

# ORGANIC CHEMISTRY

NEET / AIIMS

CRASH COURSE

ISOMERISM

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**ISOMERISM**

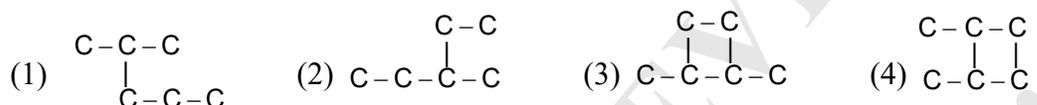
Q.1 Out of following carbon chains which one is different from other three chains –



Q.2  are –

- (1) Tautomers      (2) Functional      (3) Position      (4) All the above

Q.3 The name of which carbon chain starts from 'iso' in the following chains –



Q.4 The following classes of organic compounds exhibit metamerism except :

- (1) secondary amines      (2) esters      (3) ethers      (4) alkanols

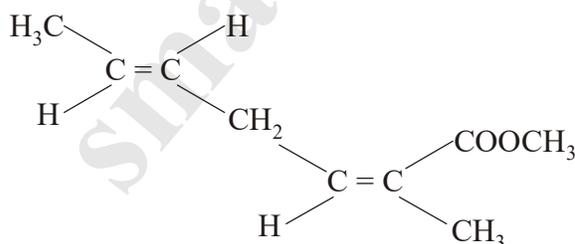
Q.5 In keto-enol tautomerism of dicarbonyl compounds, the enol form is preferred in contrast to the keto-form, this is due to

- (1) Presence of carbonyl group on each side of  $-\text{CH}_2-$   
 (2) Resonance stabilization of enol form  
 (3) Presence of methylene group  
 (4) Rapid chemical exchange.

Q.6 Tautomerism is not exhibited by -

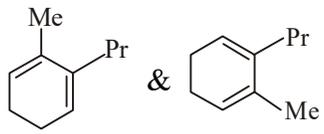
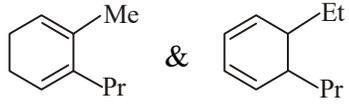
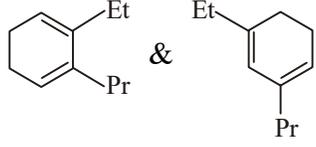
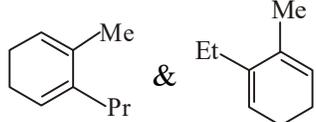


Q.7 The correct stereochemical name of



- (1) methyl 2-methylhepta (2E, 5E) dienoate  
 (2) methyl 2-methylhepta (2Z, 5Z) dienoate  
 (3) methyl 2-methylhepta (2E, 5Z) dienoate  
 (4) methyl 2-methylhepta (2Z, 5E) dienoate

Q.8 Which of the following has **incorrect** relation

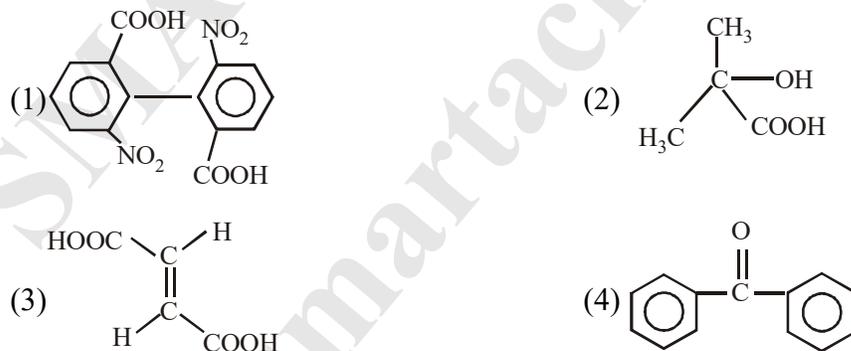
- (1)  identical
- (2)  positional isomers
- (3)  positional isomers
- (4)  homologues

Q.9 Given compound shows which type of isomerism

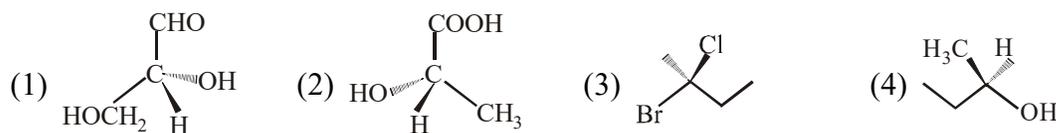


- (1) Chain isomerism  
 (2) Positional isomerism  
 (3) Metamerism  
 (4) Functional group isomerism

Q.10 Which compound would exhibit optical isomers—



Q.11 Which of the following structures has the S-configuration at the chiral centre ?



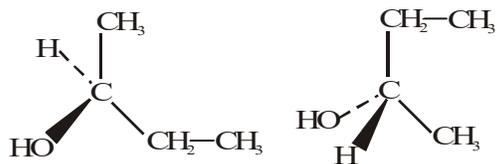




Q.24 Which conformation of butane will have the minimum energy :-

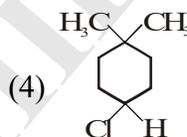
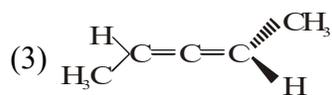
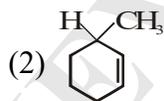
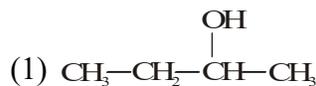
- (1) Gauche (2) Anti staggered (3) Eclipsed (4) None

Q.25 The pair of structures given below represents :

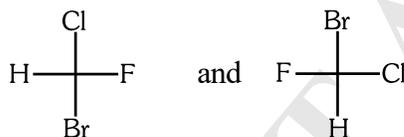


- (1) Enantiomers (2) Diastereomers (3) Homomers (4) Position isomers

Q.26 Which of the following compounds is optically inactive:



Q.27 The following two compounds are

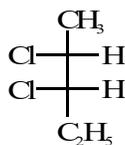


- (1) Enantiomers (2) Diastereomers (3) Identical (4) Epimers

Q.28 Compound is :-

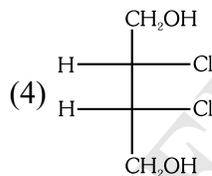
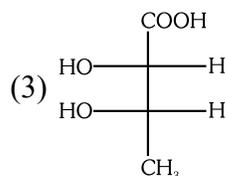
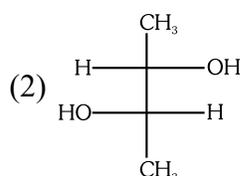
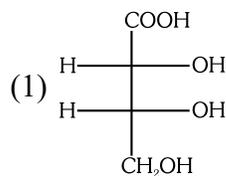
- (1) D-form (2) L-form (3) R-form (4) Z-form

Q.29 The absolute configuration of the compound is :

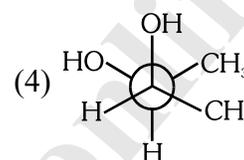
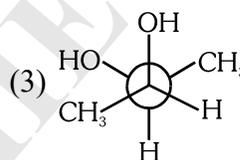
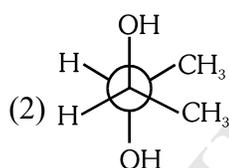
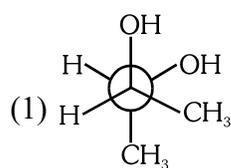


- (1) 2S, 3R (2) 2S, 3S (3) 2R, 3S (4) 2R, 3R

Q.30 Which one of the following is a meso-compound.



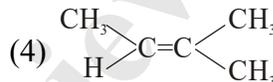
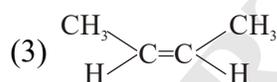
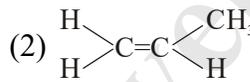
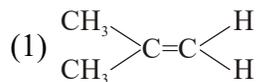
Q.31 Which one of the following is the most stable conformation of 2,3-butanediol :-



Q.32 How many isomers of  $C_5H_{11}OH$  will be primary alcohols :-

- (1) 2                                      (2) 3                                      (3) 4                                      (4) 6

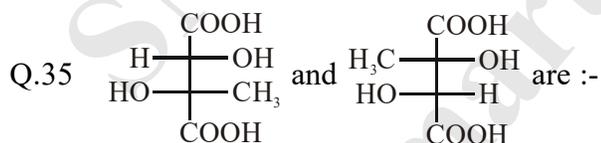
Q.33 Which can show 'Geometrical isomerism' :-



Q.34 The total number of configurational isomers of the given compound are :-



- (1) 2                                      (2) 4                                      (3) 6                                      (4) 8



- (1) Enantiomers                      (2) Position isomers                      (3) Geometrical isomers                      (4) Homomers

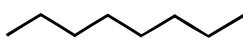
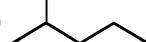
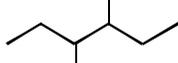
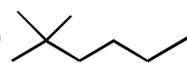
Q.36 Number of structural isomers of  $C_6H_{14}$  is -

- (1) 3                                      (2) 4                                      (3) 5                                      (4) 6

Q.37 Isomers have essentially identical :

- (1) Structural formula (2) Chemical properties  
(3) Molecular formula (4) Physical properties

Q.38 Which compound is not the isomer of 3-Ethyl-2-methylpentane ?

- (1)  (2)   
(3)  (4) 

Q.39  $\text{CH}_3 - \text{CH}_2 - \text{NH} - \text{CHO}$  ;  $\text{CH}_3 - \underset{\text{NH}_2}{\text{CH}} - \text{CHO}$

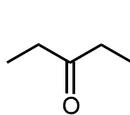
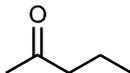
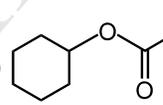
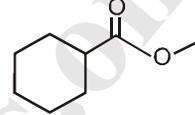
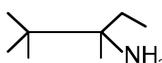
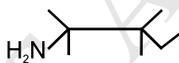
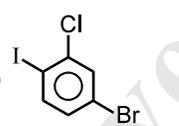
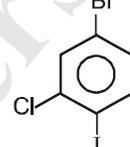
I

II

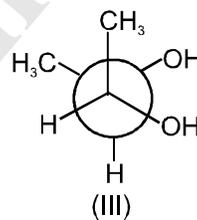
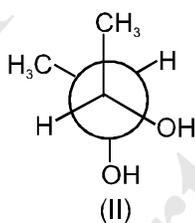
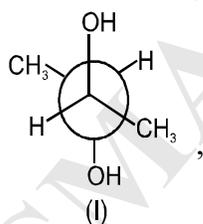
Which type of isomerism is observed between I and II.

- (1) Chain isomers (2) Position isomers (3) Functional isomers (4) Metamers

Q.40 Which of the following is a pair of metamers ?

- (1)   (2)    
(3)   (4)  

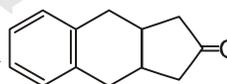
Q.41 Incorrect about the compounds I, II, III is :



- (1) I & II are diastereomers (2) I & III are identical  
(3) I & III are diastereomers (4) I & II are optically active

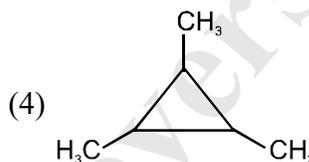
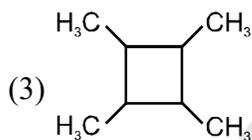
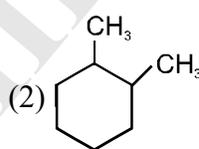
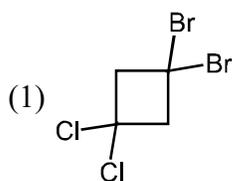
Q.42 *o*-Cresol & benzyl alcohol are :

- (1) Functional isomers (2) Position isomers (3) Chain isomers (4) All the above

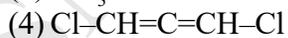
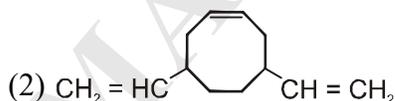
Q.43 Degree of unsaturation in  is :

- (1) 3 (2) 4 (3) 7 (4) 6.

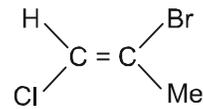
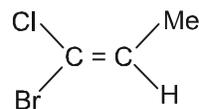
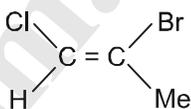
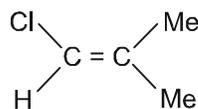
- Q.44 How many aromatic isomers are possible for trichlorobenzene ( $C_6H_3Cl_3$ )?  
 (1) 2 (2) 3 (3) 4 (4) 5
- Q.45 Total number of  $2^\circ$  amine isomers of  $C_4H_{11}N$  would be (only structural):  
 (1) 4 (2) 3 (3) 5 (4) 2
- Q.46 The number of structural isomers for  $C_5H_{10}$  is:  
 (1) 8 (2) 6 (3) 9 (4) 10
- Q.47 What should be the minimum conditions to show geometrical isomerism?  
 (1) Restricted rotation about double bond or ring  
 (2) Groups which are responsible to show geometrical isomerism differ in their relative distance  
 (3) Two different groups at both restricted atoms.  
 (4) All of these
- Q.48 Which of the following compound can not show geometrical isomerism?



- Q.49 Which of the following will not show geometrical isomerism?  
 (1)  $CH_3 - N = N - CH = CH_2$



- Q.50 Among the given compounds identify the pair of geometrical isomers :-



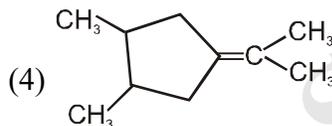
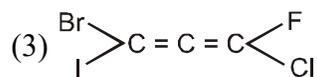
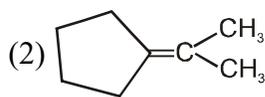
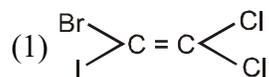
(1) I & II

(2) I & III

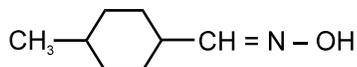
(3) II & IV

(4) III & IV

Q.51 Which of the following compound can show geometrical isomerism ?



Q.52 How many geometrical isomers are possible for the given compound ?



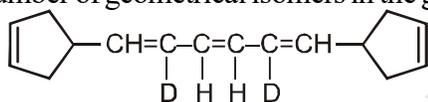
(1) 2

(2) 4

(3) 6

(4) 8

Q.53 Total number of geometrical isomers in the given compound is :



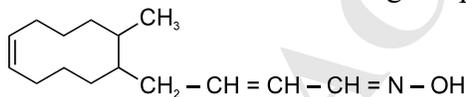
(1) 3

(2) 6

(3) 8

(4) 16

Q.54 No. of Geometrical isomers for following compound is :



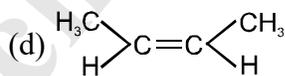
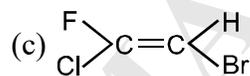
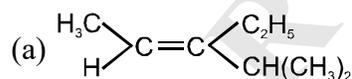
(1) 8

(2) 16

(3) 32

(4) 10

Q.55 The 'E'-isomer is/are :



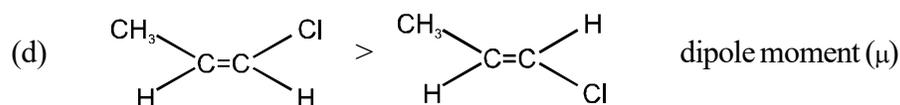
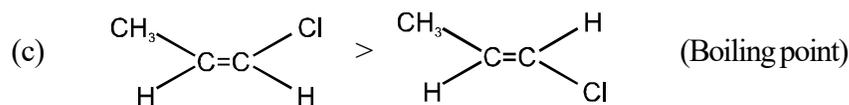
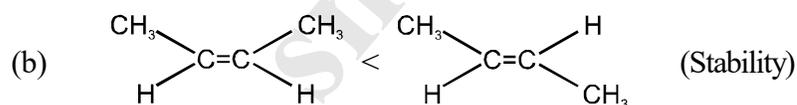
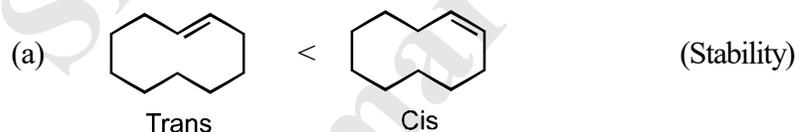
(1) only (a)

(2) only (b)

(3) (a) and (b)

(4) All

Q.56 The incorrect order with respect to the properties mentioned for the following pair of compounds is :



(1) (b), (c) and (d)

(2) (b) and (c)

(3) (a) and (d)

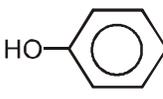
(4) (c) and (d)

Q.57 The correct order/s for the given pair of isomers is

- (1)  $\begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{H} \end{array} \begin{array}{c} \text{CH}_3 \\ \diagup \\ \text{C} \\ \diagdown \\ \text{H} \end{array} > \begin{array}{c} \text{CH}_3 \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{H} \end{array} \begin{array}{c} \text{H} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{CH}_3 \end{array}$  (Melting point)
- (2)  $\begin{array}{c} \text{H} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{HOOC} \end{array} \begin{array}{c} \text{H} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{COOH} \end{array} < \begin{array}{c} \text{H} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{HOOC} \end{array} \begin{array}{c} \text{COOH} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{H} \end{array}$  (Dipole moment)
- (3)  $\begin{array}{c} \text{H} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{Cl} \end{array} \begin{array}{c} \text{Cl} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{H} \end{array} > \begin{array}{c} \text{Cl} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{H} \end{array} \begin{array}{c} \text{Cl} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{H} \end{array}$  (Boiling point)
- (4)  $\begin{array}{c} \text{H}_3\text{C} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{H} \end{array} \begin{array}{c} \text{H} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{COOH} \end{array} > \begin{array}{c} \text{H}_3\text{C} \\ \diagdown \\ \text{C} = \text{C} \\ \diagup \\ \text{H} \end{array} \begin{array}{c} \text{COOH} \\ \diagup \\ \text{C} \\ \diagdown \\ \text{H} \end{array}$  (Water solubility)

Q.58 The necessary and sufficient condition for a molecule to be optically active :

- (1) It must contain asymmetric carbon atoms
- (2) It must be chiral atom
- (3) It must be identical with its mirror image
- (4) It must be non-superimposable with its mirror image

Q.59  will show :

- (1) Geometrical isomerism only
- (2) Optical isomerism only
- (3) Geometrical and optical isomerism
- (4) Neither geometrical nor optical isomerism

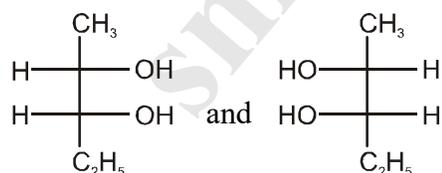
Q.60 Which of the following is an optically active compound ?

- (1) 1-Butanol      (2) 1-Propanol      (3) 2-Chlorobutane      (4) 4-Hydroxyheptane

Q.61 Meso form of tartaric acid is :

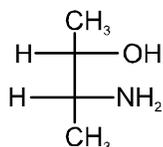
- (1) Dextro rotatory
- (2) laevorotatory
- (3) neither Laevo nor dextro rotatory due to internal compensation
- (4) A mixture of equal quantities of dextro and laevorotatory forms

Q.62 The following two compounds are :



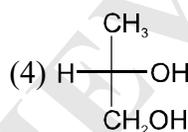
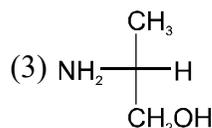
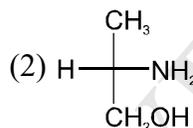
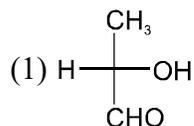
- (1) Enantiomers      (2) Diastereomers      (3) Identical      (4) Epimers

Q.63 The correct configuration assigned for given compound :

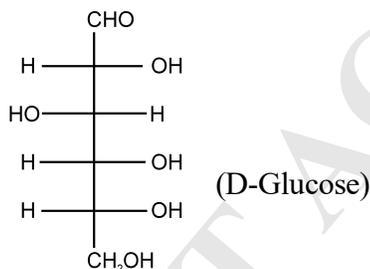


- (1) 2R, 3R                      (2) 2S, 3S                      (3) 2R, 3S                      (4) 2S, 3R

Q.64 Which of the following compound has 'D' configuration ?



Q.65 The correct IUPAC name of D-Glucose is :

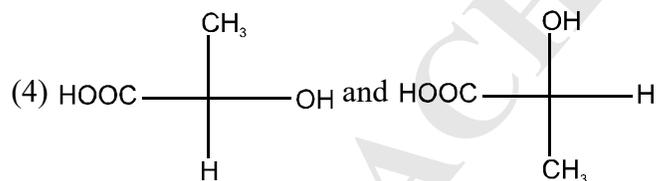
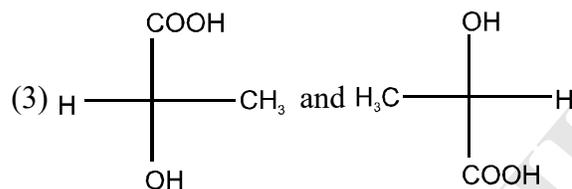
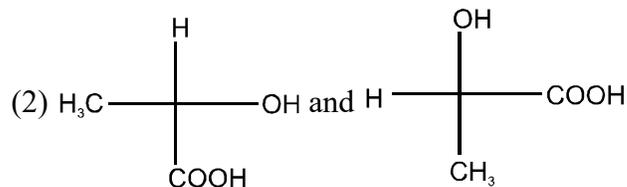
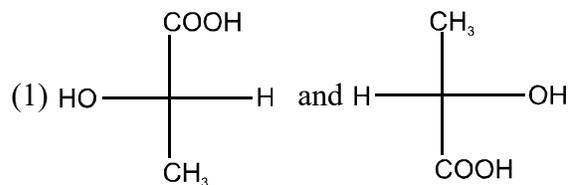


- (1) (2D, 3D, 4L, 5D) 2, 3, 4, 5, 6-pentahydroxyhexanal  
 (2) D-2, 3, 4, 5, 6-pentahydroxyhexanal  
 (3) 6-oxo-(2D, 3L, 4D, 5D) - 2, 3, 4, 5, 6-pentahydroxohexane  
 (4) (2D, 3L, 4D, 5D) - 2, 3, 4, 5, 6-pentahydroxyhexanal

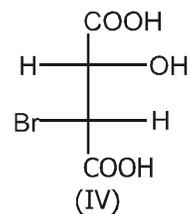
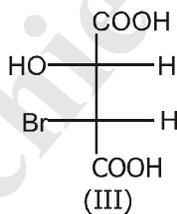
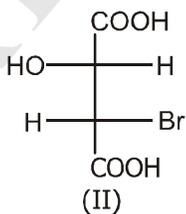
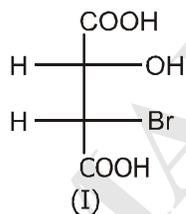
Q.66 Which of the following is not true for maleic acid and fumaric acid ?

- (1) Configurational isomers  
 (2) Stereo isomers  
 (3) Z and E isomers  
 (4) Optical isomers

Q.67 Which of the following pairs of structures represent enantiomers ?



Q.68 Which one among the following is not diastereomeric pair ?



(1) I and III

(2) I and II

(3) II and III

(4) I and IV

Q.69 How many stereoisomers (geometrical and optical) are possible for the following compound ?  
 $\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}(\text{OH})\text{COOH}$

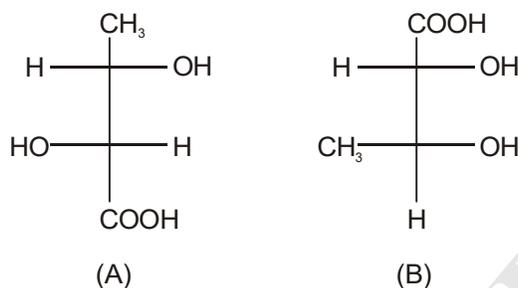
(1) 1

(2) 2

(3) 3

(4) 4

Q.70 Find relation between these two compounds A and B :



- (1) Enantiomer      (2) Diastereomer      (3) Meso      (4) Identical

Q.71 The eclipsed and staggered conformation of ethane is due to –

- (1) Free rotation about C–C single bond  
 (2) Restricted rotation about C–C single bond  
 (3) Absence of rotation about C–C bond  
 (4) None of the above

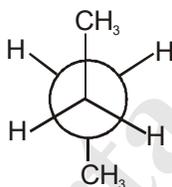
Q.72 In the complete rotation of butane from  $0^\circ$  to  $360^\circ$  the gauche (straggered) conformation appears

- (1) once      (2) Twice      (3) Thrice      (4) Four times

Q.73 Which of the following is associated with Torsional strain ?

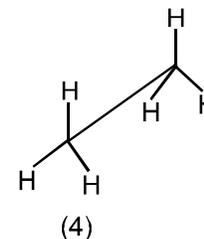
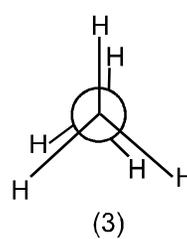
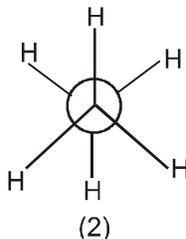
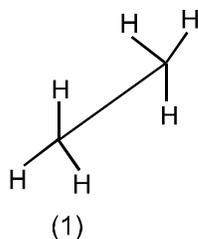
- (1) Repulsion between bond pair of electrons  
 (2) Inductive effect  
 (3) Bond angle strain  
 (4) Attraction of opposite charges

Q.74 In the given conformation  $\text{C}_2$  is rotated about  $\text{C}_2-\text{C}_3$  bond anticlockwise by an angle of  $120^\circ$  then the conformation obtained is :



- (1) Fully eclipsed conformation      (2) Partially eclipsed conformation  
 (3) Gauche conformation      (4) Staggered conformation

Q.75 In the following structures, which two forms are staggered conformation of ethane ?



- (1) 1 and 4      (2) 2 and 3      (3) 1 and 2      (4) 1 and 3

- Q.76 The correct order of stability of various conformers of 2-fluoroethanol is –
- (1) Anti > Gauche > Fully eclipsed > Partially eclipsed
  - (2) Gauche > Anti > Partially eclipsed > Fully eclipsed
  - (3) Anti > Partially eclipsed > Fully eclipsed > Gauche
  - (4) Fully eclipsed > Partially eclipsed > Gauche > Anti

### Assertion Reason Type Questions

Each of the questions given below consist of Statement – I and Statement – II. Use the following Key to choose the appropriate answer.

- (1) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (2) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (3) Assertion is true but Reason is false.
- (4) Both Assertion and Reason are false.

- Q.77 **Assertion** : Tertiary carbocations are generally formed more easily than primary carbocations.  
**Reason** : Hyperconjugation as well as inductive effect due to additional alkyl group stabilize tertiary carbocations.
- Q.78 **Assertion** : All the hydrogen atoms in but-2-ene lie in one plane.  
**Reason** : Carbon atoms in it are  $sp^2$  and  $sp^3$ -hybridized.
- Q.79 **Assertion** : Racemic mixture is optically inactive.  
**Reason** : Racemic mixture is mixture of meso structures.
- Q.80 **Assertion** : Boiling points of cis-isomers are higher than trans-isomers.  
**Reason** : Dipole moments of cis-isomers are higher than trans-isomers.

**ANSWER KEY**

|      |   |      |   |      |   |      |   |      |   |      |   |      |   |
|------|---|------|---|------|---|------|---|------|---|------|---|------|---|
| Q.1  | 2 | Q.2  | 2 | Q.3  | 1 | Q.4  | 4 | Q.5  | 2 | Q.6  | 2 | Q.7  | 4 |
| Q.8  | 2 | Q.9  | 3 | Q.10 | 1 | Q.11 | 2 | Q.12 | 4 | Q.13 | 3 | Q.14 | 2 |
| Q.15 | 3 | Q.16 | 2 | Q.17 | 4 | Q.18 | 2 | Q.19 | 2 | Q.20 | 3 | Q.21 | 2 |
| Q.22 | 1 | Q.23 | 2 | Q.24 | 2 | Q.25 | 3 | Q.26 | 4 | Q.27 | 1 | Q.28 | 2 |
| Q.29 | 3 | Q.30 | 4 | Q.31 | 3 | Q.32 | 3 | Q.33 | 3 | Q.34 | 4 | Q.35 | 4 |
| Q.36 | 3 | Q.37 | 3 | Q.38 | 2 | Q.39 | 3 | Q.40 | 2 | Q.41 | 4 | Q.42 | 1 |
| Q.43 | 3 | Q.44 | 2 | Q.45 | 2 | Q.46 | 4 | Q.47 | 4 | Q.48 | 1 | Q.49 | 4 |
| Q.50 | 3 | Q.51 | 4 | Q.52 | 2 | Q.53 | 2 | Q.54 | 2 | Q.55 | 3 | Q.56 | 4 |
| Q.57 | 4 | Q.58 | 4 | Q.59 | 3 | Q.60 | 3 | Q.61 | 3 | Q.62 | 1 | Q.63 | 4 |
| Q.64 | 3 | Q.65 | 4 | Q.66 | 4 | Q.67 | 2 | Q.68 | 1 | Q.69 | 4 | Q.70 | 4 |
| Q.71 | 1 | Q.72 | 2 | Q.73 | 1 | Q.74 | 3 | Q.75 | 3 | Q.76 | 2 | Q.77 | 1 |
| Q.78 | 4 | Q.79 | 3 | Q.80 | 1 |      |   |      |   |      |   |      |   |