

Q1. 21 January Shift 1

In Carius method, 0.75 g of an organic compound gave 1.2 g of barium sulphate, find percentage of sulphur (molar mass 32 g mol⁻¹). Molar mass of barium sulphate is 233 g mol⁻¹.

- (1) 10.30% (2) 16.48% (3) 21.97% (4) 4.55%

Q2. 21 January Shift 1

Identify correct statements from the following :

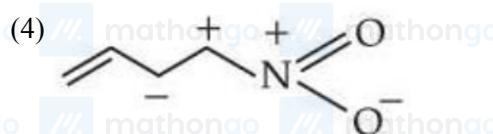
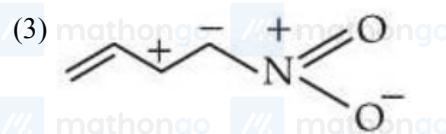
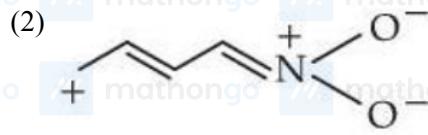
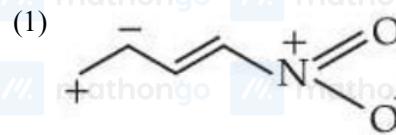
- A. Propanal and propanone are functional isomers.
- B. Ethoxyethane and methoxypropane are metamers.
- C. But-2-ene shows optical isomerism.
- D. But-1-ene and but-2-ene are functional isomers.
- E. Pentane and 2, 2-dimethyl propane are chain isomers.

Choose the correct answer from the options given below :

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

Q3. 21 January Shift 1

From the following, the least stable structure is:

**Q4. 21 January Shift 2**

Match List - I with List - II.

List - I

Pair of Compounds

- A. 2-Methylpropene and but-1-ene
- B. Cis-but-2-ene and trans-but-2-ene
- C. 2-Butanol and diethyl ether
- D. But-1-ene and but-2-ene

List - II

Type of Isomers

- I. Stereoisomers
- II. Position isomers
- III. Chain isomers
- IV. Functional group isomers

Choose the correct answer from the options given below :

- (1) A-II, B-I, C-IV, D-III (2) A-III, B-I, C-II, D-IV
 (3) A-I, B-IV, C-III, D-II (4) A-III, B-I, C-IV, D-II

Q5. 21 January Shift 2

Given below are four compounds :

- (a) n-propyl chloride
- (b) iso-propyl chloride
- (c) sec-butyl chloride
- (d) neo-pentyl chloride

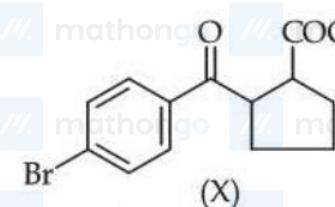
Percentage of carbon in the one which exhibits optical isomerism is :

- (1) 56 (2) 40 (3) 52 (4) 46

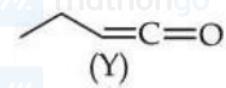
Q6. 21 January Shift 2

Given below are two statements :

Statement I: Compound (X), shown below, dissolves in NaHCO_3 solution and has two chiral carbon atoms



Statement II: Compound (Y), shown below, has two carbons with sp^3 hybridization, one carbon with sp^2 and one carbon with sp hybridization



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

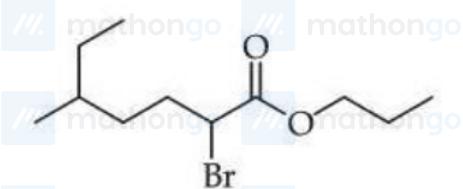
- (1) Both Statement I and Statement II are false (2) Statement I is false but Statement II is true
 (3) Statement I is true but Statement II is false (4) Both Statement I and Statement II are true

Q7. 22 January Shift 1

Sodium fusion extract of an organic compound (Y) with CHCl_3 and chlorine water gives violet color to the CHCl_3 layer. 0.15 g of (Y) gave 0.12 g of the silver halide precipitate in Carius method. Percentage of halogen in the compound (Y) is _____. (Nearest integer)
 (Given : molar mass gmol^{-1} C : 12, H : 1, Cl : 35.5, Br : 80, I : 127)

Q8. 22 January Shift 2

The IUPAC name of the following compound is :



- (1) n-propyl-2-bromo-5-methylheptanoate (2) n-propyl-1-bromo-4-methylhexanoate
(3) 2-bromo-5-methylpropanoate (4) 2-bromo-5-methylhexylpropanoate

09. 22 January Shift 2

When 1 g of compound (X) is subjected to Kjeldahl's method for estimation of nitrogen, 15 mL 1 M H_2SO_4 was neutralized by ammonia evolved. The percentage of nitrogen in compound (X) is :

- (1) 0.21 (2) 21 (3) 42 (4) 0.42

Q10. 23 January Shift 1

Given below are two statements:

Statement I: Sublimation is used for the separation and purification of compounds with low melting point.

Statement II: The boiling point of a liquid increases as the external pressure is reduced.

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

- (1) Both Statement I and Statement II are true (2) Statement I is true but Statement II is false
(3) Both Statement I and Statement II are false (4) Statement I is false but Statement II is true

Q11. 23 January Shift 2

In Carius method 0.2425 g of an organic compound gave 0.5253 g silver chloride. The percentage of chlorine in the organic compound is

- (1) 34.79% (2) 37.57% (3) 87.65% (4) 53.58%

Q12. 23 January Shift 2

Given below are two statements:

Statement I: $(\text{CH}_3)_3\overset{\oplus}{\text{C}}$ is more stable than $\overset{\oplus}{\text{C}}\text{H}_3$ as nine hyperconjugation interactions are possible in $(\text{CH}_3)_3\overset{\oplus}{\text{C}}$.

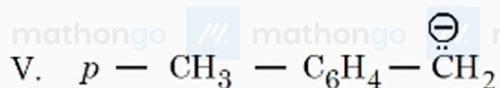
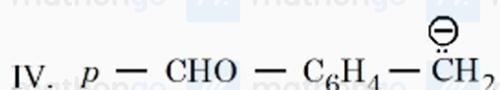
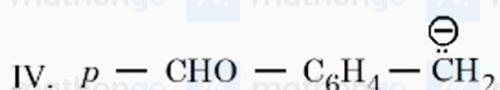
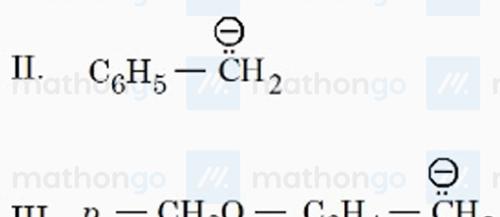
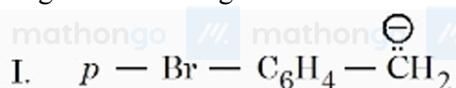
Statement II: C_2H_3 is less stable than $(\text{CH}_3)_3\text{C}^\oplus$ as only three hyperconjugation interactions are possible in C_2H_3 .

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

- (1) Statement I is false but Statement II is true
(2) Statement I is true but Statement II is false
(3) Both Statement I and Statement II are true
(4) Both Statement I and Statement II are false

Q13. 24 January Shift 1

Arrange the following carbanions in the decreasing order of stability.



Choose the correct answer from the options given below:

(1) I > IV > II > V > III

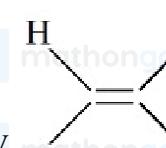
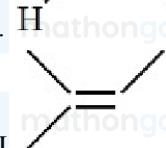
(2) I > II > IV > V > III

(3) IV > I > II > V > III

(4) IV > II > I > III > V

Q14. 24 January Shift 1

Arrange the following alkenes in decreasing order of stability.



Choose the correct answer from the options given below:

(1) III > II > I > IV

(2) I > III > IV > II

(3) III > I > II > IV

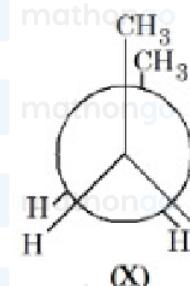
(4) I > III > II > IV

Q15. 24 January Shift 1

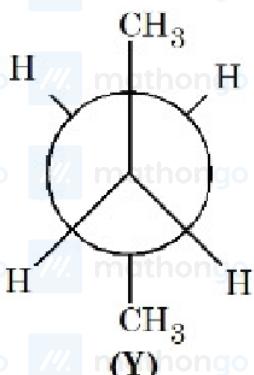
In Dumas method for estimation of nitrogen, 0.50 g of an organic compound gave 70 mL of nitrogen collected at 300 K and 715 mm pressure. The percentage of nitrogen in the organic compound is %.

Q16. 24 January Shift 2

Given below are two statements:



Statement I: There are several conformers for n-butane. Out of those conformers,



stable and most stable conformer is

Statement II: As the dihedral angle increases, torsional strain decreases from (X) to (Y).

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

- (1) Statement I is true but Statement II is false (2) Both Statement I and Statement II are true
 (3) Statement I is false but Statement II is true (4) Both Statement I and Statement II are false

Q17. 24 January Shift 2

Find out the statements which are not true.

- A. Resonating structures with more number of covalent bonds and lesser charge separation are more stable.
- B. In electromeric effect, an unsaturated system shows +E effect with nucleophile and -E effect with electrophile.
- C. Inductive effect is responsible for high melting point, boiling point and dipole moment of polar compounds.
- D. The greater the number of alkyl groups attached to the doubly bonded carbon atoms, higher is the heat of hydrogenation.
- E. Stability of carbanion increases with the increase in s-character of the carbon carrying the negative charge.

Choose the correct answer from the options given below:

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

Q18. 24 January Shift 2

0.25 g of an organic compound "A" containing carbon, hydrogen and oxygen was analysed using the combustion method. There was an increase in mass of CaCl_2 tube and potash tube at the end of the experiment. The amount was found to be 0.15 g and 0.1837 g, respectively. The percentage of oxygen in compound A is %. (Nearest integer)
 (Given: molar mass in gmol^{-1} H : 1, C : 12, O : 16)

Q19. 28 January Shift 1

CORRECT order of stability for the following is $\text{CH}_2 = \text{CH}^- > \text{CH} \equiv \text{C}^- > \text{CH}_3 - \text{CH}_2^-$

- (1) $\text{CH}_2 = \text{CH}^- > \text{CH} \equiv \text{C}^- > \text{CH}_3 - \text{CH}_2^-$
- (2) $\text{CH} \equiv \text{C}^- > \text{CH}_2 = \text{CH}^- > \text{CH}_3 - \text{CH}_2^-$
- (3) $\text{CH} \equiv \text{C}^- > \text{CH}_3 - \text{CH}_2^- > \text{CH}_2 = \text{CH}^-$
- (4) $\text{CH}_3 - \text{CH}_2^- > \text{CH}_2 = \text{CH}^- > \text{CH} \equiv \text{C}^-$

Q20. 28 January Shift 1

0.53 g of an organic compound (x) when heated with excess of nitric acid (concentrated) and then with silver nitrate gave 0.75 g of silver bromide precipitate. 1.0 g of (x) gave 1.32 g of CO_2 gas on combustion. The percentage of hydrogen in the compound (x) is ____%.

[Nearest Integer]

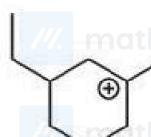
[Given: Molar mass in gmol^{-1} H : 1, C : 12, Br : 80, Ag : 108, O : 16; Compound (x) : $\text{C}_x\text{H}_y\text{Br}_z$]

Q21. 28 January Shift 2

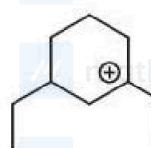
A.



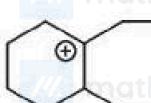
B.



C.



D.



The cyclic cations having the same number of hyperconjugation are :

Choose the correct answer from the options given below :

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

ANSWER KEYS

1. (3) 2. (4) 3. (4) 4. (4) 5. (3) 6. (4) 7. 43 8. (1)
9. (3) 10. (4) 11. (4) 12. (2) 13. (3) 14. (4) 15. 15 16. (2)
17. (1) 18. 73 19. (2) 20. 4 21. (3)

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