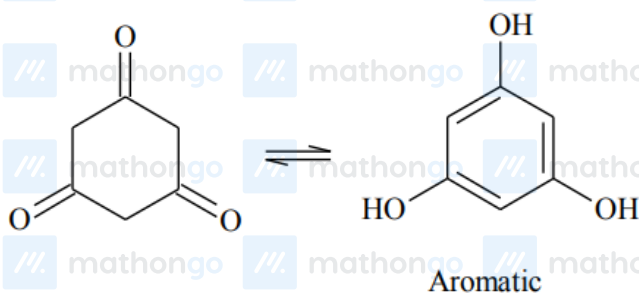
wt. of N = $\frac{40}{1000} \times 14$

% composition of N in organic compound

$$= \frac{40 \times 14}{1000 \times 1} \times 100$$

= 56%

Q10



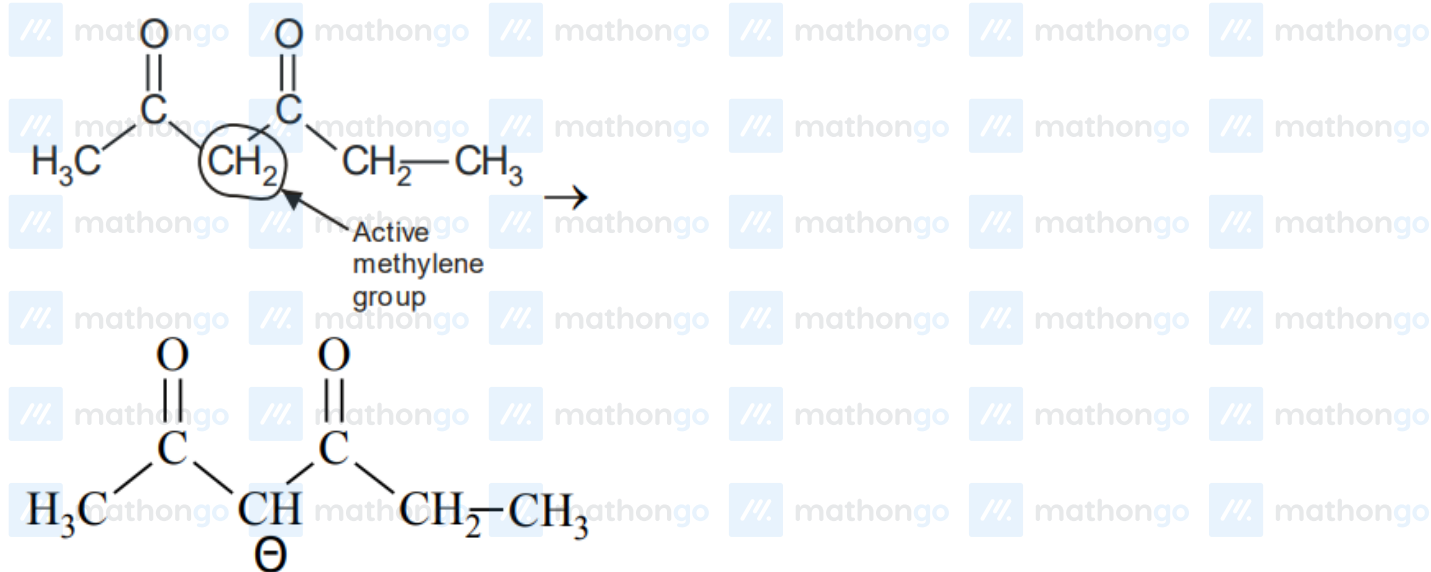
Q11

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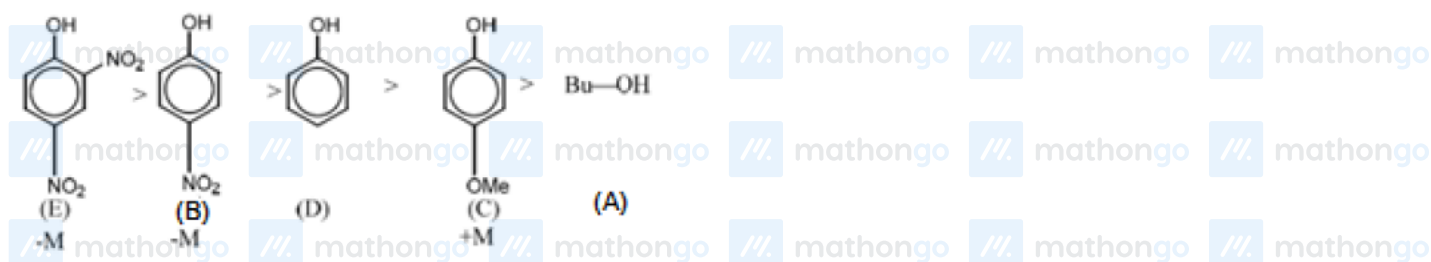
Solutions

MathonGo



Conjugate base is more stable due to more resonance of negative charge.

Q12



Q13



is Alicyclic

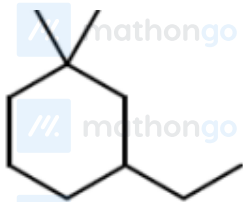
Q14

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Solutions

MathonGo



3-ethyl 1, 1 -dimethylcyclohexane

Q15

B,C and D are Aromatic

Q16

I > II > III, since neutral resonating structures are more stable than charged resonating structure. II > III, since stability of structure with $-ve$ charge on more electronegative atom is higher.

Q17

HCOOH, CH₃COOH



Second homologue

Q18

Steam distillation is used for those liquids which are insoluble in water, containing non-volatile impurities and are steam volatile.

Q19

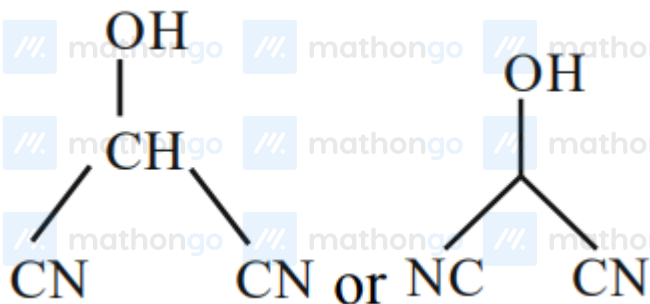
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Solutions

MathonGo

$\text{CH}(\text{OH})(\text{CN})_2$ is

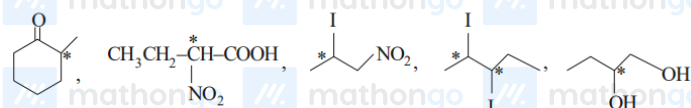


Q20

Eclipsed conformation is the least stable conformation of ethane.

Q21

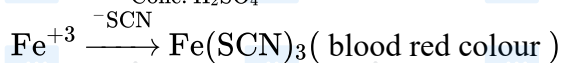
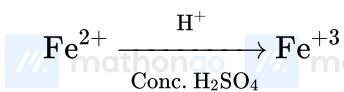
Chiral carbons are marked by.



Q22

The difference in energy between the actual structure and the lowest energy resonance structure for the given compound is known as resonance energy.

Q23



Appearance of blood red colour indicates presence of both nitrogen and sulphur.

Q24

It is a type of conjugation responsible for resonance.

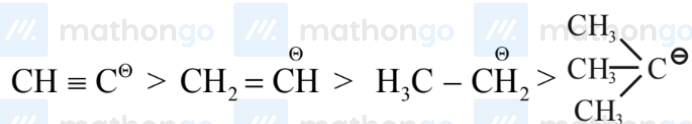
Q25

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Solutions

MathonGo



Stability of conjugate base α acidic strength $\text{C} < \text{D} < \text{B} < \text{A}$

Q26

Ethanol \rightarrow 15.9

Phenol \rightarrow 10

M-Nitrophenol \rightarrow 8.3

P-Nitrophenol \rightarrow 7.1

Q27

Cyclohex-2-en-1-ol

Q28

Memory Based

Q29

Due to unsymmetrical.

Q30



it is aromatic species

Q31

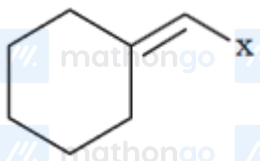
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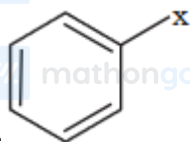
Solutions

MathonGo

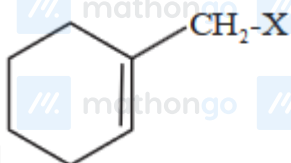
Vinyl carbon is sp^2 hybridized aliphatic carbon



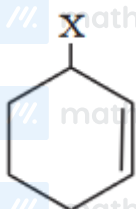
is vinyl halide while



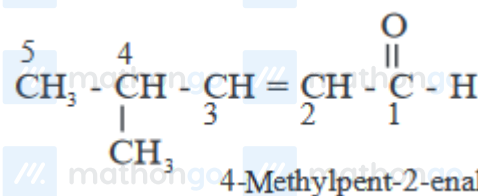
is aryl halide and



are allyl halide



Q32



Q33



↑

It is allyl carbon and sp^3 hybridized

Q34

$$\text{retardation factor} = \frac{\text{Distance travelled by sample/organic compound}}{\text{Distance travelled by solvent}} = \frac{3.5}{5} = 7 \times 10^{-1}$$

Q35

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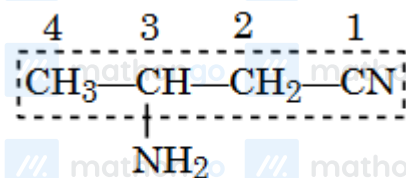
Solutions

MathonGo

Different Extraction

Different layers are formed which can be separated in funnel. (Theory based).

Q36



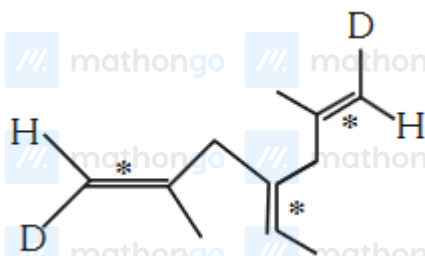
3-Aminobutanenitrile

Q37

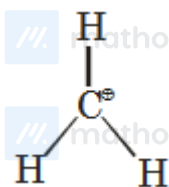
More no. of hyperconjugable Hydrogens, more stable is the carbocations.

Q38

3 stereocenters, symmetrical

Total Geometrical isomers \rightarrow 4. EE, ZZ, EZ (two isomers)

Q39



Six electron species

Q40

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Solutions

MathonGo

Principle used in chromatography is adsorption.

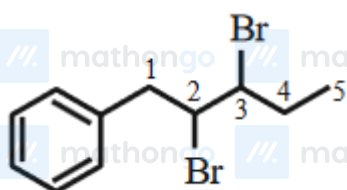
Q41

7-Hydroxyheptan-2-one is correct IUPAC name

Q42

Fact (NCERT)

Q43



2,3-dibromo-1-phenylpentane

Q44

Steam distillation technique is applied to separate substances which are steam volatile and are immiscible with water.

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