CHEMISTRY

BOOKS - MTG WBJEE CHEMISTRY (HINGLISH)

CHEMISTRY OF CARBON COMPOUNDS

Wb Jee Workout Category 1 Single Option Correct Type

1. The enolic form of acetone contains

A. nine σ -bonds, one π -bond and two lone pairs

B. eight σ-bonds, two π -bonds and two lone pairs

C. nine σ -bonds, one π -bond and one lone pairs

D. nine σ -bonds, two π -bond and one lone pairs

Answer: A

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

A. $C_2H_6 > C_2H_4 > C_6H_6 > C_2H_2$

B. $C_2H_2 < C_2H_4 < C_6H_6 < C_2H_6$

C. $C_2H_6 > C_2H_2 > C_6H_6 > C_2H_4$

D. $C_2H_4 > C_2H_6 > C_2H_2 > C_6H_6$

Answer: B

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3. Number of π -clectrons in cyclobutadienyl anion $(C_6H_4)^{2-}$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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4. The most stable free radical among the following is

A. $C_6H_5CH_2CH_2$

B. $C_6H_5CHCH_3$

C. CH_3CH_2

D. CH_3CHCH_3

Answer: B

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5. The king of delocalization involving sigma and orbitals is called

A. inductive effect

B. hyperconjugation effect

C. clectromeric effect

D. mesomeric effect.

Answer: B

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6. Intermediate involved in Reimer- Tiemann reaction is

A. carbocation

B. carbanion

C. carbene

D. free radical.

Answer: C

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7. Nucleophilicity order is correctly represented by

A. $CH_3^- < NH_2^- < HO^- < F^-$

B. $NH_2^- > HO^- F^- > CH_3^-$

C. $CH_3^- > NH_2^- > HO^- > F^-$

D. $NH_2^- > F^- > HO^- > CH_3^-$

Answer: C

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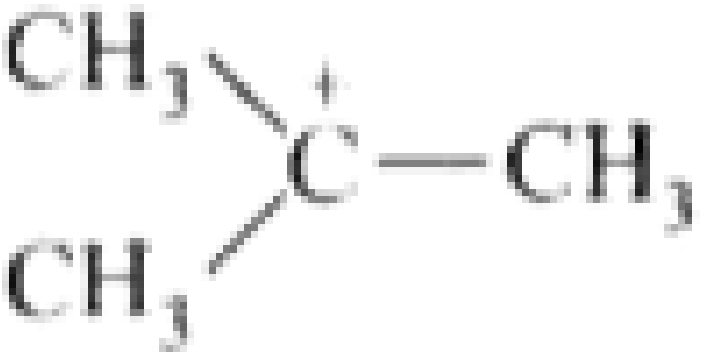
8. Among the following, thc true property about



is

A. non-planar

B. C^+ is sp^2 hybridized

C. elcctrophile can attack C^+

D. does not undergo hydrolysis

Answer: B

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9. $\overline{C}H_2 - \underset{\underset{\cdot\cdot}{O:}}{\overset{||}{C}} - CH_3 \leftrightarrow CH_2 = CH_2 \underset{\underset{\cdot\cdot}{:O:}^{-}}{\overset{|}{C}} - CH_3$

A. resonating structures

B. tautomers

C. geometrical isomers

D. optical isomers.

Answer: A

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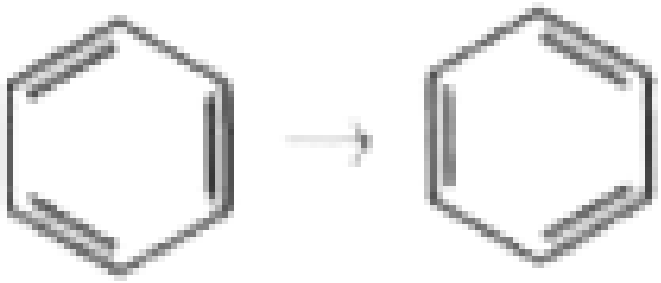
10. Which of the following statements regarding the resonance energy of benzene is correct?



A. The energy required to break the C-H bond in benzene.

B. The energy required to break the C-C bondin benzene.

C. The energy is a measure of stability of benzene.

D. The energy required to break both C-H bond and C-Cbond in benzene.

Answer: C

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11. Shortest carbon-carbon single bond distance is present in

A. CH $\equiv$ C - C $\equiv$ CH

B. $CH \equiv C - CH = CH_2$

C. $CH_2 = CH - CH = CH_2$

D. $CH_3 - CH_2 - CH_2 - CH_3$

Answer: A

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12. Which of the following is the strongest nucleophile?

A. $HC \equiv C^-$

B. $H_2C = CH^-$

C. $CH_3 - CH_2^-$

D. NH_2^-

Answer: C

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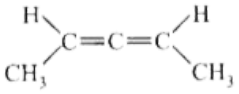
13. Which of the following compounds is optically active?

A. $CH_3 - CH_2 - CH_2OH$

B. 

C. $CH_3\underset{\underset{Cl}{|}}{C}HCH_3$

D. $CH_3 - CH_2 - CH_3$

Answer: B

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14. Orbital interaction between the sigma bonds of a substituent group and neighbouringp-orbital is known as

A. hyperconjugation

B. inductive effect

C. steric effect

D. dipole-dipole interactions.

Answer: A

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15. Identify the correct statement, from below concerning the structure of $CH_2 = C = CH_2$.

A. The molecule is planar.

B. One of the three carbon atoms is in a sp^3- hybridised state.

C. The molecule is non-planar with the two - CH_2 groups being in planar perpendicular to each other.

D. All thc carbon atoms are sp-hybridised.

Answer: C

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16. The IUPAC name of CH_3CH_2(Br) = CHCI is

A. 4-chloro -3 - bromobutene

B. 2 - bromo - 1- chlorobutane

C. 2-bromo-1-chlorobut-1-ene

D. 2-bromo-2-ethyl-3-chloropropene.

Answer: C

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17. The order of decreasing stability of the carbanions $(CH_3)_3C^-, (CH_3)_2CH^-(II), CH_3CH_2^-(III), C_6H_5CH_2$ (IV) is

A. $I > II > III > IV$

B. $IV > III > II > I$

C. $IV > I > II > III$

D. $I > II > IV > III$

Answer: B

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18. Total number of acyclic alcohols possible for the molecular formula C_4H_8O are

A. 5

B. 6

C. 7

D. 4

Answer: B

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19. How many structural and geometrical isomers are possible for dimethyleyclohexane?

A. 3,6

B. 4,6

C. 6,4

D. 3,3

Answer: A

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

A. presence of carbonyl group on each side of $-CH_2$ group

B. resonance stabilization of enol form

C. resence of methylene group

D. rapid chemical exchange.

Answer: B

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21. Which of the following molecules can exhibit conformational isomerism?

A. CH_3OH

B. H_2O_2

C. $NH_2 - NH_2$

D. All of these

Answer: D

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22. Which of the following is superimposable?

A. Propan-2-ol

B. 2,3 - Pentadiene

C. sec-Butyl alcohol

D. Aff of these

Answer: A

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23. Cis-2-butene and trans-2-butene can be distinguished on the basis of

A. their optical properties

B. their reduction products

C. the products they give on ozonolysis

D. the products they give on addition of bromine.

Answer: D

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24. Which of the following statements is wrong?

A. Maleic and fumaric acids are geometrical isomers.

B. Cis-2-Butene and trans-2-butene are dia - stereomers.

C. Trans-2-Butene has zero dipole moment.

D. Maleic acid is less soluble in water than fumaric acid.

Answer: D

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25. Enantiomers have

A. identical melting point/boiling point but different refractive indices

B. identical melting point/boiling point and refractive indices but rotate plane polarised light in opposite directions but to the same extent

C. different refractive indices and rotate plane polarized light in the same direction but to different extents

D. different melting/boiling points but rotate plane of polarised light in diferent directions but to the same extents.

Answer: B

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26. Which of the following statements is not correct?

A. Primary carbonium ions are more stable than secondary ones.

B. Secondary free radicals are more stable than primary free radicals.

C. Tertiary free radicals are more stable than secondary ones.

D. Tertiary carbonium ions are more stable than primary ones.

Answer: A

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27. Which of the following statements is correct?

A. The presence of chiral carbon is an essential condition for enantiomerism.

B. Functional isomerismis akind of stereoisomerism.

C. Diastereoisomers are always optically active.

D. Compounds containing one chiral carbon atom are always optically active.

Answer: A

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28. The number of o bonds, t bonds and lone pair of electrons present in acetic acid are

A. 7σ-bonds, 2 π-bonds, 2 lone pair of e^-

B. 6σ-bonds, 1 π-bonds, 4 lone pair of e^-

C. 7σ-bonds, 1 π-bonds, 4 lone pair of e^-

D. none of these

Answer: C

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29. The IUPAC name of $CH_3 - CH \equiv CH - C \equiv CH$is

A. pent-3-en-1-yne

B. pent-3-en-4-yne

C. pent-2-en-4-yne

D. pent-2-en-3-yne

Answer: A

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30. In the compound, $HC \equiv C - C = CH_2$, the hybridization of C-2 and C-3 carbons are respectively

A. sp^3 and sp^3

B. sp^2 and sp^3

C. sp^2 and sp

D. sp^3 and sp

Answer: C

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Wb Jee Workout Category 2 Single Option Correct Type

1. A compound is formed by substitution of two chlorine for two hydrogens in propane. The number of possible isomeric compounds is

A. 4

B. 3

C. 5

D. 2

Answer: C

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2. The most contributing tautomeric enol form of $\mathrm{MecCOCH_2}CO_2\mathrm{Et}$ is

A. $CH_2 = \mathrm{C\,(OH)CH_2}CO_2\mathrm{Et}$

B. $\mathrm{MeC(OH) = CHCO_2\ Et}$

C. MeCOCH = C(OH)OEt

D. CH_2 = C(OH) CH = C (OH) Et

Answer: B

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3. Among the following carbocations :

(I) $Ph_2C^+CH_2$ Me (II) $PhCH_2CH_2CH^+$ Ph

(III) $Ph_2\mathrm{CHCH}^+$ Me (IV) $Ph_2\mathrm{C(Me)CH}_2^+$

the order of stability is

A. $IV > II > I > III$

B. $I < II < III < IV$

C. $II > I > IV > III$

D. $I > IV > III > II$

Answer: B

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4. The total number of acyclic and cyclic isomers including geometrical isomers possible for the molecular formula, C_5H_{10} are

A. 10

B. 8

C. 9

D. 11

Answer: D

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5. Which of the following statements are true with respect to electronic displacement in a covalent bond?

(1) Inductive effect operates through π bond.

(2) Resonance effect operates through σ bond.

(3) Inductive effect operates through σ bond.

(4) Resonance effect operates through π bond.

(5) Resonance and inductive effects operate through σ bond.

A. 3 and 4

B. 1 and 2

C. 2 and 4

D. 1 and 3

Answer: A

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6. In which of the following pairs of carbocations, the first carbocation is more stable than the second ?

(i) $CH_2 = CH - CH_2$ and $CH_2 = CH - CH_2 - \overset{+}{C}H_2$

(ii) $CH_3 - NH - \overset{+}{C}H_2$ and $\overset{+}{C}H_2 - OH$

(iii) $CH_3 - O - CH_2 - \overset{+}{C}H_2$ and $CH_3 - O - \overset{+}{C}H_2$

(IV)

$CH_3\overset{+}{C}H - CH_2CH_2CH_3$ and $CH_3CH_2 - \overset{+}{C}H - CH_2CH_3$

A. (i),(ii) and (iii)

B. (i) , (ii) and (iv)

C. (ii) and (iii)

D. (iii) and (iv)

Answer: B

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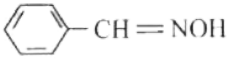
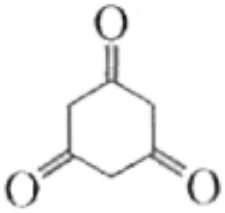
7. Tautomerism is not exhibited by

A. 

B. 

C. 

D. 

Answer: A

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8. Two isomeric alkenes A and B having molecular formula, CH_9H_9Cl on adding H_2, A gives optically inactive compound while B gives a chiral compound. The two isomers are

A. A is 3-chloro-1-pentene and B is 1-chloro-2- pentene

B. A is 2-chloro-3-methyl-2-butene and B is 1-chloro-3-methyl-1-butene

C. A is 3-chloro-2-pentene and B is 2-chloro-2- pentene

D. A is 4-chloro-2-pentene and B is 4-chloro-1- pentene.

Answer: C

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9. The number of chiral carbon atoms in I, II , III respectively are

I. 1,2-dimethylcyclohexane

II. 2-methylpentane

(iii) 3-methylhexane

A. 2,1,1

B. 2,0,1

C. 2,0,0

D. 1,1,1

Answer: C

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10. An optically active alkene with the molecular fomula C_6CH_{12} which upon hydrogenation gives optically inactive alkane is

A. 2 - hexane

B. 3 - methyl - 2- pentene

C. 2 - methyl -2- pentene

D. 3 - methyl-1-pentene

Answer: D

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11. The number of stereoisomers and optical isomers possible for the compound

abdC-Cabd are respectively

A. 3,3

B. 3,2

C. 2,3

D. 2,2

Answer: B

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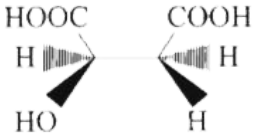
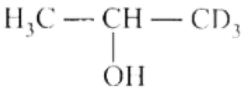
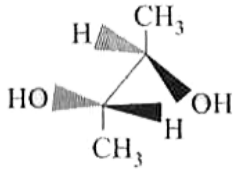
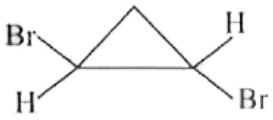
12. Which of the following molecules will not show optical activity?

A. 

B. 

C. 

D. 

Answer: C

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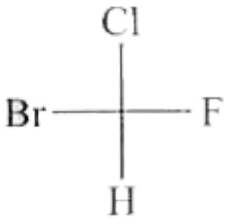
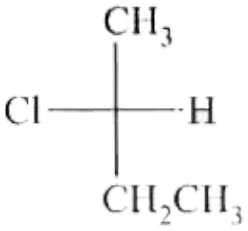
13. Select the S-isomer from the following:

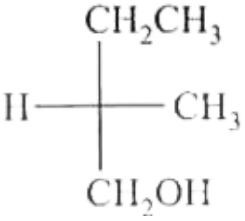
A.



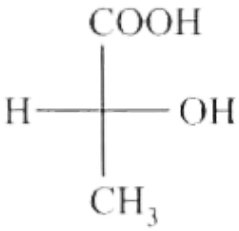
B.



C.



D.



Answer: C

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14. Consider the following conversions :

I. $CH_3\underset{\underset{CN}{|}}{CHCHO} \xrightarrow{H_3O^+} CH_3\underset{\underset{COOH}{|}}{CH_3CHCHO}$

II. $CH_3\underset{\underset{OH}{|}}{CHCN} \xrightarrow{H_3O^+} CH_3\underset{\underset{OH}{|}}{CHCOOH}$

III. $CH_3\overset{\overset{O}{||}}{C}CN \xrightarrow{H_3O^+} CH_3\overset{\overset{O}{||}}{C}COOH$

In which case(s), preference group of nomenclature changes ?

A. I

B. I, II

C. I, II, III

D. I, III

Answer: A

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15. Given below are the structures of five organic compounds (1) to (5) which can tautomerise.

$PhCOCH_2COCH_2$ $PhCOCH_2CH_3$,

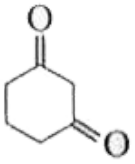
$PhCOCH_2COOC_2H_5$

$PhCOCH_2COCH_3$,
(1)

$PhCOCH_2CH_3$,
(2)

$PhCOCH_2COOC_2H_5$
(3)


(4)


(5)

Select from the following the incorrect statement regarding the enolization of the above mentioned.

A. (5) is extensively enolized compared to (4).

B. (4) is extensively enolized compared to (5).

C. (1) is extensively cnolized compared to (2).

D. Enol content of (3) is more than of (2).

Answer: B

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Wb Jee Workout Category 3 One Or More Than One Option Correct Type

1. Which of the following compounds are named correctly ?

A. $(CH_3)_2CHCH_2CH_2$CHO

(5 - methly - I - hexanal)

B. $(CH_3)_2$CHCH$_2C \equiv$ C - COOH

(5 - methly - 2- hexyonic acid)

C. $CH_3CH_2CH_2CH(CH_3)$COOH

(2 - methylhexanoic acid)

D. $CH_3CH_2CH \equiv CH - COCH_3$

(3 - hexen - 5- one)

Answer: A::B::C

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2. Which of the following compounds are optically inactive due to internal compensation?

A. 2,3 - pentanediol

B. 1,2-propanediol

C. 2,3-butanediol

D. 3,4,5-tribromoheptane

Answer: C::D

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3. Which of the following statenments are correct for cis-1,2-dibromocyclopentane?

A. It contains two chiral centers, but is optically inactive.

B. It contains no chiral centres.

C. It contains two chiral centers and is optically active.

D. It is a meso compound.

Answer: A::D

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4. Which of the following compounds will show geometrical isomerism ?

A. 2-Butene

B. Propene

C. 1- Phenylpropene

D. 2- Metyl-2-butene

Answer: A::C

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5. Which of the following show enantiomerism?

A. 1,2-Propadiene

B. 2,3-Pentadiene

C. sec-Butyl alcohol

D. All the three

Answer: B::C

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6. Which of the following order regarding the stability of intemediates is not correctly arranged?

A. $F_2\dot{\ddot{C}} < Cl_2\dot{\ddot{C}} > Br_2 > \dot{\ddot{} } I_2\dot{\ddot{C}}$

B. $(C_6H_5)_3\dot{\ddot{C}} > (C_6H_5)_2\dot{C}H > CH_2 = CH - \dot{C}H_2$

C. R - C $\equiv \overline{C} < R_2C = \overline{C}H < R_3C - \overline{C}H_2$

D. $(C_6H_5)_3\overset{+}{\dot{C}} < (C_6H_5)_2C^+ > CH_2^+ - CH = CH_2$

Answer: C

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7. Nucleophiles are

A. H_2 O

B. I

C. NH_(3)

D. BF_3

Answer: A::B::C

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8. (+) Mesomeric effect is observed with

A. $-\dot{N}\dot{H}_2$

B. $-\ddot{\underset{\cdot\cdot}{C}}l:$

C. $-\ddot{\underset{\cdot\cdot}{R}}$

D. $-SO_3H$

Answer: A::B::C

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9. Which of the following are clectrophilc?

A. BF_3

B. $:CCl_2$

C. I^-

D. $\ddot{N}H_3$

Answer: A::B

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10. Which of the following have a trigonal planar (or triangular) structurc?

A. $: \overline{C} H_3$

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

C. BF_3

D. $: \overset{+}{O} H_3$

Answer: B::C

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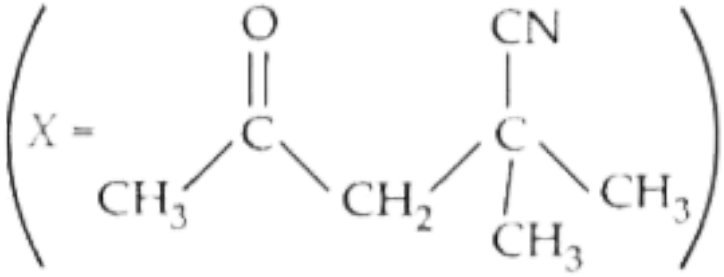
Wb Jee Previous Years Questions Category 1 Single Option Correct Type

1. The IUPAC name of the compound X is



A. 4-cyano-4-methyl-2-0xopentane

B. 2-cyano-2-methy1-4-0xopentane

C. 2,2-dimethyl-4-0xopentanenitrile

D. 4-cyano-4-methyl-2-pentanone.

Answer: C

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2. (t)-2-Chloro-2-phenylethane in toluene racemises slowly in the presence of small amount of $SbCl_5$. due to the formation of

A. carbanion

B. carbene

C. free-radical

D. carbocation.

Answer: D

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3. The correct order of acid strength of the following substituted phenols in water at 28° Cis

A. p-nitrophenol $<$ p-fluorophenol $<$ p-chlorophenol

B. p-chlorophenol $<$ p-luorophenol $<$ p-nitrophenol

C. fuorophenol $<$ p-chlorophenol $<$ p-nitrophenol

D. p-fluorophenol $<$ p-nitrophenol $<$ p-chlorophenol

Answer: C

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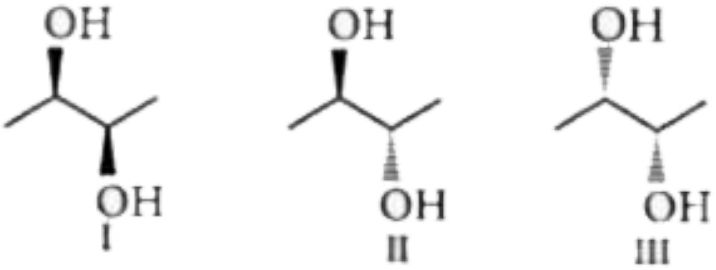
4. The correct statement regarding the following compounds is



A. all three compounds are chiral

B. only I and II are chiral

C. I and III are diastereomers

D. only I and III are chiral.

Answer: D

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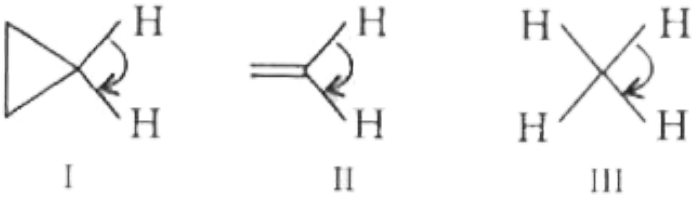
5. The correct order of decreasing H-C-H angle in the following molecule is



A. $I > II > III$

B. $II > I > III$

C. $III > II > I$

D. $I > III > II$

Answer: B

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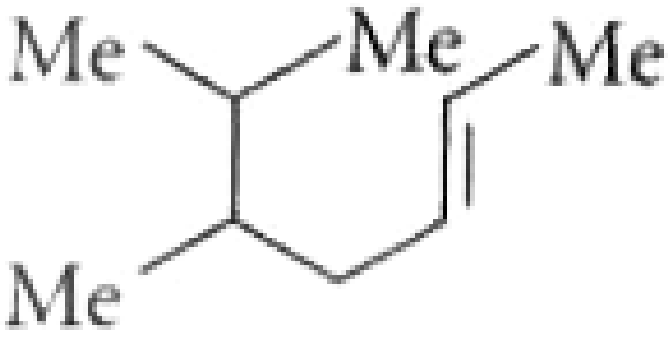
6. The IUPAC name of the following molecule is



A. 5,6-dimethylhept-2-ene

B. 2,3-dimethylhepl-5-ene

C. 5,6-dimethylhept-3-ene

D. 5-isopropylhex-2-ene.

Answer: A

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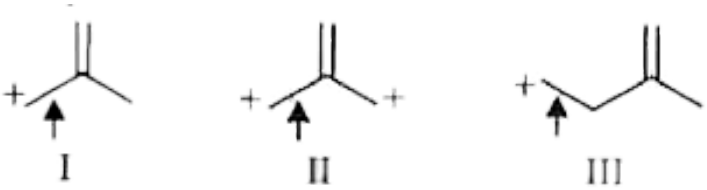
7. The corect order of decreasing length of the bond as indicated by the arrow in the following structures is



A. $I > II > III$

B. $II > I > III$

C. $III > II > I$

D. $I > III > II$

Answer: C

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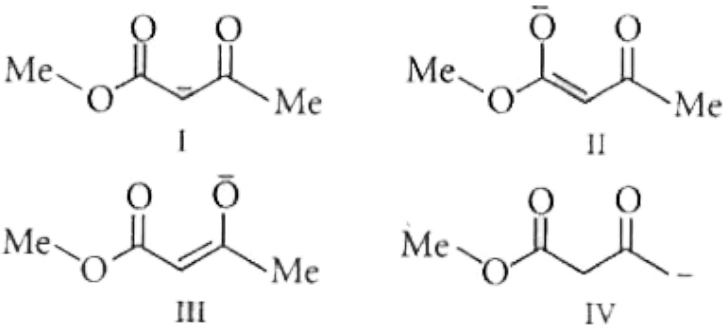
8. Among the following structures the one which is not a resonating structure of others is



A. I

B. II

C. III

D. IV

Answer: D

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9. The 4^{th} higher homologer of ethane is

A. butane

B. pentane

C. hexane

D. heptane.

Answer: C

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10. The reaction of methyltrichloroacetate (Cl_3CCO_2Me) with sodium methoxde (NaOMe) generates

A. carbocation

B. carbene

C. carbenion

D. carbon radical

Answer: B

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11. In the following compound, the number of 'sp' hybridized carbon is

$$CH_2 = C = CH - \underset{\underset{CN}{|}}{CH} - C \equiv CH$$

A. 2

B. 3

C. 4

D. 5

Answer: C

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12. Inamixture, two enantiomers are found to be present in 85% and 15% respectively. The enantiomeric excess (e,e) is

A. 0.85

B. 0.15

C. 0.7

D. 0.6

Answer: C

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13. The number of o and π -bonds between two carbon atoms in calcium carbide are

A. one σ, one π

B. one σ, two π

C. two σ, one π

D. one σ, $1\frac{1}{2}\pi$

Answer: B

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14. In the IUPAC system , $\mathrm{PhCH_2}CH_2CO_2$ H is narmed as

A. 3-phenylpropanoic acid

B. benzylacetic acid

C. carboxyethyl benzene

D. 2 - phenylpropanoic aicd.

Answer: A

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15. The indicated atom is not a nuclcophilic site in

A. $\underset{\uparrow}{BH_4^-}$

B. $\underset{\uparrow}{CH_3}Mgl$

C. $CH_3\underset{\uparrow}{O}H$

D. $CH_3\underset{\uparrow}{N}H_2$

Answer: A

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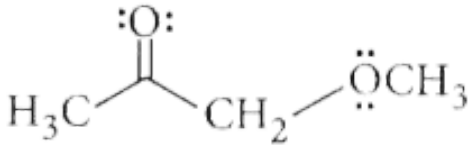
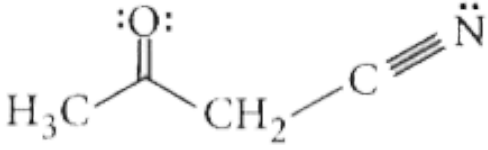
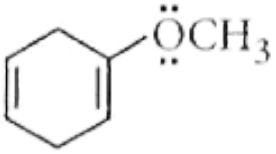
16. The molecule/molecules that has/have delocalised lone pair(s) of clectrons is/are

(I) 

(II) 

(III) 

(IV) $CH_3CH=CHCH_2\ddot{N}HCH_3$

A. I,II and III

B. I, II and IV

C. I and III

D. only III

Answer: D

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17. The conformations of n-butane, commonly known as eclipsed, gauche and anti-conformations can be interconverted by

A. rotation around C-H bond of a methyl group

B. rotation around C-H bond of a methylene group

C. rotation around Cl-C2 linkage

D. ratation around C2 - C3 linkage.

Answer: D

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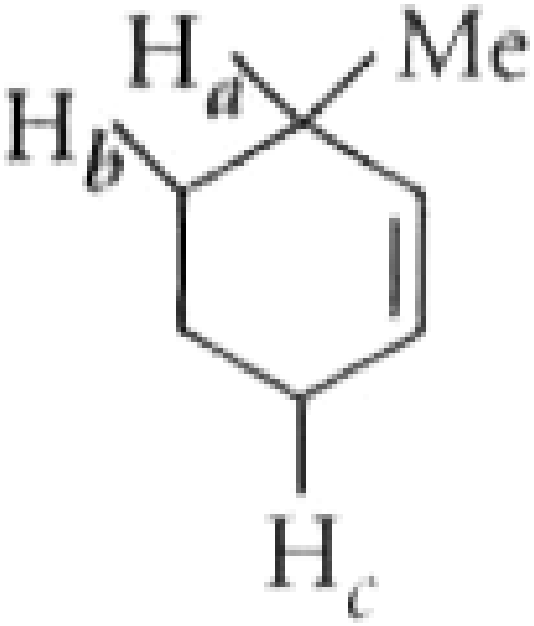
Wb Jee Previous Years Questions Category 2 Single Option Correct Type

1. The order of decreasing ease of abstraction of hydrogen atoms in the following molecule is



A. $H_a > H_b > H_c$

B. $H_a > H_c > H_b$

C. $H_b > H_a > H_c$

D. $H_c > H_b > H_a$

Answer: B

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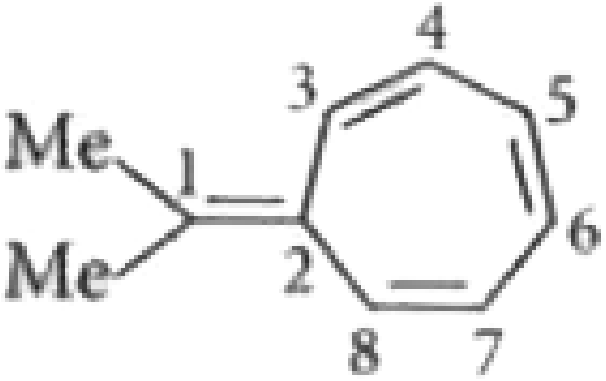
2. The most likely protonation site in the following molecule is



A. C -1

B. C-2

C. C-3

D. C-6

Answer: A

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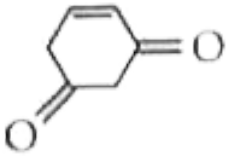
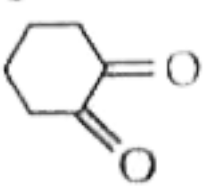
Wb Jee Previous Years Questions Category 3 One Or More Than One Option Correct Type

1. Tautomerism is/are exhibited by

A. $(Me_3CCO)_3$ CH

B. 

C. 

D. 

Answer: A::B::D

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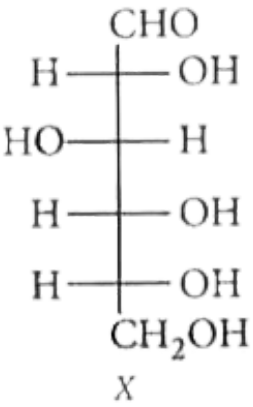
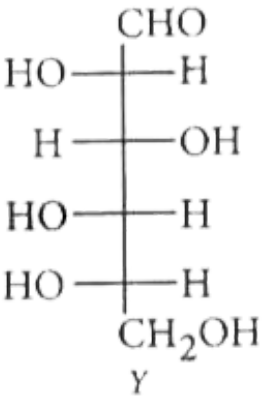
2. Among the following statements about the molecules X, and Y, the one (s) which is (are) correct is (are)



X



Y

A. X and Y are diastereomers

B. X and Y are enantiomers

C. X and Y are both aldohexoses

D. X is a D-sugar and Y is an L-sugar.

Answer: B::C::D

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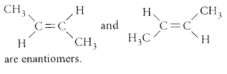
3. Choose the correct statement(s) among the following.

A.  are enantiomers.

B. CH_3CHO on reaction with HCN gives racemic mixture.

C. $CH_3 - \underset{OH}{\overset{C_2H_5}{\overset{|}{\underset{|}{C}}}} - H$ and $H - \underset{CH_3}{\overset{C_2H_5}{\overset{|}{\underset{|}{C}}}} - OH$ are

enationmers.

D. CH_3- CH NOH shows geometrical isomerism.

Answer: B::D

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