



## CHEMISTRY

### BOOKS - A2Z CHEMISTRY (HINGLISH)

#### SOME BASIC PRINCIPALS OF ORGANIC CHEMISTRY


##### Inductive, Resonance, Mesomeric And Hyperconjugation

1. Inductive effect involve

- A. Delocalisation of  $\sigma$ -electrons
- B. Partial displacement of  $\sigma$ -electrons
- C. Delocalisation of  $\pi$ -electron
- D. Displacement of lone pair

**Answer: B**

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2. If  is mixed with  $NaOH$  solution, acid-base reaction occurs and snatches from organic molecule. Which carbon will lose easily?

A.  $P$

B.  $Q$

C.  $R$

D.  $S$

**Answer: A**

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3. The inductive effects of the group  $-CH_3$ ,  $-COO^-$ ,  $-Br$ ,  $-NH_3^+$  respectively are

A.  $+I$ ,  $-I$ ,  $+I$ ,  $+I$

B.  $-I$ ,  $+I$ ,  $-I$ ,  $+I$

C.  $-I$ ,  $-I$ ,  $+I$ ,  $+I$

D.  $+I$ ,  $+I$ ,  $-I$ ,  $-I$

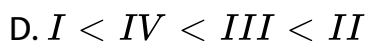
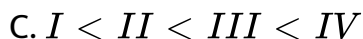
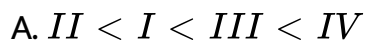
**Answer: D**

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4. What is the correct increasing order of extent of deprotonation of the following acids in its aqueous solution?

(I)  $(CH_3)_2CHCOOH$

(II)  $CH_3CH_2COOH$



**Answer: C**



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5. Select correct statement about *I* effect?

A. *I* effect transfers electrons from one carbon atom to another.

B. *I* effect is the polarisation of  $\sigma$  bond electrons.



C. *I* effect creates net charge in the molecule.

D. *I* effect is distance independent.

**Answer: B**

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6. Decreasing – *I* effect of given is:

(i)  $CN$ , (ii)  $NO_2$

(iii)  $NH_2$ , (iv)  $F$

A.  $iii > ii > i > iv$

B.  $ii > iii > iv > i$

C.  $iii > ii > iv > i$

D.  $ii > i > iv > iii$

**Answer: D**

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7. Which of the following group shows +I effects?

A.  $-Br$

B.  $-COOH$

C.  $-OR$

D.  $-COO-$

**Answer: D**

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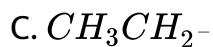
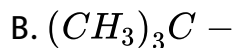
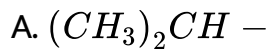
8. Find the strongest acid among the following compound

- A. Aspirin
- B. Oil of winter green
- C. O-methoxy carbonyl benzoic acid
- D. Sodium Carbonate

**Answer: C**

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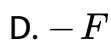
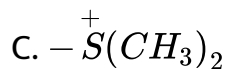
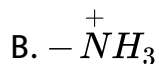
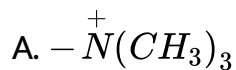
9. Which of the following alkyl groups has the maximum +I effect?



Answer: B

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10. Which of the following is the strongest  $-I$  group?

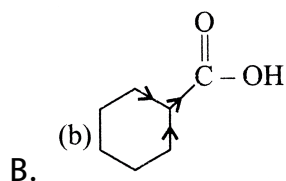


Answer: A

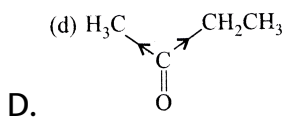
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11. In which of the following species, incorrect direction of Inductive effect is shown?

A. 



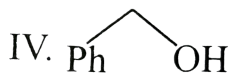
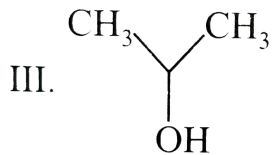
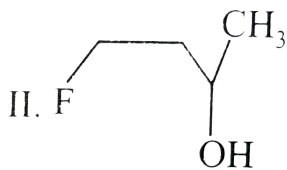
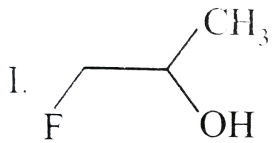
C. 



**Answer: D**

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12. The order of reactivity of the following alcohols towards conc. *HCl* is



I.

II.

III. IV.

A.  $I > II > III > IV$

B.  $I > III > II > IV$

C.  $IV > III > II > I$

D.  $IV > III > I > II$

**Answer: C**



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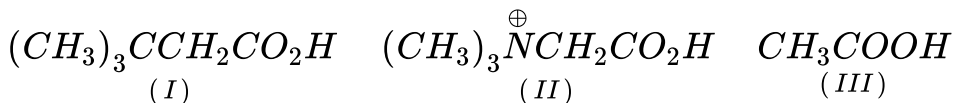
13.  $(CH_3)_3CCH_2COOH$  is more acidic than  $(CH_3)_3SiCH_2COOH$  because

- A. Size of  $Si$  is more than that of carbon
- B. Electronegativity of carbon is less than that of silicon
- C. Silicon is more electropositive than carbon due to which  $(CH_3)_3SiCH_2COO^-$  becomes less stable
- D. None of the above

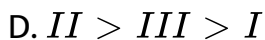
**Answer: C**

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14. For the following acids



$pK_a$  value will be in order



**Answer: C**

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15. Which of the following acids has the smallest dissociation constant?



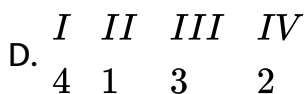
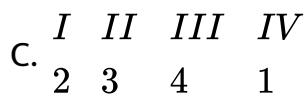
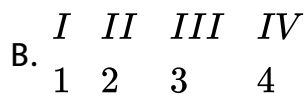
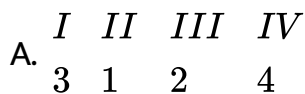
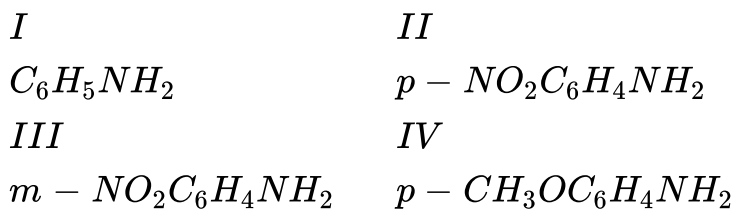




Answer: C

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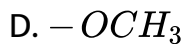
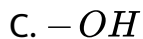
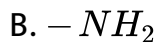
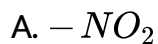
16. Assign number 1 for least to 4 for most to indicate the relative base strength of the following



**Answer: A**

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17.   $pK_a$  value of the compound decreases if  $X$  is:



**Answer: A**

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18. Which of the following pairs are resonating structures ?

A. 

B. 

C. 

D. 

**Answer: B**

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**19.** Which is the incorrect statement regarding resonance contributing structures?

A. All atoms in a contributing structures must have complete valence shells

B. All contributing structures must have same arrangement of atoms

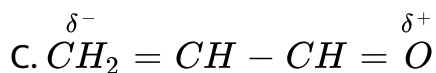
C. All contributing structures must have same number of valence electrons.

D. Equivalent resonance structures have same potential energies

**Answer: A**

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**20.** Polarization of electrons in acrolein may be written as:



**Answer: D**

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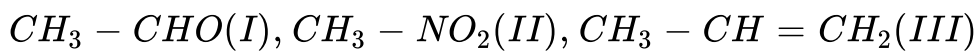
21. The bond order of individual carbon-carbon bond in benzene is

- A. One
- B. Two
- C. Between one and two
- D. One and two, alternately

**Answer: C**

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22. What is the decreasing order of acidic strength of the following compound for their most acidic hydrogen?



A.  $I > II > III$

B.  $III > II > I$

C.  $III > I > II$

D.  $II > I > III$

Answer: D

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23. Which is the most stable resonating structure?

A. 

B. 

C. 

D. 

**Answer: B**

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**24.** Resonance effect involves:

- A. Delocalisation of  $\pi$ -electrons along a conjugated system.
- B. Delocalization of lone pair along a conjugated system.
- C. Delocalisation of negative charge along a conjugated system.
- D. All are correct.

**Answer: D**

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**25. During delocalization, which statement is incorrect:**

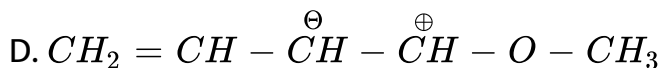
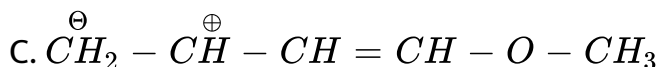
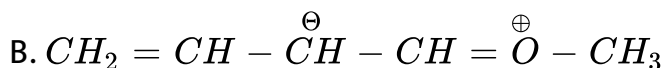
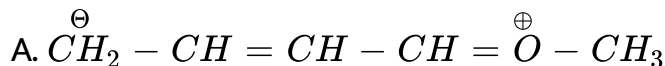
- A. Net charge remains same
- B. Number of paired electrons remain same
- C. Number of unpaired electrons remain same
- D. Energy of resonating structures remain same

**Answer: D**

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26. Which of the following resonating structures of 1-methoxy-1,3-butadiene is least stable?



Answer: C

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27.  $\text{KOH}$  can be used as drying agent for

A. carboxylic acids

B. phenols

C. amines

D. esters

**Answer: C**

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**28.** Which of the following statements is incorrect?

A. The energy of resonance hybrid is always less than that of any resonating structure.

B. The resonance energy is the difference between the enthalpies of formation of the molecule and the resonating structure having maximum energy.

C. The resonance structures are hypothetical structure and they do not represent any real molecule.

D. In delocalized structured of benzenes the  $\pi$ -charge cloud is spread equally above and below the plane of molecule.

**Answer: B**

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**29.** Which of the following statements regarding resonance is *NOT* correct?

A. the different resonating structures of atomic nuclei

B. the different resonating structures differ in the arrangement of electrons.

C. the hybrid structures has equal contribution from all the resonating structures always.

D. None of the individual resonating structure explain all characteristics of the molecule.

**Answer: C**

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**30. Resonance energy is:**

A. The potential energy difference between most stable resonating structures and resonance hybrid

B. The potential energy difference between the least stable resonating structures and resonance hybrid

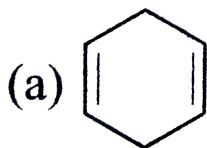
C. The potential energy difference between the least stable and most stable resonating structures.

D. None

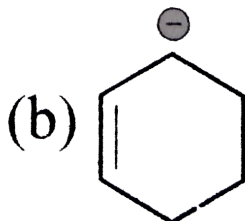
**Answer: A**

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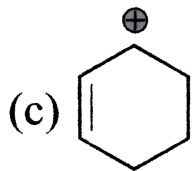
31. Which of the following species cannot show resonance?



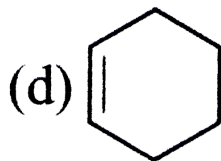
A.



B.



C.

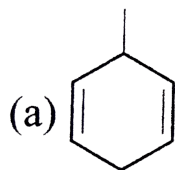


D.

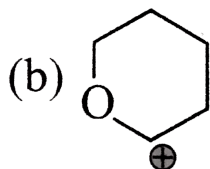
**Answer: A**

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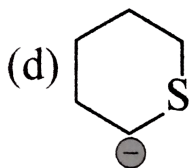
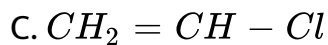
**32. Resonance is not possible in:**



A.



B.

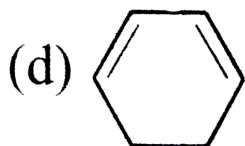
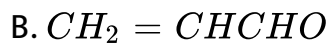
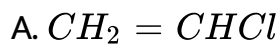


D.

**Answer: A**

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**33. Which does not have conjugate system?**

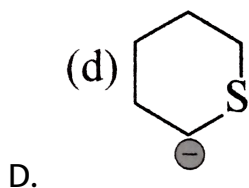
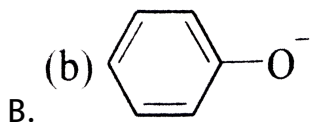
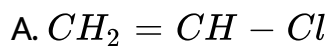


D.

Answer: C

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34. The compound which is not resonance stabilised

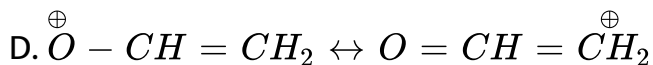
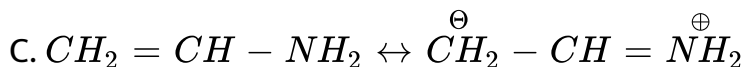
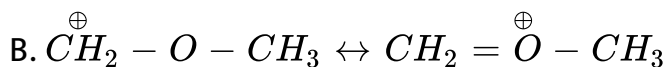
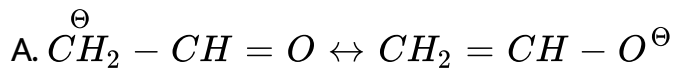


Answer: C

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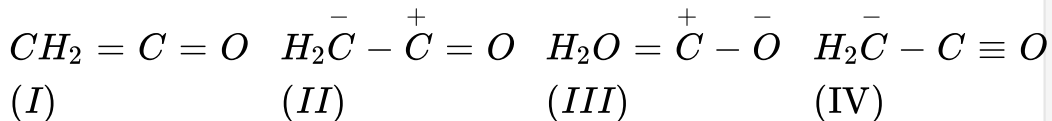
35. In which of the following first resonating structure is more stable than the second?

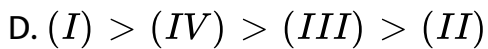
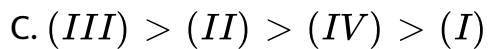
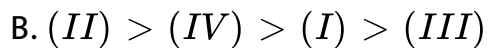
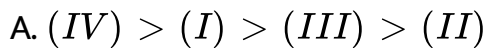


Answer: C

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36. The correct stability order of the following resonance structure is:

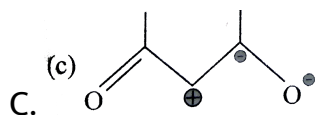
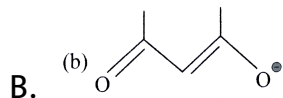
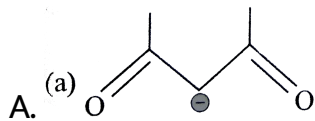




Answer: D

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37. Which is the most stable resonating structure?



D. 

**Answer: B**

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**38.** The correct stability order of given resonating structures



A.  $I > II > III > IV$

B.  $IV > III > II > I$

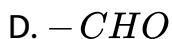
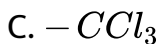
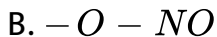
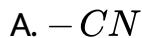
C.  $I = II = III = IV$

D.  $II = III > I = IV$

**Answer: D**

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39. Which of the following group shows  $+m$  effects?

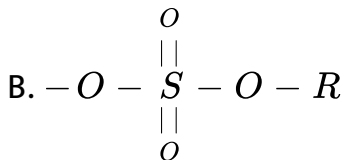
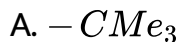


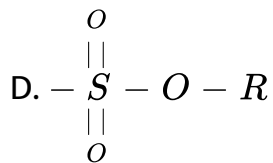
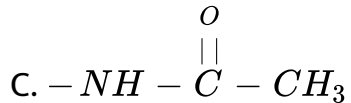
Answer: B



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40. Which of the following group show  $-m$  effect?

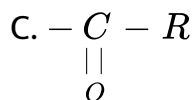
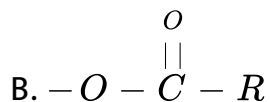
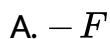




**Answer: D**

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**41.** Which of the following group shown  $+m > -I$  effect?

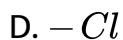
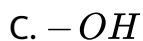
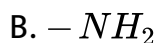
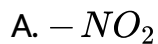


**Answer: B**



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42. Which of the following group show  $-m$  and  $-I$  effect?

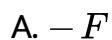


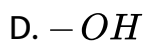
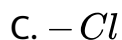
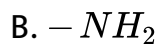
Answer: A



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43. Identify which of the following group as  $+M$  as well as  $-M$ ?

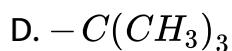
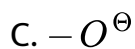
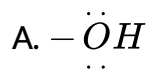




**Answer: C**

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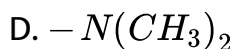
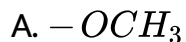
**44.**  $+m$  and  $+I$  both effects are shown by:



**Answer: C**

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45. The weakest  $+m$  group of the given species by:



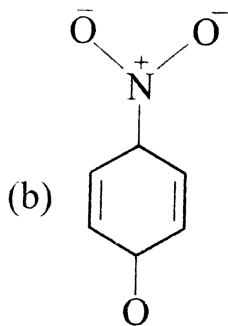
**Answer: C**

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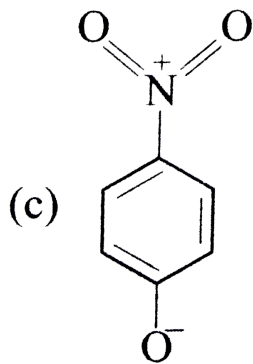
46. The most unlikely representation of resonance structure of  $p$ -nitrophenoxide ion is:



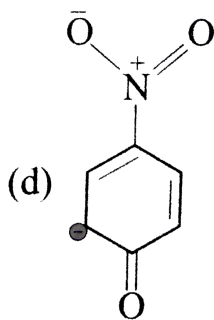
A. 



B.



C.



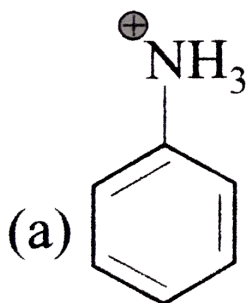
D.

Answer: C

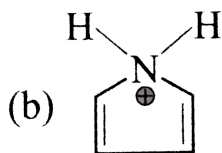


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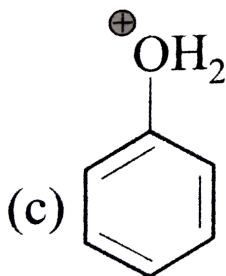
47. In which delocalisation of positive charge is possible?



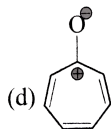
A.



B.



C.



D.

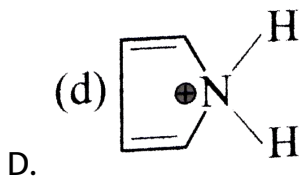
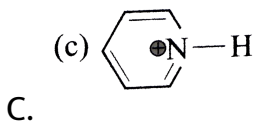
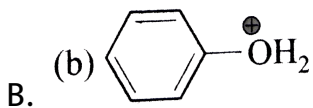
Answer: D



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48. Resonance stabilized cation is:

A. 



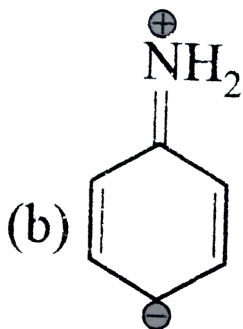
Answer: C



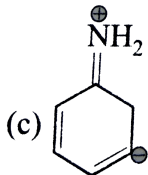
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49. Which of the following is not the correct resonating structure of  $C_6H_5NH_2$ ?

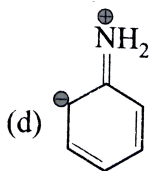
A. 



B.



C.



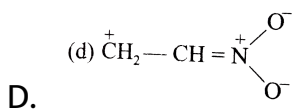
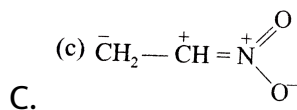
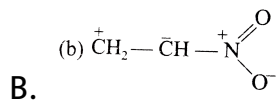
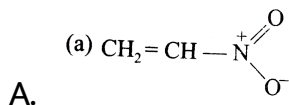
D.

Answer: C



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50. Least contributing resonating structure of nitroethene is:



Answer: C

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51. The least and most stable resonating structures respectively are:



A. 2,1

B. 2,3

C. 3,1

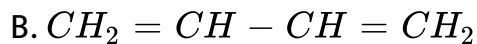
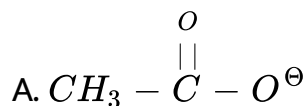
D. 1,2

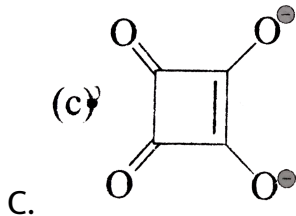
**Answer: C**



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52. Which of the following species does not have equally contributing resonating structures?

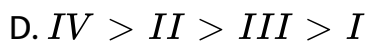
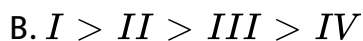




Answer: D

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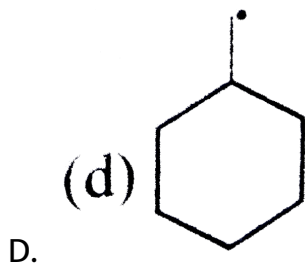
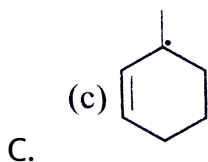
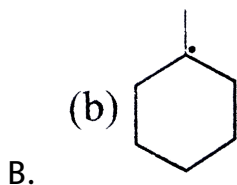
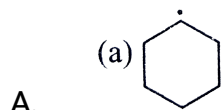
53. The correct order of electron density in aromatic ring of following compounds is:



Answer: D

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54. Most stable radical among the following is:

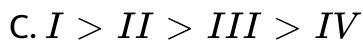
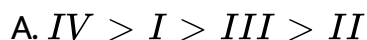
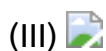
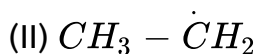
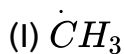




Answer: C

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55. Arrange the following radicals in decreasing order of their stability.



Answer: B



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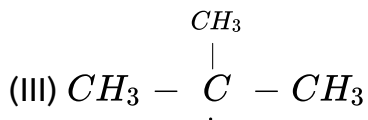
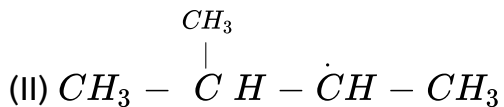
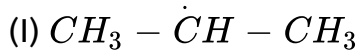
56. The hyperconjugative stabilities of tert-butyl cation and 2-butane, respectively, are due to

- A.  $\sigma$  to  $p$ (empty) and  $\sigma$  to  $\pi^*$  electron delocalisations
- B.  $\sigma$  to  $\sigma^*$  and  $\sigma$  to  $\pi$  electron delocalisations
- C.  $\sigma$  to  $p$  (filled) and  $\sigma$  to  $\pi$  electron delocalisations
- D.  $p$ (filled) to  $\sigma^*$  and  $\sigma$  to  $\pi^*$  electron delocalisations

**Answer: A**

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57. Arrange the following increasing order of number of hyperconjugation structures.



A.  $I < II < III$

B.  $II < I < III$

C.  $III < II < I$

D.  $II < III < I$

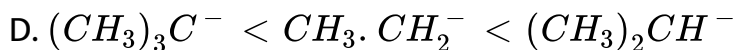
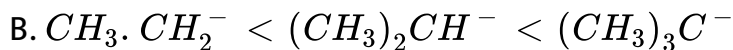
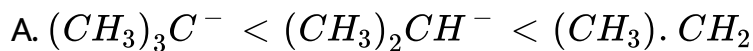
Answer: B



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58. Arrangements of  
 $(CH_3)_3C -$ ,  $(CH_3)_2CH -$ ,  $CH_3 \cdot CH_2 -$  when attached to

benzyl or  $n$  unsaturated group in increasing order of inductive effects is:



**Answer: D**

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**59.** Hyperconjugation involves the overlapping of the following orbitals :

A.  $p$ -and  $\pi$ -orbitals

B.  $2\pi$ -orbitals

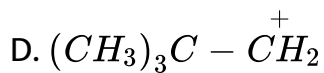
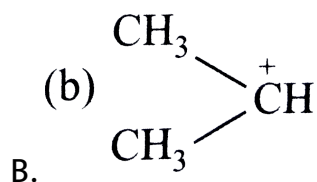
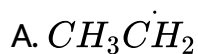
C. *d* and  $\pi$ -orbitals

D.  $\sigma$ - and *p*-orbitals

**Answer: D**

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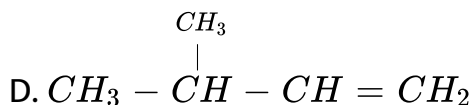
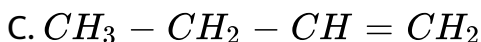
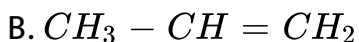
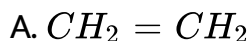
60. Which of the following cannot exhibit hyperconjugation?



**Answer: D**

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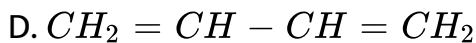
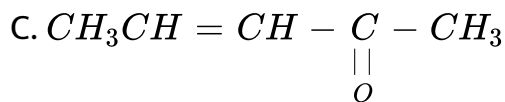
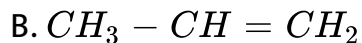
61. Which of the following alkenes will show maximum number of hyperconjugation forms?



Answer: B

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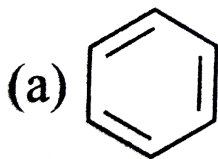
62. Which one of the following has inductive, mesomeric and hyperconjugation effect?



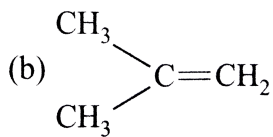
Answer: C

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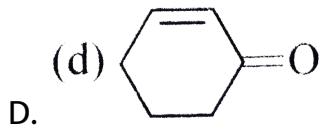
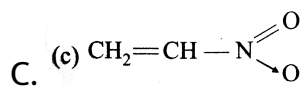
63. In which of the following  $C = C$  bond length is minimum?



A.



B.



**Answer: B**

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**64.** Which of the following is correct about the following compound



- A. All the  $C - C$  bond length are same
- B.  $C_1 - C_2$  bond length is shorter than  $C_2 - C_3$  bond length
- C.  $C_1 - C_2$  bond length is greater than  $C_2 - C_3$  bond length

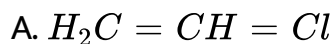


D. All the  $C - C$  bond length are equal to  $C - C$  bond length of benzene

**Answer: B**

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65. In which case the  $\sigma$  bond pair and  $\pi$  bond pair of electrons both are attracted in the same direction (towards same atom):



**Answer: C**

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66. The correct heat of hydrogenation order of



A.  $III > I > II > IV$

B.  $I > III > II > IV$

C.  $II > I > IV > III$

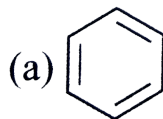
D.  $III > IV > II > I$

**Answer: D**

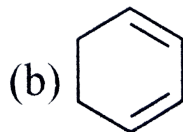
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67. The minimum magnitude of heat of hydrogenation per mole of molecule is of:

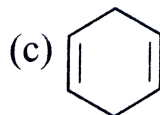
A.



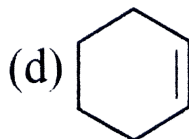
B.



C.



D.



**Answer: D**



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**Acid And Basic Strength**

1. Select the decreasing order of relative basic strengths of following species:



A.  $II > IV > I > III$

B.  $III > I > IV > II$

C.  $III > IV > I > II$

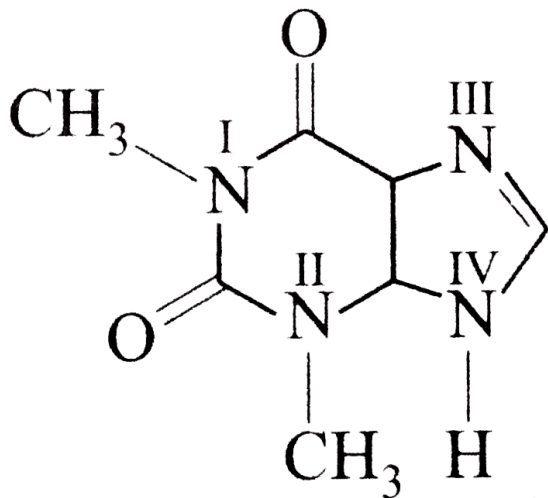
D.  $II > I > IV > III$

**Answer: D**



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2. The correct increasing order of basic strength of the labeled  $N$  is:



A.  $I < II < III < IV$

B.  $I < II < IV < III$

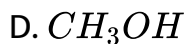
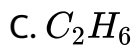
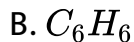
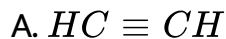
C.  $I < III < IV < II$

D.  $IV < III < II < I$

**Answer: B**

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3. Among the following compounds, the strongest acid is :

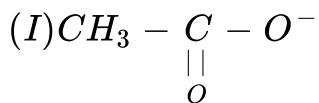


Answer: D

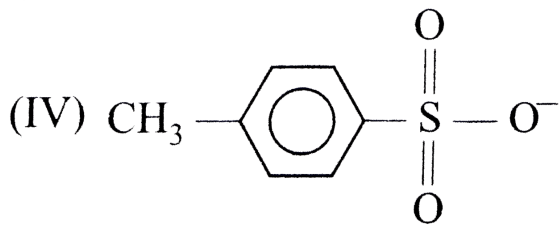


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4. The correct order of nucleophilicity among the following is:



(III)  $CN^-$



(iv)

A.  $I > II > III > IV$

B.  $IV > III > II > I$

C.  $II > III > I > IV$

D.  $III > II > I > IV$

**Answer: C**

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5. Find the order of basic strength, (if  $R = Me$ ).

(I)  $R_4OH^-$ , (II)  $R_3N$

(III)  $R_2NH$ , (IV)  $RNH_2$

A.  $I > III > IV > II$

B.  $IV > III > I > II$

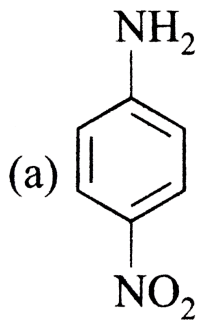
C.  $II > IV > III > I$

D.  $II > IV > I > III$

**Answer: A**

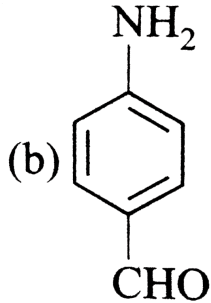
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6. Which is most basic in the following compounds?

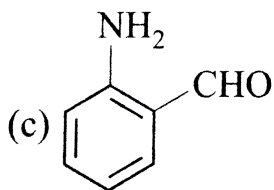


A.

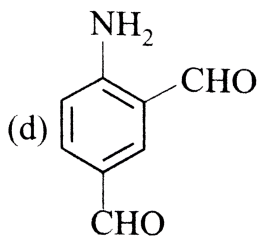




B.



C.



D.

**Answer: C**

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7. Select the basic order of following molecules.



A. (IV) > (I) > (III) > (IV)

B. (III) > (I) > (IV) > (II)

C. (II) > (I) > (III) > (IV)

D. (I) > (III) > (II) > (IV)

**Answer: D**

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8. Out of the following compounds, which will have a zero dipole moment?

A. 1, 1-dichloroethylene

B. cis-1, 2-dichloroethylene

C. trans-1, 2-dichloroethylene

D. None of these compounds

Answer: C

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9. Arrange the following in increasing order of basic strength



A.  $II < I < III < IV$

B.  $IV < III < II < I$

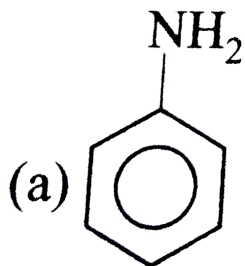
C.  $IV < III < I < II$

D.  $I < II < III < IV$

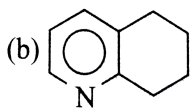
Answer: D

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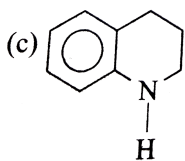
10. Choose the strongest base among the following:



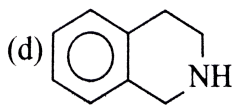
A.



B.



C.



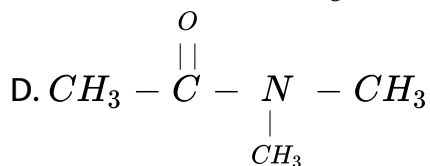
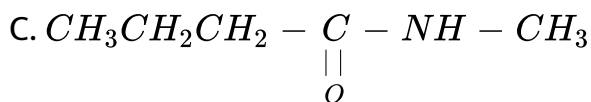
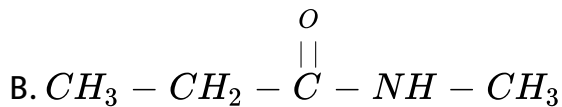
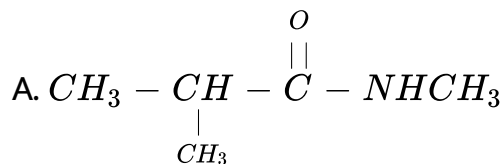
D.

Answer: D



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11. Which of the following has lowest melting point?



Answer: D

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12. Select the basic strength order of following molecules



A.  $III > II > I$

B.  $II > III > I$

C.  $I > III > II$

D.  $III > I > II$

**Answer: A**

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13. 

What is formed in the above reaction?

A. 

B. 

C. 

D. 

**Answer: D**

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14. Consider thiol anion ( $RS^{\ominus}$ ) and alkoxy anion ( $RO^{\ominus}$ ).

Which of the following statements is correct?

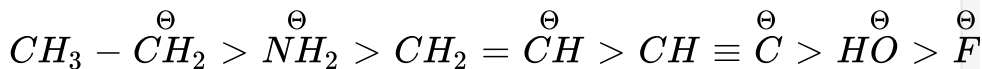
- A.  $RS^{\ominus}$  is less basic and less nucleophilic than  $RO^{\ominus}$
- B.  $RS^{\ominus}$  is less basic but more nucleophilic than  $RO^{\ominus}$
- C.  $RS^{\ominus}$  is more basic and more nucleophilic than  $RO^{\ominus}$
- D.  $RS^{\ominus}$  is more basic but less nucleophilic than  $RO^{\ominus}$

**Answer: B**

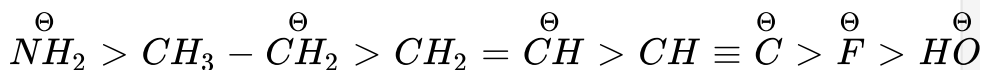
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15. The correct basic strength order of the following anions is:

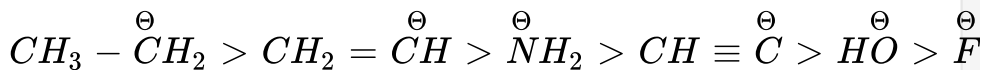
A.



B.



C.



D.  $\overset{\ominus}{\text{F}} > \overset{\ominus}{\text{O}} > \text{CH} = \overset{\ominus}{\text{C}} >$

$\text{CH}_2 = \overset{\ominus}{\text{C}}\text{H} > \overset{\ominus}{\text{N}}\text{H}_2 > \text{CH}_3 -$

$\overset{\ominus}{\text{C}}\text{H}_2$

Answer: C

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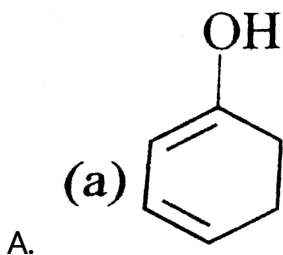
16. Which of the following has the most acidic hydrogen ?

- A. 3 – Hexanone
- B. 2, 4-Hexanedione
- C. 2, 5-Hexanedione
- D. 2, 3-Hexanedione

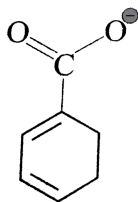
**Answer: B**

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17. Which of the following cannot be a base?

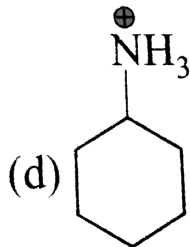


B. 



(c)

C.



(d)

D.

**Answer: D**

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18. 

Arrange above phenol in increasing order of  $pK_a$  value:

A.  $I < II < III$

B.  $III < I < II$

C.  $III < II < I$

D.  $I < III < II$

**Answer: C**

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19. Arrange the following compounds in decreasing order of their acidic strength.



A.  $IV < II < I < III$

B.  $I < II < III < IV$

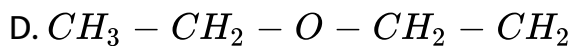
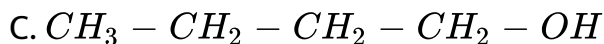
C.  $IV < II < III < I$

D.  $I < III < II < IV$

**Answer: A**

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**20.** Which compound would be least soluble in water?



**Answer: B**

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21. Identify the correct order of boiling points of the following

compounds:  $CH_3CH_2CH_2CH_2OH$ ,  $CH_3CH_2CH_2CHO$

$CH_3CH_2CH_2COOH$

A. 1 > 2 > 3

B. 3 > 1 > 2

C. 1 > 3 > 2

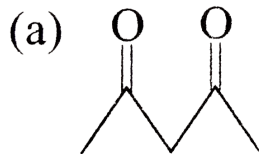
D. 3 > 2 > 1

**Answer: B**

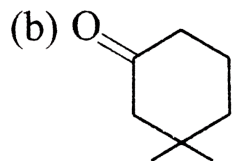


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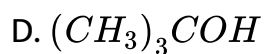
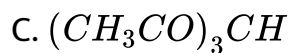
22. Most acidic hydrogen is present in:



A.



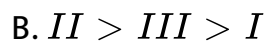
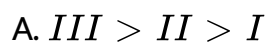
B.



Answer: d

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23. The decreasing order of electron density on the ring is:



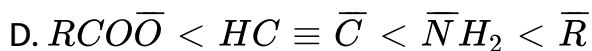
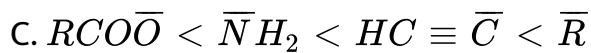
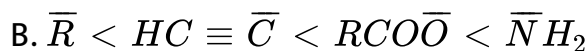
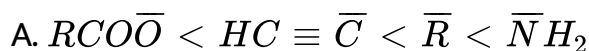
C.  $I > III > II$

D.  $III > I > II$

Answer: A

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24. The correct order of increasing basicity of the given conjugate bases ( $R = CH_3$ ) is



Answer: D

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25. Among the following compounds, the most acid is:

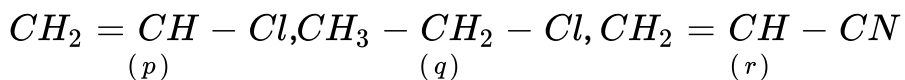
- A. *p*-nitrophenol
- B. *p*-hydroxybenzoic acid
- C. *o*-hydroxybenzoic acid
- D. *p*-toluic acid

**Answer: C**



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26. Correct dipole moment order is:



- A.  $r > q > p$



B.  $r > p > q$

C.  $q > r > p$

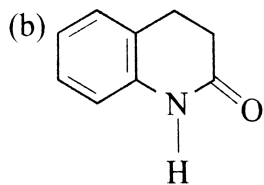
D.  $p > r > q$

**Answer: A**

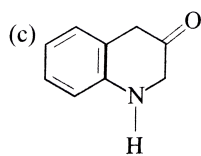
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27. Which of the following compound is the strongest base?

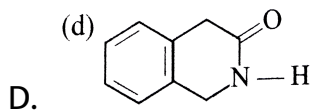
A. 



B.



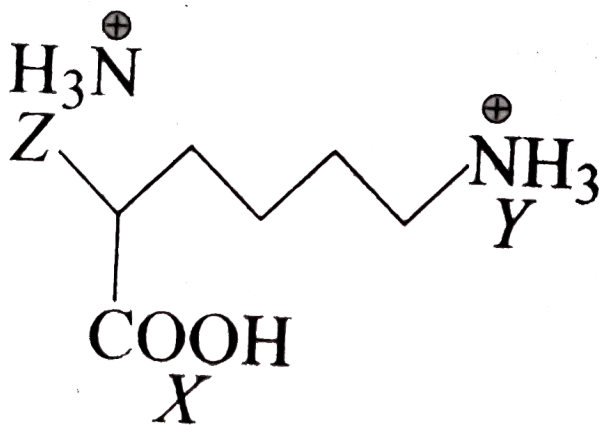
C.



Answer: A

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28. Arrange in the order of increasing acidic strengths.



A.  $X > Z > Y$

B.  $Z < X > Y$

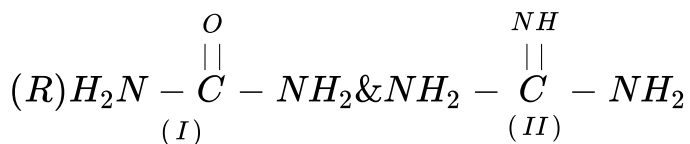
C.  $X > Y > Z$

D.  $Z > X > Y$

**Answer: A**

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**29.** Find more basic between following pairs of compounds?



A. (P) – (I), (Q) – (II), (R) – (I)

B. (P) – (II), (Q) – (I), (R) – (I)

C. (P) – (II), (Q) – (I), (R) – (II)

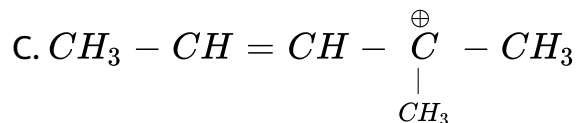
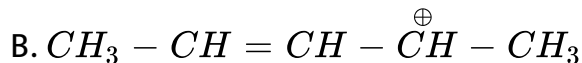
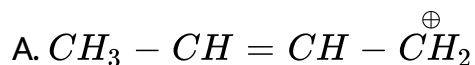
D. (P) – (II), (Q) – (II), (R) – (II)

**Answer: D**

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## Bond Fission, Reagents, Reactive Intermediates And Their Stability

1. Which allylic carbocation is most stable?

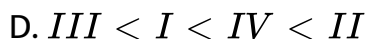
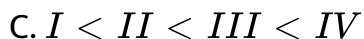
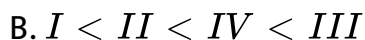
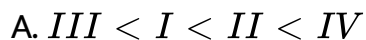


D. All have same stability

Answer: C

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2. What is the increasing order of basic strength of the following compounds in aqueous solution?



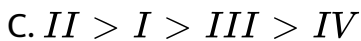
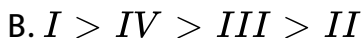
**Answer: A**

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3. In the following compounds,



The order of acidity is:

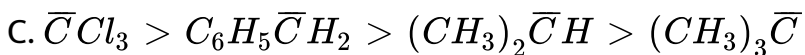
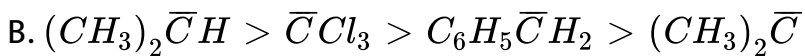
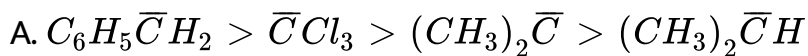


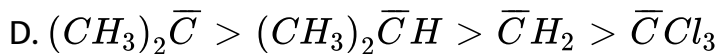
**Answer: D**

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4. Arrange the carbonions,

$(CH_3)_3\bar{C}$ ,  $\bar{C}Cl_3$ ,  $(CH_3)_2\bar{C}H$ ,  $C_6H_5\bar{C}H_2$  in order of their decreasing stability

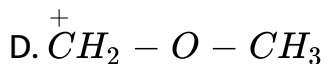
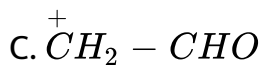
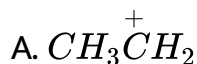




Answer: C

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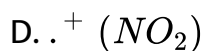
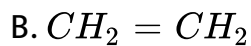
5. The most unstable carbocation is:



Answer: C

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6. Which of the following is not an electrophile?

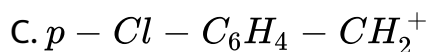
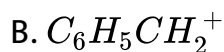
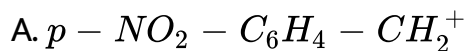


Answer: B

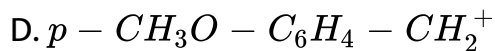


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7. Most stable carbonium ion is :



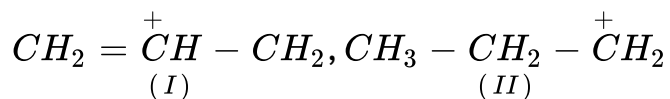


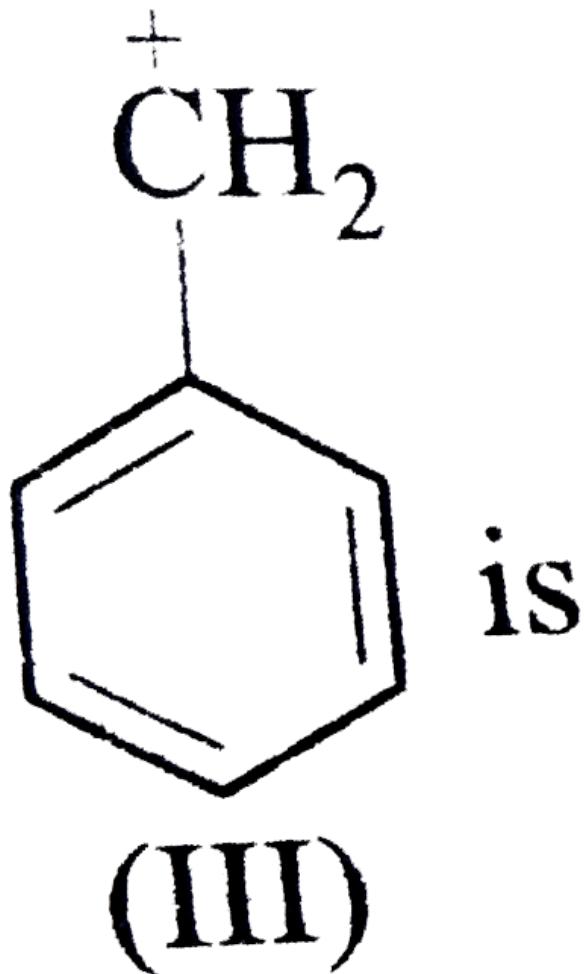


**Answer: D**

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**8.** The order of stability of the following carbocations





A.  $III > II > I$

B.  $II > III > I$

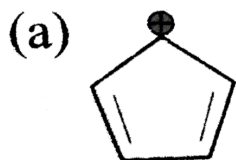
C.  $I > II > III$

D.  $III > I > II$

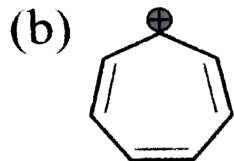
Answer: D

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9. The most stable carbocation is:



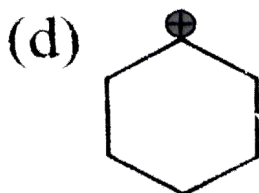
A.



B.



C.



D.

**Answer: B**

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**10. Write correct stability order of following compounds.**



A.  $2 > 4 > 3 > 1$

B.  $4 > 2 > 3 > 1$

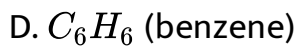
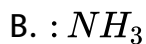
C.  $2 > 3 > 1 > 4$

D.  $1 > 2 > 3 > 4$

**Answer: A**

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11. Which of the following is not a nucleophile?

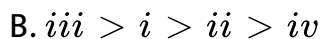
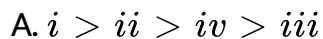


Answer: C



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12. The stability order of following carbocation is



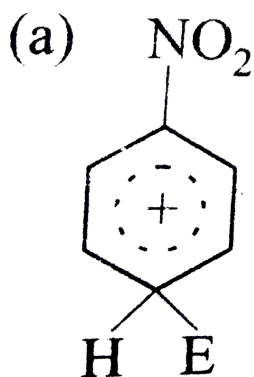
C.  $iv > ii > iii > i$

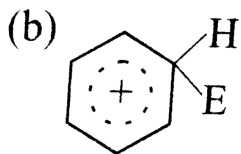
D.  $ii > iv > iii > i$

**Answer: D**

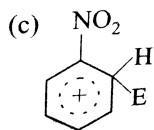
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13. The electrophile,  $E^{(\oplus)}$  attacks the benzene ring to generate the intermediate  $\sigma$ -complex. Of the following which  $\sigma$ -complex is of lowest energy?

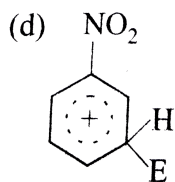




B.



C.



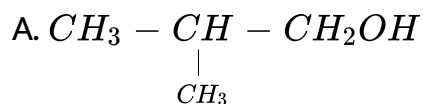
D.

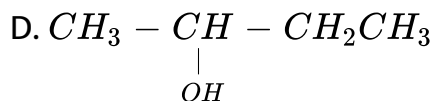
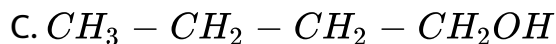
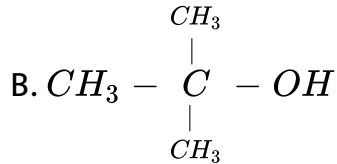
**Answer: B**



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**14.** The compound which would give the most stable carbocation on dehydration is :

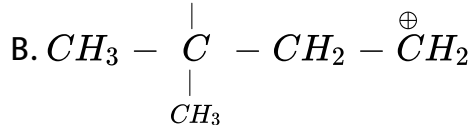
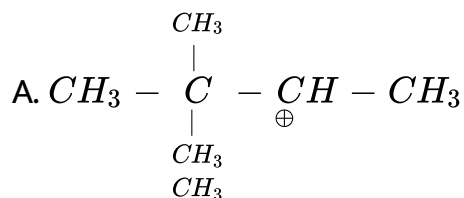
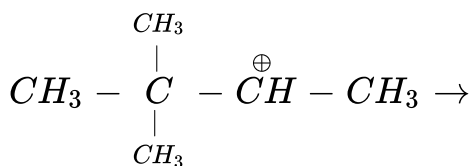




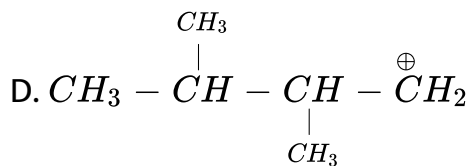
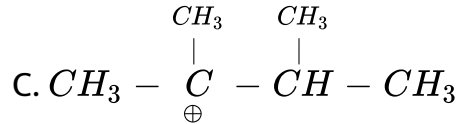
**Answer: B**

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**15.** Which of the following is the rearranged more stable carbocation of the given species?







Answer: C

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16. Which of the following is the rearranged more stable carbocation of the given species?



A. 

B. 

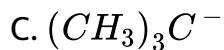
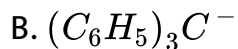
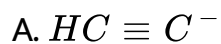
C. 

D. 

**Answer: B**

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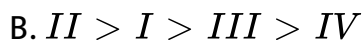
17. Which of the following is the least stable carbanion?



**Answer: C**

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18. Arrange the following carbocation in decreasing order of stability.



**Answer: B**

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19. Arrange the following carbocation in decreasing order of stability.



A.  $III > I > IV > I$

B.  $III > II > I > IV$

C.  $I > III > II > IV$

D.  $III > I > II > IV$

**Answer: D**

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20. Among the following, the paramagnetic species is:

A. Free radical

B. Carbonium ion

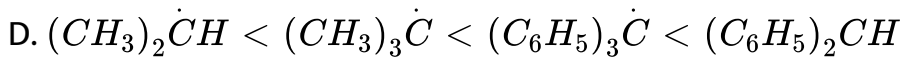
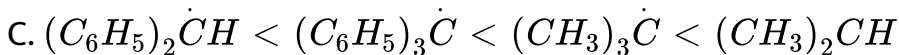
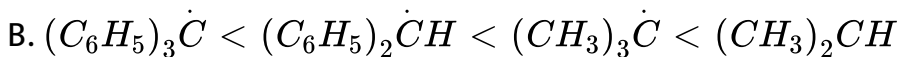
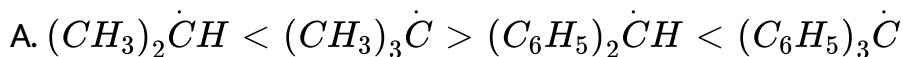
C. Carbanion

D. All the three

Answer: A

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21. The increasing order of stability of the following free radicals is:



Answer: A

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22. The hybrid state of positively charged carbon in vinyl ( $CH_2 = CH^+$ ) cation is :

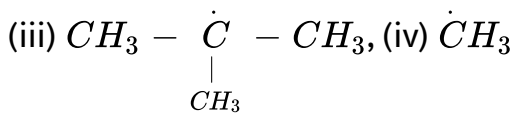
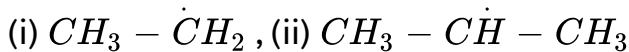
- A. The carbon is  $sp^2$  hybridised to minimize angle strain around pi-bond
- B. The carbon is  $sp$  hybridised to maximize  $s$ -character in the orbital with the lone pair
- C. The carbon is  $sp$  hybridized to minimize repulsion between the bonding and non-bonding electrons
- D. The carbon is  $sp$  hybridized to help to stabilize the orbital with the lone pair.

**Answer: B**



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23. The stability of given free radicals in decreasing order is



A.  $iii > iv > i > ii$

B.  $i > ii > iii > iv$

C.  $iii > ii > iv > i$

D.  $iii > ii > i > iv$

Answer: D



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24. Which of the following is the correct order of stability of free radicals?

A. benzyl > allyl > 2° > 1°

B. allyl > benzyl > 2° > 1°

C. allyl > 2° > 1° > benzyl

D. benzyl > 2° > 1° > allyl

**Answer: A**

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25. In the following carbocations, the stability order is:



A. *III* > *II* > *IV* > *I*

B. *IV* > *I* > *II* > *III*

C. *IV* > *III* > *II* > *I*

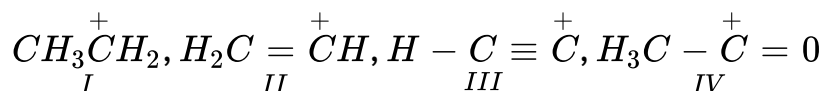
D. *III* > *IV* > *II* > *I*



Answer: A

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26. The decreasing order of stability of the following cations is



A.  $I > III > II > IV$

B.  $IV > III > II > I$

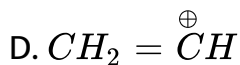
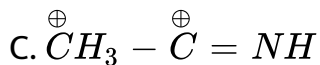
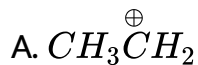
C.  $III > IV > II > I$

D.  $II > I > III > IV$

Answer: B

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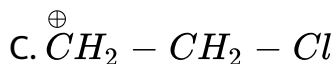
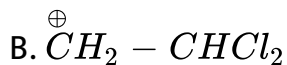
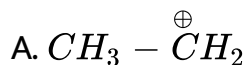
27. Which of the following is most stable carbocation?

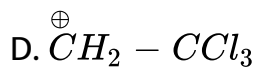


Answer: C

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28. Which of the following is most stable carbocation?

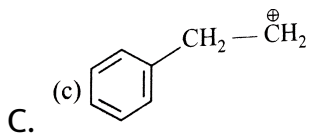
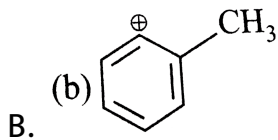
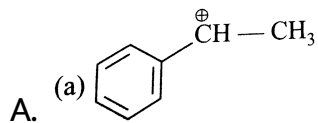




Answer: A

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29. The most stable carbocation is:

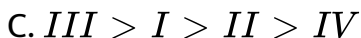
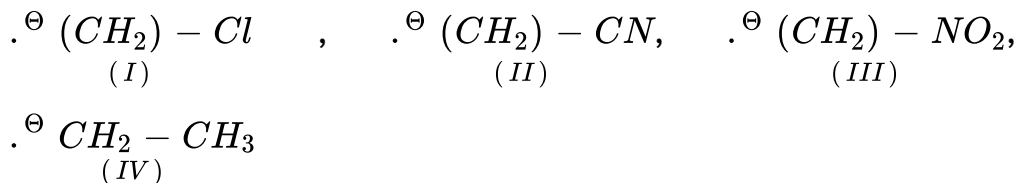


D. 

Answer: D

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30. Arrange the following carbanions in decreasing order of stability:

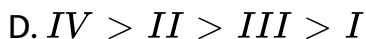
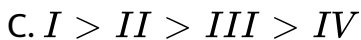
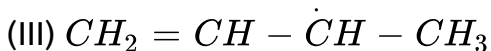
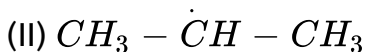
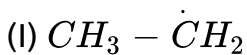


Answer: B



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31. Give the stability order of following radicals:

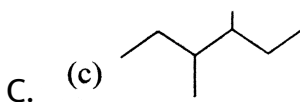
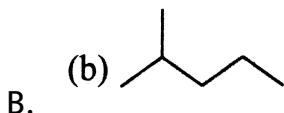
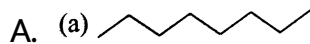


**Answer: B**



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



**Answer: B**

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2. The compound which is not isomeric with diethyl ether is :

A. *n*-propyl methyl ether

B. butan-1-ol

C. 2-methylpropan-2-ol

D. butanone

**Answer: D**



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**3. Which of the following statements are correct?**

(I) A pair of positional isomers differs in the position of the same functional group.

(II) A pair of structural isomers have the same relative molar mass.

(III) A pair of functional group isomers belongs to different homologous series.

**A. II and III**

B. *I* and *III*

C. *I* and *II*

D. *I*, *II* and *III*

**Answer: C**



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4. An isomer of ethanol is:

A. methanol

B. diethyle ether

C. acetone

D. dimethyl ether

**Answer: D**



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5. The number of isomers of  $C_6H_{14}$  is:

A. 4

B. 5

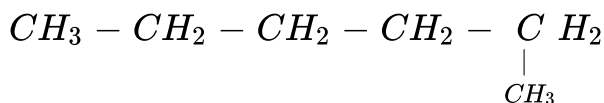
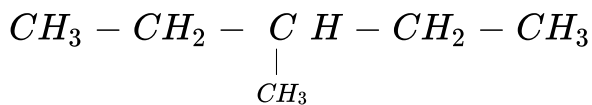
C. 6

D. 7

**Answer: B**

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6. What is the correct relationship between the following compounds?



- A. Chain isomers
- B. Position isomers
- C. Functional isomers
- D. Identical

**Answer: A**

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7. Which of the following statements regarding ethanoic acid and methyl methanoate are correct?

(I) They are functional group isomers with molecular formula  $C_2H_4O_2$ .

(II) They belong to different homologous series

(III) They have different chemical properties.

A. *I* and *II*

B. *I*, *II* and *III*

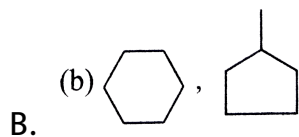
C. *II* and *III*

D. *I* and *III*

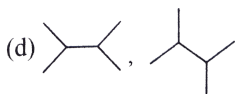
**Answer: D**

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8. Which of the following pairs is the chain isomer?



C. 



D.

**Answer: B**

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9. Which of the following statements concerning 3, 4-dibromo-1-pentane and 3, 5-dibromo-2-pentane are correct?

(I) They have same molecular formula  $C_5H_8Br_2$

(II) They are positional isomers.

(III) They have similar chemical properties.

A. *I* and *III*

B. *I* and *II*

C. *II* and *III*

D. *I*, *II* and *III*

**Answer: B**

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10. What is the relation between 3-Ethylpentane and 3-Methylhexane?

- A. Chain isomers
- B. Position isomers
- C. Functional isomers
- D. Relation

**Answer: A**

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11. How many structural isomers  $C_4H_8$  have?

A. 5

B. 4

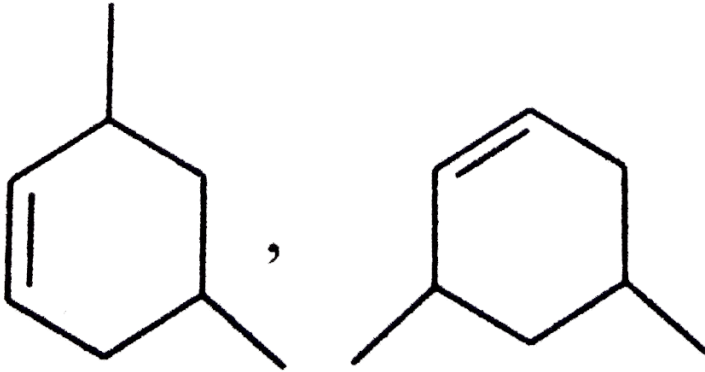
C. 3

D. 6

**Answer: A**



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12.

Relation between the above compound is:

- A. Position isomers
- B. Chain isomers
- C. Identical
- D. Functional isomer

**Answer: C**



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13. Constitutional isomerism is possible in alkanes only if the number carbon atoms present is

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14. Total number of position isomers of dimethyl cyclohexane.

A. 2

B. 3

C. 4

D. 5

**Answer: C**

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15. How many structural isomers (aldehyde+ketone) are possible for  $C_5H_{10}O$ ?

A. 3

B. 7

C. 6

D. 4

**Answer: B**



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16. Which of the following shows functional isomerism?

A.  $CH_3CH_2Cl$  and  $CH_3CH_2Br$

B.  $CH_3CH_2Br$  and  $CH_2BrCH_2Br$

C.  $C_2H_5OC_2H_5$  and  $CH_3OC_3H_7$

D.  $CH_3CH_2CHO$  and  $CH_3COCH_3$

**Answer: D**

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17. Organic compound containing carbon, hydrogen and nitrogen, can be either amine or nitrile. How many amine isomers are possible with molecular formula  $C_4H_{11}N$ ?

A. 8

B. 6

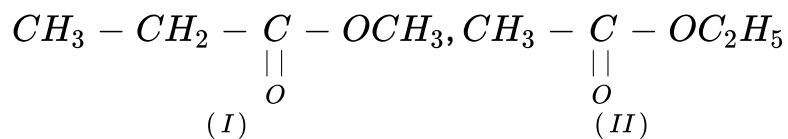
C. 7

D. 4

Answer: A

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18. Which type of isomerism is observed between *I* and *II*?



- A. Functional isomerism
- B. Metamerism
- C. Position isomerism
- D. Stereoisomerism

Answer: B

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19. How many different structural isomers exist for  $C_3H_6O$  in which no atom is  $sp^2$  or  $sp$ -hybridised?

A. 2

B. 5

C. 4

D. 3

**Answer: D**

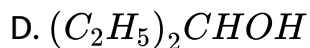
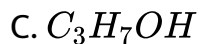


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20. The isomer of diethyl ether is

A.  $(CH_3)_2CHOH$

B.  $(CH_3)_3COH$



**Answer: B**

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21. How many structural isomer exist for  $C_7H_8O$  where each isomer contain a phenyl ring?

A. 5

B. 4

C. 3

D. 6

**Answer: A**

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22. How many structural isomers of tertiary amines corresponding to molecular formula  $C_6H_{15}N$  are possible?

A. 4

B. 5

C. 6

D. 7

**Answer: D**

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23. What is wrong about enantiomers of 2-chloropropanoic acid?

A. Have same solubility in water

B. Have same rate of reactions with  $(+) - 2 -$  butanol

C. Have same refractive indices

D. Have same  $pK_a$  value

**Answer: B**



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**24.** How many structural isomers are possible for compound containing  $C$ ,  $H$  and  $O$  atoms only with their molar masses 100 as well as the isomers are simultaneously ketons?

A. 3

B. 4

C. 5

D. 6

**Answer: D**



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**25.** Which of the following compound are structural isomers of



(I) 2-methyl butanal

(II) Propyl ethanoate

(III) Pentanal

A. *I* and *II*

B. *I* and *III*

C. *II* and *III*

D. *I*, *II* and *III*

**Answer: B**





26. How many structural isomers are possible for compound containing  $C$ ,  $H$  and  $O$  atoms only with their molar masses 100 as well as the isomers are simultaneously ketons?

A. 5

B. 6

C. 7

D. 8

**Answer: B**

27. An organic compound has three ether isomers and it is the smallest ether which satisfy this condition. Which of the following is true regarding this compound?

- A. Only one alcohol isomers exist
- B. Four alcohol isomers exist and they are constitutional isomers
- C. Five alcohol isomers exist and they are possibility isomers of each other
- D. Molecule formula of the compound is  $C_5H_{12}O$

**Answer: B**

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28. How many amide isomers are possible for  $C_4H_9ON$ ?

A. 4

B. 5

C. 6

D. 8

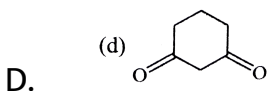
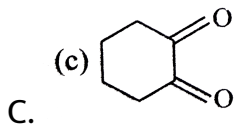
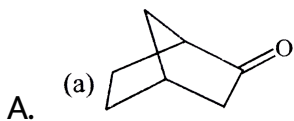
**Answer: D**



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## Tautomerism

1. Among the following compounds, one that will not shown keto-enol tautomerism is



**Answer: B**

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2. Which statements about tautomerism is incorrect?

A. Tautomers always exist in equilibrium.

B. Tautomers can be separated by physical / chemical process.

- C. Tautomerism is a chemical phenomenon which takes place in liquid and gaseous state and catalysed by acid as well as base.
- D. All tautomers are always functional group isomers.

**Answer: D**

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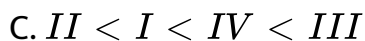
3. The enolic form of acetone contains:

- A.  $8\sigma$  bonds,  $1\pi$  bond and 2 lone pairs
- B.  $8\sigma$  bond,  $2\pi$  bond and 2 lone pairs
- C.  $10\sigma$  bond,  $1\pi$  bond and 1 lone pair
- D.  $9\sigma$  bond,  $2\pi$  bond and 1 lone pair

**Answer: A**

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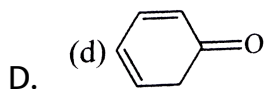
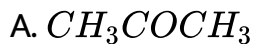
4. Arrange the following in the increasing order of stability of their most stable enol.



**Answer: B**

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5. Maximum enolisation takes place in



Answer: D

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6. In hexane-2,4-dione, how many different mono-enols are possible?

A. 7

B. 3

C. 4

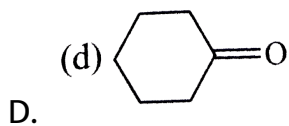
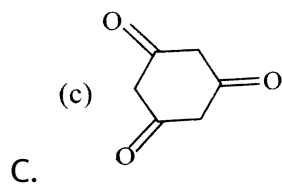
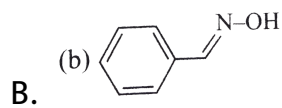
D. 6

**Answer: A**

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7. Tautomerism is not exhibited by

A. 

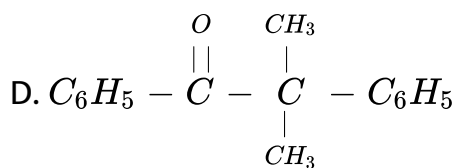
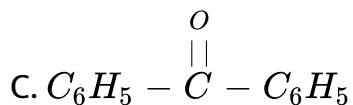
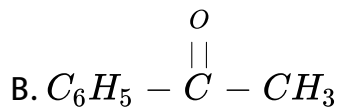
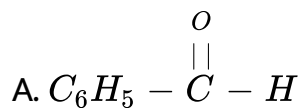




Answer: A

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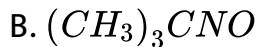
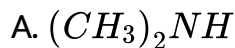
8. Keto-enol tautomerism is observed in



Answer: B

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9. Tautomerism will be exhibited by

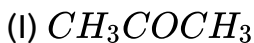


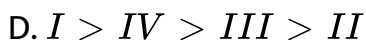
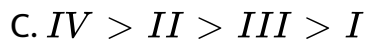
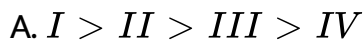
Answer: D



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10. What is the correct order of equilibrium enol content of the following compounds?

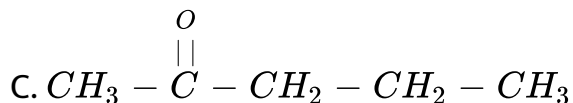
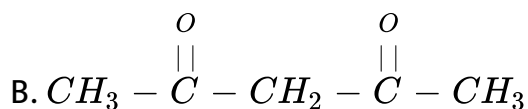
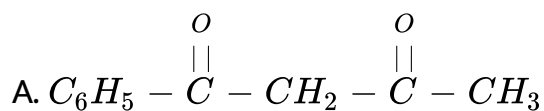


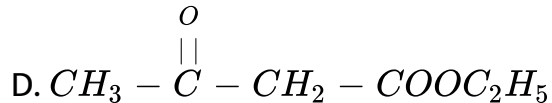


**Answer: B**

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11. Which among the following compounds will give maximum enol content in solution?

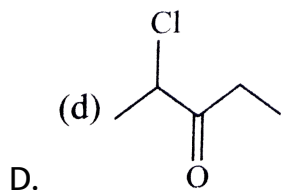
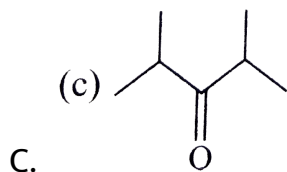
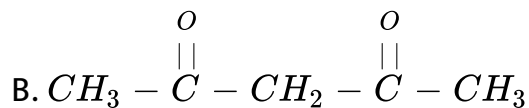
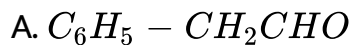




Answer: A

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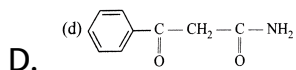
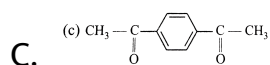
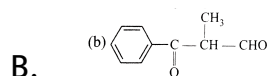
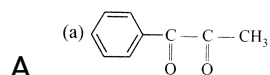
12. Which of the following has greater enol content than keto counterpart?



Answer: B

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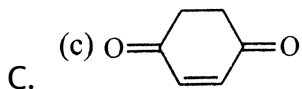
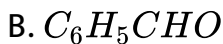
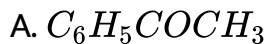
13. Which of the following has highest % enol content in the liquid?



Answer: B

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14. In which of the following compound, enol form exists?

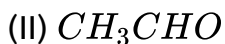
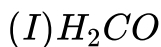


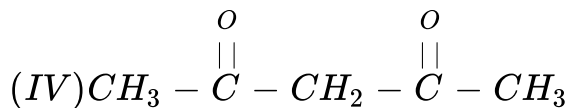
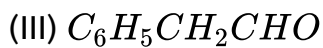
D. Both (a) and (c)

**Answer: D**

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15. Arrange the following in the increasing order of acidic strength





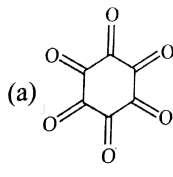
**Answer: A**



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**16.** The most stable keto isomer of the following compound

 is



A.

B. 

C. 

D. 

**Answer: C**

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## Geometrical Isomerism

1. What is incorrect about geometrical isomerism?

A. In organic compounds, presence of a double bond is essential for geometrical isomerism.



B. Geometrical isomers can be separated by fractional distillation

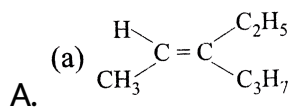
C. It arises due to restricted rotation of atoms or groups about double bond

D. A pair of geometrical isomers are simultaneously a pair of diastereomers

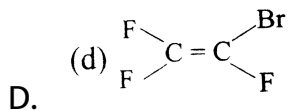
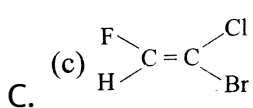
**Answer: A**

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2. The *Z*-configuration in the following is



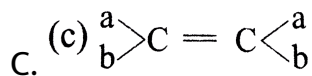
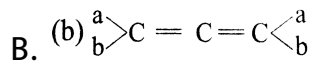
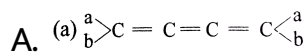
B. 



**Answer: A**

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**3. Which show geometrical isomerism?**



D. None of these

**Answer: A**



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4. Which of the following compounds will exhibit cis-trans (geometrical) isomerism?

A. 2-Butene

B. 2-Butyne

C. 2-Butanol

D. Butanal

**Answer: A**

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5. How many geometrical isomers exist for the molecule shown below?



A. 3

B. 2

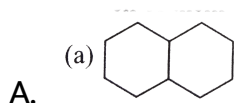
C. 5

D. 6

**Answer: A**

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**6. Which of them will not show geometrical isomerism?**



D. 

**Answer: D**

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7. An alkene exists as geometrical isomers. The minimum number of carbon atoms in the molecule is

A. 2

B. 3

C. 4

D. 6

**Answer: C**

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8. Find total no. of geometrical isomers of following compound



A. 4

B. 6

C. 8

D. 2

**Answer: D**



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9. How many alkene isomers are possible for compound with molecular formula  $C_5H_{10}$ ?

A. 3

B. 6

C. 5

D. 4

**Answer: B**



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**10.** Geometrical isomerism results because molecule has

A. A centre of symmetry

B. A plane of symmetry

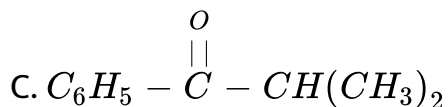
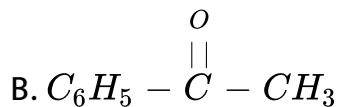
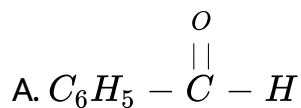
C. The capacity to rotate the plane of polarized light

D. Two dissimilar groups attached to a double bond carbon  
atom

Answer: D

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11. Keto-enol tautomerism is not observed in:

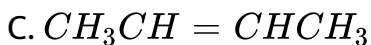
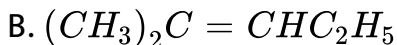
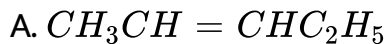


Answer: A

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12. Which of the following cannot show geometrical isomerism?



D. All of the three

**Answer: B**

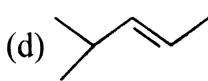


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13. Which of these will not show geometrical isomerism?



D.



**Answer: A**

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14. Which of the following compounds will exhibit geometrical isomerism ?

- A. 1-Phenyl-2-butane
- B. 3-Phenyl-1-propane
- C. 2-Phenyl-1-butane
- D. 1,1-Diphenyl-1-propane

**Answer: A**

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15. Which will show geometrical isomerism?



A. *I, II, III, IV*

B. *I, II, III*

C. *I, III, IV*

D. *I, II, IV*

**Answer: D**



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16. The number of isomers for the compound with molecular formula  $C_2BrClFI$  is:

A. 3

B. 4

C. 5

D. 6

**Answer: D**



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17. Which of the following is not true for maleic acid and fumaric acids?

A. Configurational isomers

B. Stereoisomers

C. *Z* and *E* isomers

D. Optical isomers

**Answer: D**

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**18.** The total number of isomeric (including stereo) bromo-chloro-fluoro-iodopropadiene is:

A. 2

B. 4

C. 6

D. 12

**Answer: C**

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19. Geometrical isomerism is possible in

- A. Acetone-oxime
- B. Isobutene
- C. Acetophenone-oxime
- D. Benzophenone-oxime

**Answer: C**



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20. How many total isomers exist for compound with composition  $C_4H_8$ ?

- A. 6
- B. 4

C. 2

D. 8

**Answer: A**



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**21.** How many different stereoisomers exist for 1-chloro-2(3-chlorocyclobutyl) ethane?

A. 2

B. 7

C. 5

D. 4

**Answer: D**



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22. Which of the following will not show cis-trans isomerism?

- A. Butanedioic acid
- B. 1, 2-dimethyl cyclopropane
- C. 1, 2-dichloroethene
- D. Butanedioic acid

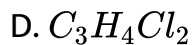
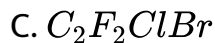
**Answer: A**

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23. Which compounds shown below has six isomers?

- A.  $C_2F_2Cl_2$





**Answer: B**



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**24.** Which of the following has three different stereoisomers?

A. 2, 4-hexadiene

B. 1, 3-butadiene

C. 2, 5-hexadiene

D. 2, 4-heptadiene

**Answer: A**

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25. Which will form geometrical isomers?

A. 

B.  $CH_3CH = NOH$

C. 

D. All of these

**Answer: D**

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26. Which type of isomerism cannot be shown by benzaldoxime?

A. Optical isomerism

B. Functional group isomerism

C. Geometrical isomerism

D. Configuration isomerism

**Answer: B**



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27. A cyclic dichloride has a total five constitutional plus geometrical isomers. Which of the following satisfy this condition without altering the carbon skeleton?

A. Dichloromethyl cyclopropane

B. Dichlorocyclopentane

C. Dichlorocyclobutane

D. Dichlorocyclohexane

**Answer: C**

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**28.** How many cyclic isomers exist (structural and geometrical only) for  $C_3H_3Cl_3$ ?

A. 2

B. 5

C. 4

D. 3

**Answer: D**

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29. Which of the following carbonyls has four different enol isomers ?

A. 3 – hexanone

B. Butanone

C. 2 – pentanone

D. 2 – methyl– 3 – pentanone

**Answer: A**



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30.  $CH_3 - \overset{C}{\parallel} - Cl$  is  
 $Cl - C - Br$

A. trans

B. *Z*

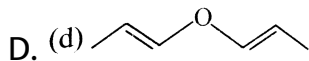
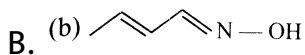
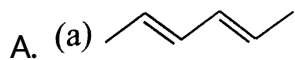
C. both correct

D. none of these

**Answer: B**

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31. Which compound below has four stereoisomers?



**Answer: C**

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32. How many cyclic isomers (structural and geometrical only) exist for  $C_5H_{10}$ ?

A. 3

B. 5

C. 6

D. 8

**Answer: C**

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33. Geometrical isomers differ in:

A. position of functional group

B. spatial arrangement of atoms

C. position of atoms

D. length of carbon chain

**Answer: B**



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**34.** The correct stereochemical name of



A. Methyl 2-methylhepta( $2E$ ,  $5E$ ) dienote

B. Methyl 2-methylhepta( $2Z$ ,  $5Z$ ) dienote

C. Methyl 2-methylhepta( $2E$ ,  $5Z$ ) dienote

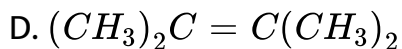
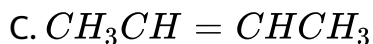
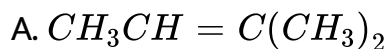
D. Methyl 2-methylhepta( $2Z$ ,  $5E$ ) dienote



**Answer: D**

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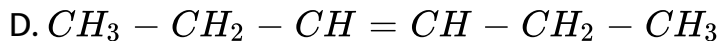
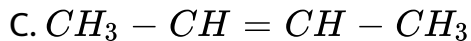
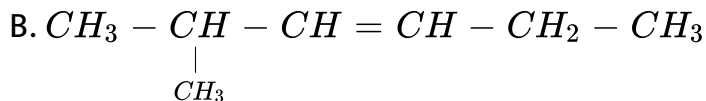
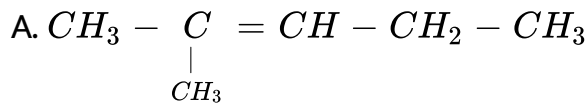
**35.** Which compound can show geometrical isomerism?



**Answer: C**

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**36.** Which of the following not show cis-trans isomerism?



**Answer: A**

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**37.** Which is a pair of geometrical isomers is ?



A. (I) and (II)

B. (I) and (III)

C. (II) and (IV)

D. (III) and (IV)

**Answer: C**

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**38.** The alkene that exhibits geometrical isomerism is

A. propane

B. 2-methyl propene

C. 2-butene

D. 2 – methyl-2-butene

**Answer: C**

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39. Which of the following does not show geometrical isomerism?

A. 1, 2-Dichloro-1-pentene

B. 1, 3-Dichloro-2-pentene

C. 1, 1-Dichloro-1-pentene

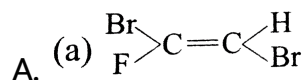
D. 1, 4-Dichloro-2-pentene

Answer: C

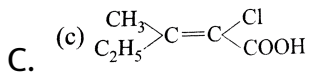


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40. The 'Z'-isomer is



B. 



D. 

**Answer: D**

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**41. False statement is**

- A. Angle of rotation increases with increases in number of asymmetric carbon atoms
- B. Cis-isomer of a compound is more stable than trans form
- C. Fumaric acid on heating produces fumaric anhydride
- D. all of these

**Answer: D**

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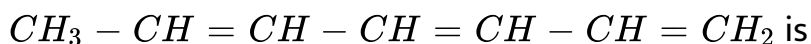
42. Which of the following compound will exhibit cis-trans isomerism?

- A. But-2-ene
- B. Propene
- C. But-1-ene
- D. Benzene

**Answer: A**

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43. The number of geometrical isomers for



A. 2

B. 4

C. 6

D. 8

**Answer: D**

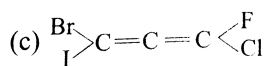


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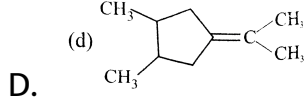
**44.** Which of the following compound can show geometrical isomerism?

A. 

B. 



C.



Answer: c

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45. The number of isomers for the compound with molecular formula  $C_2BrClFI$  is:

A. 3

B. 4

C. 5

D. 6

Answer: D

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46. Which will show geometrical isomerism?

A. 

B. 

C. 

D. 

**Answer: D**



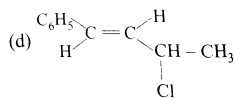
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47. the correct stereochemical formula of trans-3-chloro-1-phenylbut-1-ene is

A. 

B. 

C. 



D.

**Answer: D**

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## Optical Isomerism

1. Which structures represents (s) diastereomers of *I*?



A. Only *II*

B. *III* and *IV*

C. *II* and *IV*

D. *II* and *III*

**Answer: D**

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2. How many optically active stereoisomers are possible of butane 2, 3 diol?

A. 1

B. 2

C. 3

D. 4

**Answer: B**

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3. The instrument which can be used to measure optical activity, i.e., specific rotation:

- A. Refractometer
- B. Photometer
- C. Voltmeter
- D. Polarimeter

**Answer: D**



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4. Which is true regarding a plane polarized light?

- A. As it propagates, magnitude of electric vector varies periodically but direction of polarization remains

unchanged.

B. As it propagates, neither magnitudes nor direction of electric vector varies

C. As it propagates, both magnitude of electric vector and direction of polarization varies

D. Change in orientation of nicol prism has no effect on direction of polarization.

**Answer: A**

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5. The optically active tartaric acid is named as  $D - (+) -$  tartaric acid because it has a positive

A. Optical rotation and is derived from  $D$ -glucose

B.  $pH$  in organic solvent

C. Optical rotation and is derived from  $D - (+) -$   
glyceraldehyde

D. Optical rotation when substituted by deuterium.

**Answer: C**

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6. The smallest alcohol which exhibit optical activity is

A. *n*-Butyl alcohol

B. Butan-1-ol

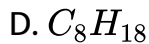
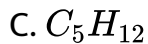
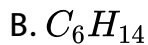
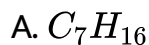
C. Pentane-2-ol

D. Butan-2-ol

**Answer: D**

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7. What is the molecular formula for the alkane of smallest molecular weight which possesses a stereogenic centre?



**Answer: A**

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8. The structure  shows:

- A. geometrical isomerism
- B. optical isomerism
- C. geometrical and optical isomerism
- D. tautomerism

**Answer: B**



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9. How many optically active stereoisomers are possible of butane 2, 3 diol?

- A. 1
- B. 2



C. 3

D. 4

**Answer: B**



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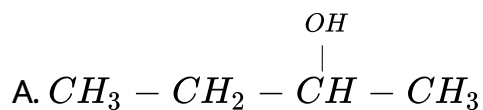
10. At a given temperature and for a given wavelength of plane polarized light, the fundamental property of an optically light, the fundamental property of an optically active substance is

- A. direction of specific rotation
- B. magnitude of specific rotation
- C. both magnitude and direction of specific rotation.
- D. Neither magnitude nor direction of specific rotation.

Answer: C

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11. Which of the following compound is optically inactive?



B. 

C. 

D. 

Answer: C

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12. Which of the following compounds exhibits stereoisomerism?

- A. 2-methyl butene-1
- B. 3-methylbutyne– 1
- C. 3-methylbutanoic acid
- D. 2-methylbutanoic acid

**Answer: D**

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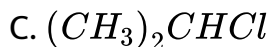
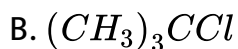
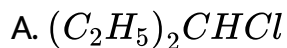
**13.** Which of the following is a comparatively significant factor affecting the magnitude of specific optical rotation?

- A. Concentration of the substance of interest
- B. Experimental temperature
- C. Purity of sample
- D. Length of sample tube

Answer: B

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14. The organic chloro compound, which shows complete stereochemical inversion during a  $S_N^2$  reaction, is:



Answer: D

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15. The absolute configuration of



A. *S, S*

B. *R, R*

C. *R, S*

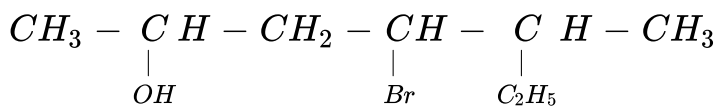
D. *S, R*

**Answer: B**



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16. Number of chiral carbon present in the following compound:



A. 2

B. 3

C. 4

D. 5

**Answer: B**



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**17.** Of the compounds, which corresponds to the general name dichlorocyclobutane, how many are optically active?

A. 0

B. 4

C. 3

D. 2

**Answer: D**

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**18.** The number of stereoisomers obtained by bromination of trans-2-butane is

A. 1

B. 2

C. 3

D. 4

**Answer: A**

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19. What can be said with certainty if a compound has

$$[\alpha]_{D1}^{25^{\circ}C} = -9.25^{\circ}C?$$

- A. The compound is not a meso-isomer
- B. The compound has *R*-configuration
- C. The compound has at least one chiral centre
- D. The optical purity of compound is less than 100 %

**Answer: A**



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20. Which of the following compound has '*S*' configuration?

A. 

B. 



C. 

D. 

**Answer: C**

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21. If solution of a compound ( $30g/100ml$  of solution ) has measured rotation of  $+15^\circ$  in a  $2dm$  long sample tube, the specific rotation of this compound is

A.  $+50^\circ$

B.  $+7.5^\circ$

C.  $+15^\circ$

D.  $+25^\circ$

**Answer: D**

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**22.** Which statements is true about 1, 3-dimethyl cyclobutane?

- A. Only one stereomer is possible
- B. Two sets of enantiomers are possible
- C. Two diastereomeric forms are possible
- D. Two enantiomers and a meso form are possible

**Answer: C**

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**23.** Enantiomers are

- A. molecule that have at least one chiral carbon
- B. non-superimposable molecules that are mirror images of one another
- C. non-superimposable constitutional isomers
- D. non-superimposable molecules

**Answer: B**

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**24.** The correct configuration assigned for given compound



- A.  $2R, 3R$
- B.  $2S, 3S$
- C.  $2R, 3S$

D.  $2S, 3R$

**Answer: D**

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25. Out of following, the alkane that exhibit optical isomerism is

A. 3-methyl-1-pentene

B. 4-methyl-1-pentene

C. 3-methyl-2-pentene

D. 2-methyl-2-pentene

**Answer: A**

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26. Which of the following compound has '*D*' configuration?

A. 

B. 

C. 

D. 

**Answer: C**

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27. Which of the following is not true of enantiomers? They have the same

A. specific rotation

B. melting points

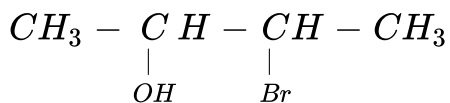
C. boiling points

D. density

**Answer: A**

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28. Total number of stereoisomers of compound is:



A. 2

B. 4

C. 6

D. 8

**Answer: B**

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29. How many chiral compounds are possible on monochlorination of 2-Methyl butane ?

A. 2

B. 4

C. 8

D. 6

**Answer: B**

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30. Which of the following compounds is not chiral?

A. 3-chloro-2-methyl pentane

B. 2-chloropentane

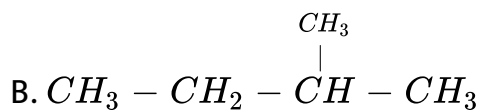
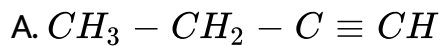
C. 1-chloro-2-methyl pentane

D. 1-chloropentene

**Answer: D**

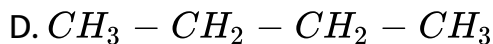
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**31.** Amongst the following compounds, the optically active alkane having lowest molecular mass is:



C. 





**Answer: C**

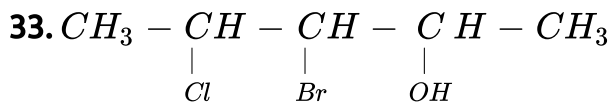
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32. The correct statement regarding a chiral compound is

- A. It must have at least one chiral carbon
- B. It should be devoid of any axis of symmetry
- C. It may be superimposable on its mirror image
- D. A compound containing only one chiral carbon is always chiral

**Answer: D**

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Total number of stereoisomers in above compound is:

A. 6

B. 4

C. 8

D. 6

**Answer: C**



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34. The correct statements regarding elements of symmetry and chirality of compound is

- A. A compound with either plane or centre of symmetry is always achiral
- B. Centre of symmetry has no role to play in chirality of a compound
- C. Presence of an axis of symmetry destroy chirality
- D. A compound with an axis of symmetry simutaneously contain centre of symmetry.

**Answer: A**

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**35.** A hydrocarbon  $X$  is optically active  $X$  upon hydrogenation gives an optically inactive alkane  $Y$ . Which of the following pair of compounds can be  $X$  and  $Y$  respectively?

- A. 4 – methyl– 2 – hexene and 3 – methyl hexane
- B. 2 – methyl– 1 – butene and 2 – methyl butane
- C. 4 – methyl cyclopentene and methyl cyclopentane
- D. 3 – methyl– 1 – pentene and 3 – methyl pentane

**Answer: D**

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**36.** Which statements is wrong about symmetry?

- A. Plane of symmetry is an imaginary plane which bisects the molecule in two equal halves in such a way that each half of the molecule is the mirror image of the other half.

B. Centre of symmetry is the point in a molecule through which if a straight line is drawn from any part of the molecule this line encounters identical groups at equal distances in opposite direction.

C. A molecule which does not possess any element of symmetry is called asymmetric molecule.

D. A molecule which does not possess any element of symmetry is called symmetric molecule.

**Answer: D**



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**37. What is true regarding a meso form of a compound?**

- A. A meso form is achiral due to the presence of an axis of symmetry
- B. A meso form is achiral due to internal compensation of optical rotation
- C. A meso form cannot be isolated from its optically active stereoisomer by fractional
- D. A meso form does not contain any chiral carbon.

**Answer: B**

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**38.** How many different stereoisomers exist for the compound below?



A. 2

B. 8

C. 6

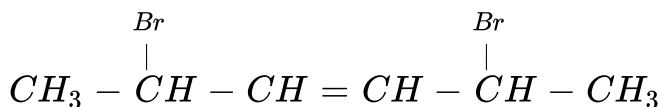
D. 4

**Answer: D**



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**39.** Total number of stereoisomers of compound is:



A. 2

B. 4

C. 6

D. 8

**Answer: C**

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40. Which of the following compounds will have a mesoisomer also?

- A. 2-chlorobutane
- B. 2, 3-dichloropentane
- C. 2, 3-dichlorobutane
- D. 2-hydroxy propanoic acid

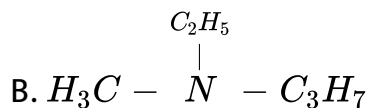
**Answer: C**

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41. Which of the following species will be optically active

A. 



C. 

D. 

Answer: C

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42. How many cyclic isomers (structural and geometrical only) exist for  $C_5H_{10}$ ?

A. 7

B. 5

C. 3

D. 8

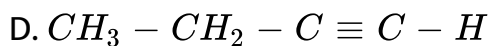
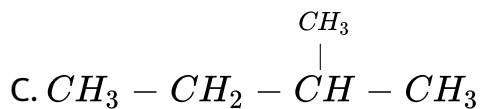
**Answer: A**

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43. Amongst the following compounds, the optically active alkane having lowest molecular mass is:





B. 



**Answer: B**

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44. If optical rotation produced by  is  $+36^\circ$ , then that produced by 



A.  $-36^\circ$

B.  $0^\circ$

C.  $+36^\circ$

D. unpredictable

**Answer: B**

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45. What is incorrect regarding cis -1, 3 - -diborano-trans-2, 4`-dichlorocyclobutane?

- A. It has plane of symmetry
- B. It has total three stereoisomers
- C. It has not chiral carbon
- D. It has a centre of symmetry

**Answer: D**



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46. Racemic mixture is formed by mixing of two:

- A. Isomeric compounds
- B. Chiral compounds

C. Meso compounds

D. Optical isomers

**Answer: D**

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47. A similarity between optical and geometrical isomerism is that?

- A. Each forms equal number of isomers for a given compound
- B. If in a compound one is present, then so is the other
- C. Both are included in stereoisomerism
- D. They have no similarity

**Answer: C**

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48. The pair of molecules shown are



- A. enantiomers
- B. constitutional isomers
- C. diastereomers
- D. two conformations of the same molecule

**Answer: C**

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49. What is relationship between the following projections?

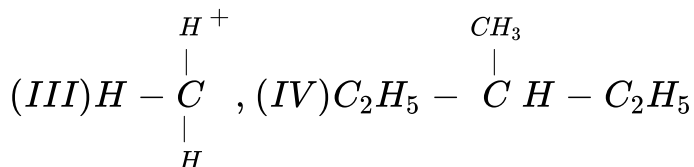
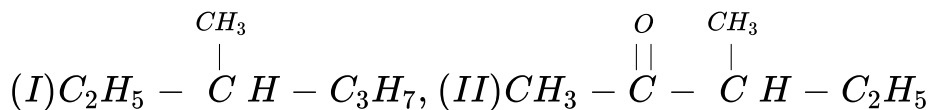


- A. enantiomers
- B. Conformers
- C. diastereomers
- D. Structural isomers

**Answer: B**

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50. Among the following structures *I* to *IV*, it is true that:



- A. Only (III) is Chiral
- B. Only (II) and (IV) are Chiral

C. All four are Chiral

D. Only (I) and (II) are Chiral

**Answer: C**

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51. Which of the following compounds will have a mesoisomer also?

A. 2-hydroxypropanoic acid

B. 2, 3-dichloropentane

C. 2, 3-dichlorobutane

D. 2-Chlorobutane

**Answer: B**

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52. Out of following, the alkane that exhibit optical isomerism is

- A. 3-methyl-2-pentene
- B. 4-methyl-1-pentene
- C. 3-methyl-1-pentene
- D. 2-methyl-2-pentene

**Answer: C**

53. The number of stereoisomers possible for a compound of the molecular formula  $CH_3 - CH = CH - CH(OH) - Me$  is

- A. 3

B. 2

C. 4

D. 6

**Answer: C**



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## Conformational Isomerism

1. Which of the following molecules is expected to rotate the plane polarized light?

A. 

B. 

C. 

D. 

**Answer: A**

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2. Which of the following will have the least hindered rotation about carbon-carbon bonds?

A. Ethane

B. Ethylene

C. Acetylene

D. Hexachloroethane

**Answer: A**

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3. The most stable conformation of 2-fluoroethan-2-amine is

A. 

B. 

C. 

D. 

**Answer: C**

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4. In the Newman projection formula of the most stable staggered form of *n*-butane, which of the following reasons is the cause of its instability?

A. van der Waals strain

- B. Torsional strain
- C. Combination of both
- D. None of these

**Answer: A**

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5. The total number of conformations of ethane is:

- A. 1
- B. 2
- C. 3
- D. Infinite

**Answer: D**

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6. The two structures *I* and *II* represent:



- A. Conformational isomers
- B. Stereoisomers
- C. Constitutional isomers
- D. Identical

**Answer: A**

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7. Which of the following correctly lists the configurations of cyclohexane in order increasing potential energies?

A. Chair > Twist boat > Boat > Half-chair

B. Half-chair > Boat > Twist boat < Chair

C. Chair < Twist boat < Half-chair < Boat

D. Chair < Boat < Twist boat < Half-chair

**Answer: A**

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**8.** Identify the most stable conformer of 2-fluoro ethanol among the following:

A. 

B. 

C. 

D. 

**Answer: C**

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9. The isomers that can be interconverted through rotation around a single bond are:

- A. Conformers
- B. Diastereomers
- C. Enantiomers
- D. Positional isomers

**Answer: A**

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10. The correct energy graduation of different conformers is

A. Staggered > Skew > eclipsed

B. Skew > Staggered > eclipsed

C. Eclipsed > skew > staggered

D. Skew > staggered > eclipsed

**Answer: C**



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11. Which statement is correct about anti-conformation of 1-Chloropropane?

A. It is the most polar form

B. It has maximum torsional strain

C. It has minimum steric strain

D. (a) and (b) both

**Answer: D**

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12.  $CH_3 - CH_2 - CH_2 - CH_3$ . There is free rotation about ( $C_2 \sigma C_3$ ) bond. The same most stable formation is repeated after rotation of

A.  $60^\circ$

B.  $120^\circ$

C.  $240^\circ$

D.  $360^\circ$

**Answer: D**

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**13.** Which of the following statements is not true?

- A. The different arrangement formed by rotations about a single bond are called conformations.
- B. The repulsion felt by the bonding electrons of one substituent as they pass close to the bonding electrons of another substituent is called steric strain.
- C. The strain arises due to repulsion between electron clouds of the interacting atom or groups is called steric strain.
- D. The investigation of the various conformation of the compound and their relative stabilities is called

conformation analysis.

**Answer: B**

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**14.** Which is not true regarding conformers of ethane?

- A. Theoretically infinite conformations exist
- B. By proper experimental setup, staggered conformer can be separated out of system
- C. Increasing temperature increases the percentage of eclipsed conformer
- D. Staggered conformer has lower torsional strain than eclipsed one

**Answer: B**

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**15. Which of the following is gauche conformer?**

A. 

B. 

C. 

D. 

**Answer: D**

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**16. Most stable form of cyclohexane is**

- A. Boat
- B. Chair
- C. Skew
- D. eclipsed

**Answer: B**

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17. In the given conformation, if  $C_2$  is rotate about  $C_2 - C_3$  bond anticlockwise by an angle of  $120^\circ$  then the conformation obtained is



- A. fully eclipsed conformation
- B. partially eclipsed conformation

C. gauche conformation

D. staggered conformation

**Answer: C**

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**18.** When temperature is increased

A. % of eclipsed form increases

B. % of skew form increases

C. % of staggered form increases

D. No effect on any form

**Answer: A**

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19. In the given conformation isomers which of the following has minimum torsional strain and minimum van der Waals strain.



A. I

B. II

C. III

D. IV

**Answer: B**



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20. What are the type of isomers in following pairs?



A. conformers

B. position

C. optical

D. Geometrical

**Answer: A**



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21. Select the correct statements/s:

A. Eclipsed and staggered ethanes give different products on relation with chlorine in presence of light.

B. The conformational isomers can be isolated at room temperature.

C. Torsional strain in ethane is minimum at dihedral angles  $60^\circ$ ,  $180^\circ$  and  $300^\circ$

D. Steric strain is minimum in staggered gauche form of *n*-butane.

**Answer: C**

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**22.** Which of the following statements regarding the projections shown below is true?



A. a and b both represented the same configuration

B. Both a and b are optically active

C. b alone is optically active

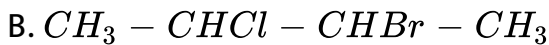
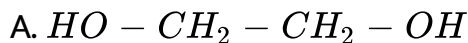
D. a alone is optically active

**Answer: C**



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**23.** which of the following compound has zero dipole moment in one of the stable conformations?



Answer: D

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24. The identical compounds are:



A.  $x, y$

B.  $y, z$

C.  $y, w$

D.  $x, z$

Answer: D

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25. Which of the following conformer of butane has minimum energy?

A. 

B. 

C. 

D. 

**Answer: A**

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## Section B - Assertion Reasoning

1. Assertion: tert-Butyl carbanion is less stable than methyl carbanion.

Reason: The +I-effect of the  $CH_3$  groups tends to stabilize the tert-butyl carbanion.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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2. Assertion ( $A$ ): All the  $C$  atoms of but-2-ene lie in one plane

Reason ( $R$ ): Double-bond  $C$  atoms are  $sp^2$ -hybridised.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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**3. Assertion:** Carbon-oxygen bonds are of equal length in acetate ion.

**Reason:** Bond length decreases with the multiplicity of bond between two atoms.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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4. Assertion: 

*I* and *II* are resonating structures and *III* is resonance hybrid.

Reason: The resonance hybrid is the hypothetical structure that is considered to be a 'blend' of the real contributing structures.



- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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5. Assertion: Alkyl carbanions like ammonia have pyramidal shape.

Reason: The carbon carrying negative charge has an octet of electrons.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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6. Assertion:  is more stable than 

Reason: 'I' has double bonds at anti position while (II) has double bond on the same side, so (I) has lot of electronic repulsion.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**

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7. Assertion: Pyrrolidine (*II*) is more basic than pyrrole (*I*)



Reason: Protonated pyrrole has delocalisation of positive charge in aromatic ring.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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**8.** Assertion: Salicylic acid is much stronger than its *m-p* isomers and benzoic acid itself.

Reason: It is due to steric inhibition to resonance, as  $-OH$  group forces  $-COOH$  out of the plane of ring.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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9. Assertion:  $CH_3CHO$  and  $CH_2 = CHOH$  are resonance structures.

Reason: Tautomers differ both in the position of atoms as well as electrons.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: D**

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**10.** Assertion: Ortho substituted benzoic acids are stronger than benzoic acid.

Reason: Ortho substituted tends to prevent coplanarity of  $-COOH$  with ring. Thus resonance is diminished which increases acidic strength (ortho effects)

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**

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**11.** Assertion:  $pka_1$  of fumaric acid is more than maleic acid.

Reason: Conjugate base of fumaric acid is stabilised by intramolecular *H*-bonding.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**



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**12. Assertion:** Nitrenese cannot be isolated.

**Reason:** Nitrenes are the nitrogen analogues of carbene

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.



- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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**13.** Assertion: Free radicals are always planer.

Reason: They can achieve  $sp^2$  as well as  $sp^3$ -hybridisation

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

**Answer: D**

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**14.** Assertion: Organic compound which do not contain chiral carbon atoms cannot be optically active.

Reason: An organic compound is optically active only when its mirror image is non-superimposable irrespective of the fact whether it contains a chiral carbon

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: D**

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**15.** Assertion: Stereoisomers which are not mirror image of each other are called diastereomers.

Reason: Diastereomers may or may not be optically active.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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**16.** Assertion: Enol form of cyclohexane-1, 3, 5-trione is more stable than its keto-form.

Reason: It does not contain  $\alpha$ -hydrogen atoms.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: D**

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17. Assertion: Trihydroxyglutaric acid ( $HO_2C - CHOH - CHOH - CHOH - CO_2H$ ) exists in four stereoisomeric forms, two of which are optically active while the other are meso-forms.

Reason: It contains two asymmetric and one pseudo-asymmetric carbon atom.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**

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**18.** Assertion: There is evidence for existence of *N*-methylacetamide in two structural forms *I* and *II* as shown below: 

Reason: Rotation about carbon-nitrogen bond is restricted due to resonance.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**

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**19.** Assertion: Neopentane forms one mono substitutes compound.

Reason: Neopentane is an isomer of pentane.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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**20.** Assertion: Trans-2-butane on reaction with  $Br_2$  gives meso-2, 3 – dibromobutane.

Reason: The reaction involves syn-addition of bromine.



- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: C**

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**21.** Assertion: Cyclohexane exhibits keto-enol tautomerism.

Reason: In cyclohexanone, one form contains the keto group ( $C = O$ ) while other contains enolic group ( $-C = C - OH$ ).

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**

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**22. Assertion:** Staggered form is less stable than the eclipsed form

**Reason:** The conformation in which the bond pairs of two central atoms are very far from one another is called staggered form.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: D**



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**23.** Assertion: Trans isomers are more stable than cis isomers

Reason: The cis isomer is the one in which two similar group are on the same side of double bond.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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**24.** Assertion: Propadiene is optically active.

Reason: Propadiene has a plane of symmetry.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: D**

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**25. Assertion:** Lactic acid is optically active.

**Reason:** A symmetry in the inner structure of the organic compound causes optical activity.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: B**

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## AIPMT/ NEET Questions

1. 

- A. resonating structures
- B. tautomers
- C. geometrical isomers

D. optical isomers

**Answer: A**

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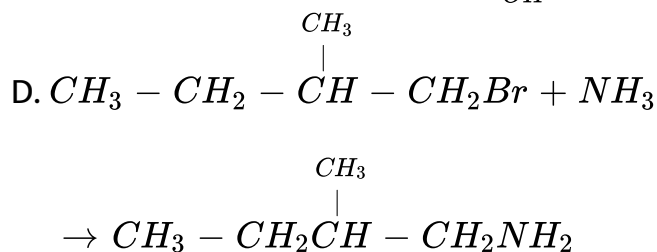
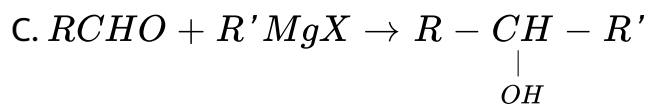
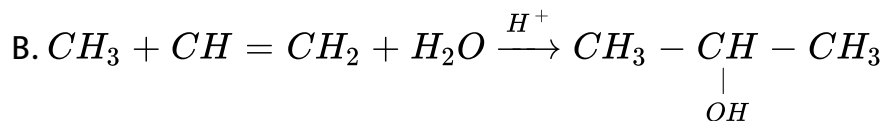
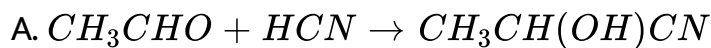
2. Geometrical isomers differ in:

- A. position of functional group
- B. Position of atoms
- C. spatial arrangement of atoms
- D. length of carbon chain

**Answer: C**

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3. Which one is a nucleophilic substitution reaction among the following?



**Answer: D**

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4. The molecule formula of diphenyl methane is  $C_{13}H_{12}$ .





How many structural isomers are possible when one of the hydrogen is replaced by a chlorine atom?

A. 6

B. 4

C. 8

D. 7

**Answer: B**



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5. Which one of the following pairs represent stereoisomerism?

A. Structural and geometrical isomerism

B. Linkage and geometrical isomerism

C. Chain and rotational isomerism

## D. Optical and geometrical isomerism

**Answer: D**

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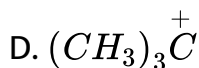
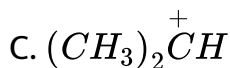
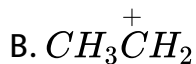
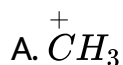
6. If there is no rotation of plane polarized light by a compound in a specific solvent, thought to be chiral, it means that:

- A. It is certainly meso
- B. It is racemic mixture
- C. it is certainly not chiral
- D. no such compound

**Answer: A**

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7. The most stable carbocation is:



Answer: D



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8. Which of the following undergoes nucleophilic substitution exclusively  $S_N1$  mechanism?

A. Benzyl chloride

B. Isopropyl chloride

C. Chlorobenzene

D. Ethyl chloride

**Answer: A**



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9. The chirality of the compound is



A. *R*

B. *S*

C. *Z*

D. *I*

**Answer: A**



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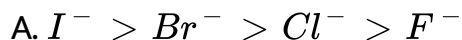
10. Which of the following is not chiral?

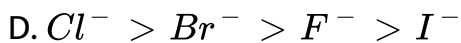
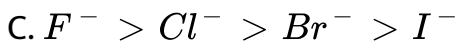
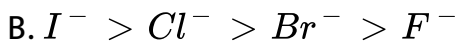
- A. 3-bromopentane
- B. 2-hydroxy propanoic acid
- C. 2-butanol
- D. 2, 3-dibromopentane

**Answer: A**

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11. The correct order of nucleophilicity is

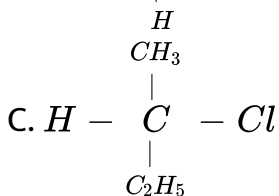
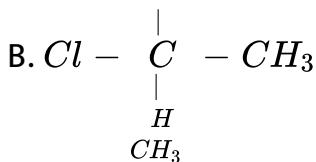
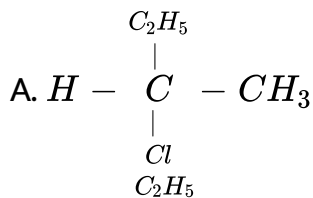


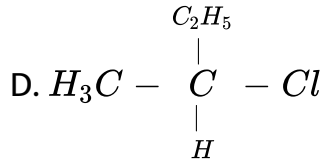


Answer: A

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12.  $CH_3 - CHCl - CH - CH_3$  has a chiral centre. Which one of the following represent its *R*-configuration?





**Answer: B**

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**13.** Base strength of

(1)  $H_3C\overset{\ominus}{C}H_2$ , (2)  $H_2C = \overset{\ominus}{C}H$  and (3)  $H - C \equiv \overset{\ominus}{C}$  is in the order of

A. (3) > (2) > (1)

B. (1) > (3) > (2)

C. (1) > (2) > (3)

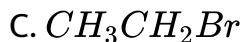
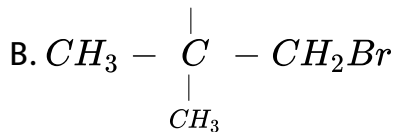
D. (2) > (1) > (3)

**Answer: C**

14. In a  $S_N2$  substitution reaction of the type



which one of the following has the highest relative rate?



**Answer: C**



15. The stability of carbanions in the following



A. (2) > (3) > (4) > (1)

B. (4) > (2) > (3) > (1)

C. (1) > (3) > (2) > (4)

D. (1) > (2) > (3) > (4)

**Answer: D**

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16. Which one of the following is the most reactive towards electrophilic attack?

A. 

B. 

C. 

D. 

**Answer: B**



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17. A strong base can abstract an  $\alpha$ -hydrogen from

A. amine

B. ketone

C. alkane

D. alkene

**Answer: B**

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18. How many stereoisomers does this molecule have?



A. 6

B. 8

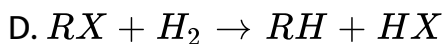
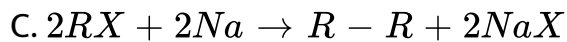
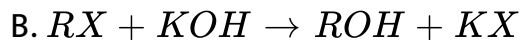
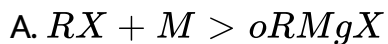
C. 4

D. 2

Answer: C

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19. Which of the following reactions is an example of nucleophilic substitution reaction?



**Answer: B**

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20. In the following the most stable conformation of *n*-butane is:



**Answer: B**

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21. Which of the following conformers for ethylene glycol is the most stable?

A. 

B. 

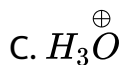
C. 

D. 

**Answer: D**

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22. Which of the following species is not electrophilic in nature?

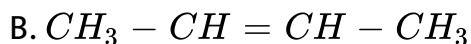
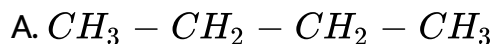


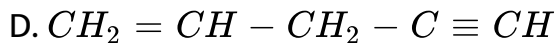
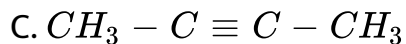
Answer: C



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23. Considering the state of hybridization of carbon atoms, find out the molecule among the following which is linear?





**Answer: C**

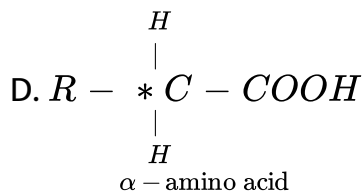
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24. Which of the following acids does not exhibit optical isomerism?

A. Lactic acid

B. Tartaric acid

C. Maleic acid



**Answer: C**



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25. The order of stability of the following tautomeric compound

is



A.  $III > I > II$

B.  $II > I > III$

C.  $II > III > I$

D.  $I > II > III$


**Answer: C**



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26. Given

 ItbRgt Which of the given compound can exhibits tautomerism

- A. II and III
- B. I,II and III
- C. I and II
- D. I and III

**Answer: B**

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27. The enolic form of ethyl acetoacetate as shown below has



- A. 9 sigma bonds and 2pi bonds
- B. 9 sigma bonds and 1 pi-bond
- C. 18 sigma bonds and 2pi-bonds
- D. 16 sigma bonds and 1 pi-bonds

**Answer: C**



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**28.** The number of structure isomers possible from the molecular formula  $C_3H_9N$  is:

- A. 2
- B. 3
- C. 4
- D. 5

**Answer: C**

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**29.** Two possible stereostructures of  $CH_3CHOH.COOH$ , which are optically active, are called:

- A. Enantiomers
- B. Mesomers
- C. diastereomers
- D. Astropisomers

**Answer: A**

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30. The pair of electrons in the given carbanion,  $CH_3C \equiv C^\ominus$  is present in which of the following orbitals?

A.  $sp$

B.  $2p$

C.  $sp^3$

D.  $sp^2$

**Answer: A**

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31. The correct statement the comparison of staggered and eclipsed conformations of ethan is:

- A. The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain.
- B. The staggered conformation of ethane is less stable than eclipsed conformations has torsional strain.
- C. The eclipsed conformation of ethane is more stable than staggered conformations, because eclipsed conformations has no torsional strain.
- D. The eclipsed conformations of ethane is more stable than staggered conformations even though the eclipsed conformations has torsional strain.

**Answer: A**



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32. Which of the following biphenyls is optically active?

A. 

B. 

C. 

D. 

**Answer: C**



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33. The correct statement regarding a carbonyl compound with a hydrogen atom on the its alpha-carbon is:

A. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and

this process is known as keto-enol tautomerism.

B. a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol.

C. a carbonyl compound with a hydrogen atom on its corresponding enol and this process is known as aldehyde-ketone equilibrations.

D. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enole and this process is known as carbonyl cation.

**Answer: A**



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**34.** The correct statement regarding electrophile is:

- A. Electrophile is a negatively charged species and can form a bond by accepting of electrons from another electrophile
- B. Electrophiles are generally neutral species and can form a bond by accepting a pair of electrons from a nucleophile
- C. Electrophile can be either neutral or positively charged species and can form a bond by accepting pair of electrons from a nucleophile
- D. Electrphile is a negatively charged species and can form a bond by accepting a pair of electrons from a nucleophile

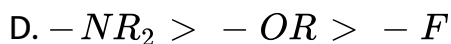
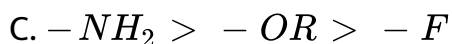
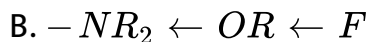
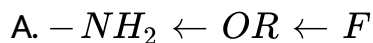
**Answer: C**



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35. Which of the following is correct with respect to  $-I$  effect of the substitutes? ( $R = alkyl$ )



Answer: A::B

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36. Which of the following carbocations is expected to be most stable?

A. 

B. 

C. 

D. 

**Answer: C**

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## AIIMS Questions

1. Number of  $\pi$  electrons present in naphthalene is

A. 4

B. 6

C. 10

D. 14

**Answer: C**

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2. The shape of ethylene molecule is

- A. square planar
- B. furan
- C. trigonal planar
- D. tetrahedral

**Answer: C**

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3. The dipole moment is the highest for

- A. trans-2butene
- B. 1, 3-Dimethylbenzene
- C. acetophenone
- D. ethanol

**Answer: C**

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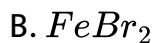
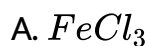
4.  $C - C$  bond length in benzene is

- A.  $1.39\text{\AA}$
- B.  $1.54\text{\AA}$
- C.  $1.34\text{\AA}$
- D. Different in different bonds

**Answer: A**

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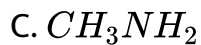
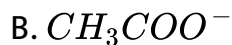
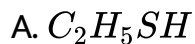
5. Which of the following can't be used in Friedel-Crafts reactions?



**Answer: C**

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6. Among the following the strongest nucleophilic is



**Answer: D**



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7. Which is not found in alkanes?

A. Chain isomerism

B. Geometrical isomerism

C. Metamerism

D. Position isomerism

**Answer: C**

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8. Meso-tartaric acid is optically inactive due to the presence of

- A. molecular symmetry
- B. molecular asymmetry
- C. external compensation
- D. two asymmetric *C*-atom

**Answer: A**

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9. which one of the following pairs represents the stereoisomerism?

- A. Geometrical isomerism, position isomerism
- B. Geometrical isomerism, conformational isomerism
- C. Optical isomerism, geometrical isomerism
- D. Optical isomerism, metamerism

**Answer: C**

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10. Diethyl ether is not associated with which one of these isomers

- A. Butanoic acid



B. Methyl propionate

C. Stereoisomerism

D. None of these

**Answer: D**



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**11.** Diethyl ether and methyl *n* propyl ether are

A. position isomers

B. functional isomers

C. metamers

D. chain isomers

**Answer: C**

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12. The isomerism exhibits by alkyl cyanide and alkyl isocyanide is

- A. functional
- B. positional
- C. tautomerism
- D. chain isomers

**Answer: A**

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13. Which of the following is a chiral compound?

- A. Hexane

B. Methan

C. *n*-butane

D. 2, 3, 4-trimethyl hexane

**Answer: D**



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**14.** Among the following the most stable compound is

A. cis-1, 2-cyclohexenediol

B. trans-1, 2-cyclohexanediol

C. cis-1, 3-cyclohexenediol

D. trans-1, 3-cyclohexanediol

**Answer: D**

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15. In the given conformation, if  $C_2$  is rotate about  $C_2 - C_3$  bond anticlockwise by an angle of  $120^\circ$  then the conformation obtained is

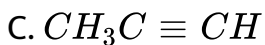
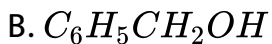
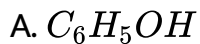


- A. fully eclipsed conformation
- B. partially eclipsed conformation
- C. gauche conformation
- D. staggered conformation

**Answer: C**

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16. Among the following dissociation constant is highest for .



**Answer: D**



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17. Number of isomers of  $C_4H_{10}$  is

A. 2

B. 3

C. 4

D. Isomerism not exist

**Answer: a**

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**18.** Which of the following will have geometrical isomers ?

A. 2-methyl propene

B. 2-butane

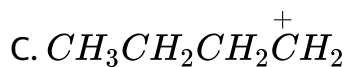
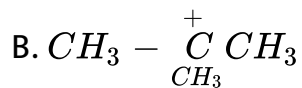
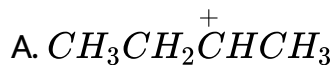
C. 1-butene

D. Propene

**Answer: B**

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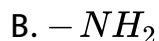
19. Which of the following is the most stable cation?



Answer: B

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20. In a reaction of  $C_6H_5Y$  the major product ( $> 60\%$ ) is *m*-isomer, so the group *Y* is



C.  $-OH$

D.  $-Cl$

**Answer: A**

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21. Among the following the aromatic compound is

A. 

B. 

C. 

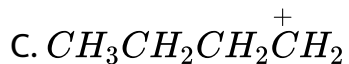
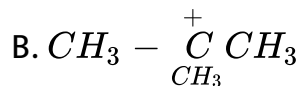
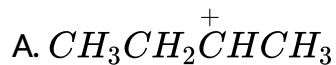
D. 

**Answer: A**

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22. Which of the following is the most stable cation?



Answer: B



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23. Which of the following compounds is aromatic in nature?



C. 

D. 

**Answer: A**

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24. Which of the following is an electrophile?

A.  $CCl_2$

B.  $CH_3^\ominus$

C.  $H_2O$

D.  $NH_3$

**Answer: A**

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25. Arrange the following nucleophiles in the decreasing order of nucleophilicity



A.  $C, B, A, D$

B.  $A, B, C, D$

C.  $D, C, B, A$

D.  $B, C, A, D$

**Answer: D**



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**Assertion- Reasoning Questions**

1. Statement I: Molecules that are non-superimposable on their mirror images are chiral.

Statement II: All chiral molecules have chiral centres.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: C**



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2. Assertion: Diastereoisomers have different physical properties.

Reason: They are non-superimposable mirror images.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true and the reason is not the correct explanation of the assertion

C. If the assertion is true but reason is false

D. If assertion is false but reason is true.

**Answer: B**



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3. Assertion: Maleic acid shows geometrical isomerism.

Reason: It has  $C = C$  bond.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: A**



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4. Assertion: 2, 3-dichloropentene has four stereoisomers.

Reason: It contains two chiral carbon atoms.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanation of the assertion.
- C. If the assertion is true but reason is false.
- D. If assertion is false but reason is true.

**Answer: A**



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5. Assertion: Addition of  $Br_2$  to 1-butene gives two optical isomers.

Reason: The product contains one asymmetric carbon atoms.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is not the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: A**



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6. Assertion: Trans-2-butane on reaction with  $Br_2$  gives meso-2,3 – dibromobutane.

Reason: The reaction involves syn-addition of bromine.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: C**



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7. Assertion: Hydroxyketones are not directly used in Grignard reaction.

Reason : Grignard reagents react with hydroxyl group.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: A**



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8. Assertion: Benzyl bromide when kept in acetone water produces benzyl alcohol.

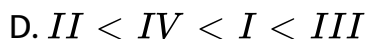
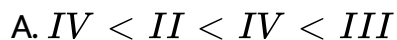
Reason: The reaction follows  $S_N2$  mechanism.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If the assertion is true but reason is false
- D. If assertion is false but reason is true.

**Answer: A**

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1. Arrange the following compounds in increasing order of length of their  $C - N$  bond.

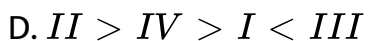


**Answer: B**

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2. The order of heat of hydrogenation in following compounds is:

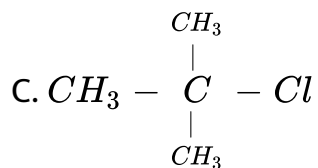
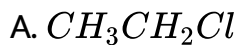


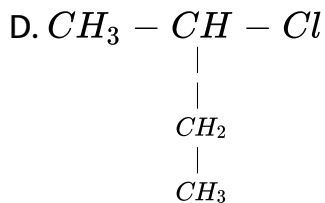


**Answer: B**

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3.  $S_N1$  reaction is faster in

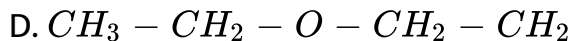
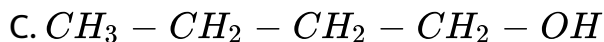




**Answer: C**

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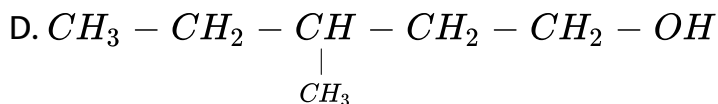
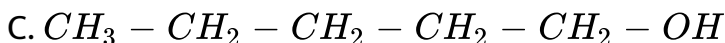
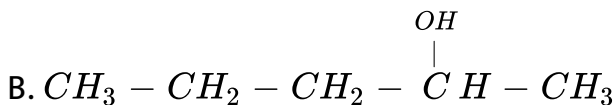
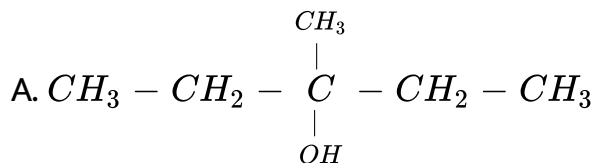
4. Which compound would be least soluble in water?



**Answer: B**

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5. Among the following compound which can be dehydrated very easily is :



**Answer: A**

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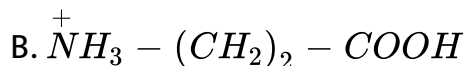
6. Which of the following is not the characteristic of the mechanism of free radical halogenation chain reactions?

- A. It gives major product derived from most stable free radicals
- B. It is usually sensitive to change in solvent polarity
- C. It proceeds in three main steps like initiation, propagations and termination
- D. It may be initiated *UV* light

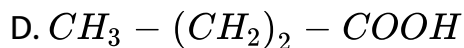
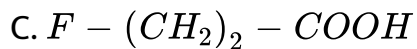
**Answer: B**

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7. Find the strongest acid among the following compound



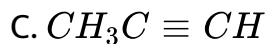
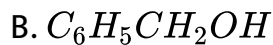
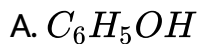




**Answer: B**

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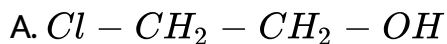
8. Among the following the dissociation constant is highest



**Answer: D**

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9. Which one of the following compounds is most acidic



**Answer: B**

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10. The optically active tartaric acid is named as  $D - (+) -$  tartaric acid because it has a positive

A. Optical rotation and is derived from  $D$ -glucose

B.  $pH$  in organic solvent

C. Optical rotation and is derived from  $D - (+) -$   
glyceraldehyde

D. Optical rotation when substituted by deuterium.

**Answer: C**

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11. Among the following compounds ( $I - III$ ) the correct order of reaction with electrophilic reagent is



A.  $II > III > I$

B.  $III > I > II$

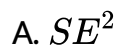
C.  $I > II > III$

$$D. I = II > III$$

**Answer: C**

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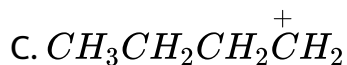
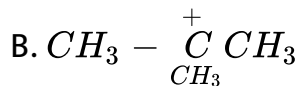
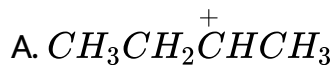
12. The following reaction is described as



**Answer: C**

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13. Which of the following is the most stable cation?



Answer: B



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14. The observed dipole moment of nitromethane is highly than the dipole moment calculated from electronegativity of carbon, nitrogen and oxygen atoms because of

A. hyperconjugation effect

B. resonance effect

C. inductive resonance

D. *H*-bonding

**Answer: A**

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15. Dehydrohalogenation in presence of  $OH^-$  is correct represented by

A. 

B. 

C. 

D. 

**Answer: A**

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**16.** Among the following the aromatic compound is

A. 

B. 

C. 

D. 

**Answer: A**

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17. Which of the following compounds are not arranged in order of decreasing reactivity towards electrophilic substitution

A. Fluorobenzene > chlorobenzene > bromobenzene

B. Phenol > *n*-propyl benzene > benzoic acid

C. Chlorotoluene > para-nitrotoluene > 2-chloro-4-nitrotoluene

D. Benzoic acid > phenol > *n*-propyl benzene

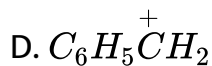
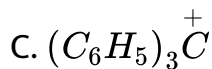
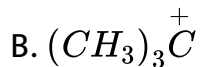
**Answer: D**

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18. Most stable carbonium ion is :

A.  $\overset{+}{C}H_3$

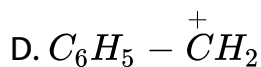
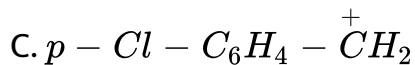
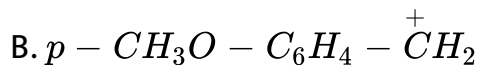
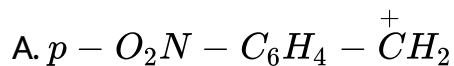




**Answer: C**

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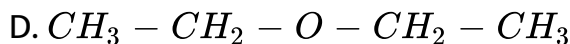
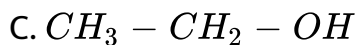
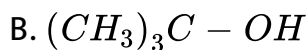
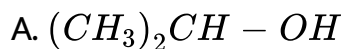
**19.** Which one of the following species is most stable



**Answer: B**

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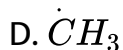
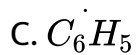
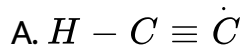
20. Which of the following gives most stable carbocation by dehydration



**Answer: B**

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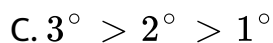
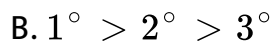
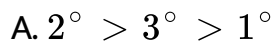
21. Which of the following free radicals would be expected to be most selective?



**Answer: B**

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22. The +I effect of alkyl groups is in the order



D. None of these

**Answer: C**

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23. How many carbon atoms in the molecule  $HCOO - (CHOH)_2 - COOH$  are asymmetric?

A. 1

B. 2

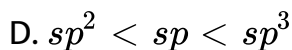
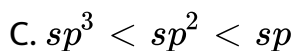
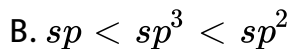
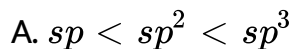
C. 3

D. None of these

**Answer: B**

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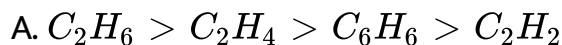
24. With a change in hybridisation of the carbon bearing the charge, the stability of a carbonion increase in the order

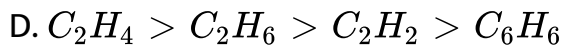
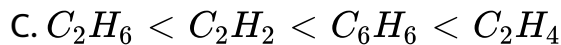
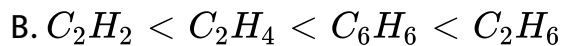


Answer: C

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25. The  $C - C$  bond length of the following molecules is in the order





**Answer: B**



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26. In the reaction  $CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$  a chiral centre is produced. This product would be

A. Laevorotary

B. Meso compound

C. Dextrorotatory

D. Racemic mixture

**Answer: D**

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27. Cyclic hydrocarbon molecules 'A' has all the carbon and hydrogen in a single plane. All the carbon-carbon bonds are of same length less than  $1.54\text{\AA}$ , but more than  $1.34\text{\AA}$ . The  $C - C$  bond angle will be

A.  $109^{\circ} 28'$

B.  $100^{\circ}$

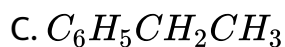
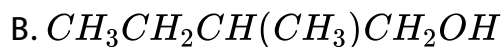
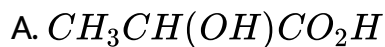
C.  $180^{\circ}$

D.  $120^{\circ}$

**Answer: D**

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28. Which of the following compounds may not exist as enantiomers?



Answer: C

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29. Number of isomers of molecular formula  $C_2H_2Br_2$  are

A. 1



B. 2

C. 3

D. 0

**Answer: C**



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**30.** Which one of the following is an optically active compound?

A. *n* – propanol

B. 2-chloropentane

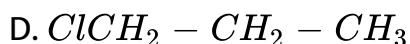
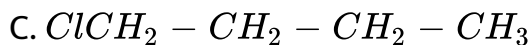
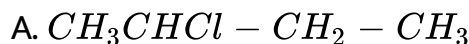
C. *n*butanol

D. 4-hydroxyheptane

**Answer: B**

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31. Which of the following compounds shows optical isomerism?



**Answer: A**

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32. The total number of isomers of a disubstituted benzene compound is

A. 1

B. 2

C. 3

D. 4

**Answer: C**



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**33. Number of optical isomers of lactic acid are**

A. 1

B. 2

C. 3

D. 4

**Answer: B**

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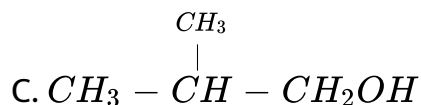
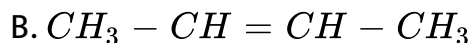
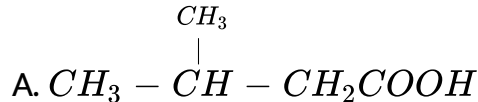
**34.** *n*-butane and isobutane are examples of

- A. Chain isomers
- B. Geometrical isomers
- C. Position isomers
- D. Tautomers

**Answer: A**

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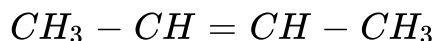
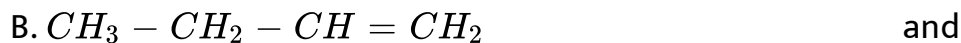
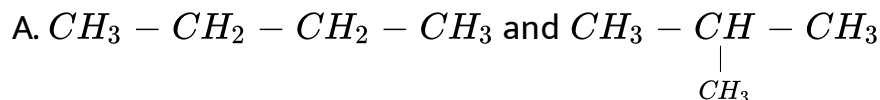
**35.** Which of the following has chiral structure?

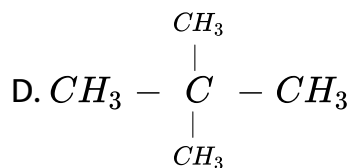
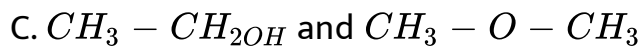


**Answer: D**

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**36.** Which of the following pairs is an example of position isomerism?





and



**Answer: B**

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**37.** Geometrical isomerism is shown in

A. 2-butene

B. 2-butyne

C. 2-butanol

D. Butanal

**Answer: A**



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38. An organic compound exhibits optical isomerism when

- A. Four group linked to carbon atom are different
- B. Three groups linked to carbon atoms are different
- C. Two groups linked to carbon atom are different
- D. All the groups linked to carbon atom are same

Answer: A



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39. How many total isomers exist for compound with composition



A. 2

B. 3

C. 4

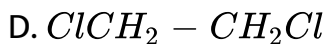
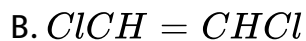
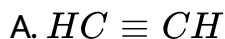
D. 6

**Answer: D**



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**40.** Which of the following can exhibit cis-trans isomerism?





**Answer: B**

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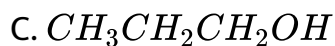
**41.** Mesotartaric acid is optically inactive due to the presence of:

- A. molecular symmetry
- B. molecular asymmetry
- C. external compensation
- D. two asymmetric *C*-atom

**Answer: A**

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42. Which of the following compounds exhibits optical isomerism?



**Answer: B**



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43. The maximum number of stereoisomers possible for 2-hydroxy-2-methyl butanoic acid is

A. 1

B. 2

C. 3

D. 4

**Answer: B**



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**44.** which one of the following pairs represents the stereoisomerism?

A. Geometrical isomerism, position isomerism

B. Geometrical isomerism, conformational isomerism

C. Optical isomerism, geometrical isomerism

D. Optical isomerism, metamerism

**Answer: C**

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**45.** Diethyl ether is not associated with which one of these isomers

- A. Butanoic acid
- B. Methyl propionate
- C. Stereoisomerism
- D. None of these

**Answer: D**

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46. Diethyl ether and methyl *n* propyl ether are

- A. position isomers
- B. Functional isomers
- C. Metamers
- D. chain isomers

**Answer: C**



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47. *n*-Propyl alcohol and isopropyl alcohol are examples of

- A. Position isomerism
- B. Chain isomerism
- C. tautomerism

D. Geometrical isomerism

**Answer: A**

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48. The isomerism exhibits by alkyl cyanide and alkyl isocyanide is

A. Functional

B. Positional

C. tautomerism

D. Metamerism

**Answer: A**

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49. The isomers that can be interconverted through rotation around a single bond are:

- A. Geometrical isomers
- B. Conformers
- C. Enantiomers
- D. Diastereomers

**Answer: B**



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50. The number of enantiomers of the compound

$CH_3CHBrCHBrCOOH$  is

- A. 0
- B. 1

C. 3

D. 4

**Answer: D**

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51.  $C_6H_5C \equiv N$  and  $C_6H_5N \equiv C$  exhibit which type of isomerism

A. Position

B. Functional

C. Dextro isomerism

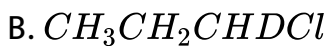
D. Metamerism

**Answer: B**

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52. Which of the following compounds is not chiral?



**Answer: A**

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53. Cis-and trans-2-butane are

A. Conformational isomers

- B. Optical isomers
- C. Position isomers
- D. Geometrical isomers

**Answer: D**

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**54.** Racemic mixture is formed by mixing two:

- A. Isomeric compounds
- B. Chiral compounds
- C. Meso compounds
- D. Optical isomers

**Answer: D**

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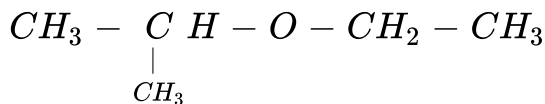
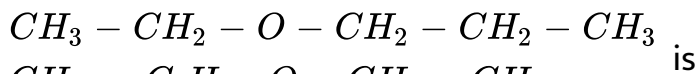
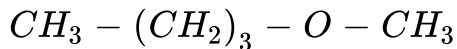
55. Which of the following does not show geometrical isomerism?

- A. 1, 2dichloro-1-pentene
- B. 1, 3-dichloro-2-pentene
- C. 1, 1-Dichloro-1-pentene
- D. 1, 4-Dichloro-2-pentene

**Answer: C**

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56. Isomerism shown by

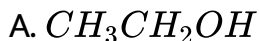


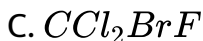
- A. Position isomerism
- B. Chain isomerism
- C. Metamerism
- D. Optical isomerism

**Answer: C**

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57. Of the following, the compound possessing optical isomerism





**Answer: B**

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**58.** Assertion: Benzyl bromide when kept in acetone water produces benzyl alcohol.

Reason: The reaction follows  $S_N2$  mechanism.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true and the reason is the correct explanations of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

**Answer: A**

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**59.** Assertion: Carbon possesses property of catenation.

Reason: Carbon atoms form double as well as triple bonds during catenation.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true and the reason is the correct explanations of the assertion

C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

**Answer: B**

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**60.** Assertion: The order of reactivity of carbonium ions is  $1^\circ > 2^\circ > 3^\circ$ .

Reason: Carbon atom in carbonium ions is in  $sp^3$  state of hybridisation.

- A. If both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true and the reason is the correct explanations of the assertion
- C. If assertion is true but reason is false.

D. If assertion is false but reason is true.

**Answer: C**



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