CHEMISTRY

BOOKS - G.R. BATHLA & SONS CHEMISTRY (HINGLISH)

UNSATURATED HYDROCARBONS

ILLUSTRATION OF OBJECTIVE QUESTIONS

1. The shape of but-2-ene is:

A. planar

B. tetrahedral

C. linear

D. pyramidal

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2. The molecule that will have dipole moment is:

A. trans-3-hexene

B. trans-2-pentene

C. 2,2-dimethylpropane

D. 2,2,3,3-tetramethylbutane

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3. Which of the following cannot be obtained by oxidation of alkenes with potassium permanganate followed by acid hydrolysis?

A. Carboxylic acid

B. Aldehydes

C. Ketones

D. CO_2

Answer: D

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4. Find the identify of compound [N] in the following reaction sequences:

$H = C - Na + CH_3CH_2CH_2CH_2Br \rightarrow [A],$

$\underset{1\text{mole}}{A}\ (Cl_2) \underset{1\text{mole}}{\rightarrow} [B]$

A. cis-1,2-dichlorobutane

B. trans-2,3-dichloro-2-hexene

C. cis-1,2-dichloro-1-hexene

D. trans-1,2-dichloro-1-hexene

Answer: D

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5. 1-phenyl-2-chloropropane on treating with alc. KOH gives mainly

A. 1-phenylpropan-1-ol

B. 1-phenylpropan-2-ol

C. 1-phenylpropene

D. 2-phenylpropene

Answer: C

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6. Allene (C_3H_4) contains,

A. one triple and two double bonds

B. two double and four single bonds

C. two triple and one double bond

D. one double bond and one triple bond

Answer: B

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SOME SOLVED PROBLEMS

1. Write the structural of all the possible isomers of dichloroethene. Which of them will have zero dipole moment?

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2. Propene reacts with HBr to give isopropyl bromide but does not give n-propyl bromide.

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3. Acetylene is acidic but it does not react with NaOH or KOH. Give reason.

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4. Ethene on treating with Br_2 in presence of sodium chloride forms a mixture of CH_2ClCH_2Br and CH_2BrCH_2Br. Give reason.

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5. The peroxide effect is observed in case of HBr and not with HF, HCl or HI. Give reason.

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6. a) 2- Methylpropene can be converted into isobutyl bromide by hydrogen bromide. Write the condtion.

b) Ehyne and its derivatives will give precipate with ammoniacal silver nitrate solution. Mention the condition under which this statement is true.

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7. 36.4 g of 1,1,2,2-tetrachoropropane was heated with zinc dust and the product was bubbled through ammoniacal $AgNO_3$. What is the mass of precipitatee obtained? Give equation for the reaction involved.

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8. Compound (A) contains only carbon and hydrogen. Id decolourises bromine in $C(Cl_4)$ solution and reacts slowly with concentrated H_2SO_4. Compound (A) reacts with HBr to form (B). (B) reacts with NaOH to form (C). On oxidation (C) gives hexane-3. Write the structural formulae of (A), (B), (C) and explain the reactions involved.

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9. The hydrocarbon [A] adds one mole of hydrogen in the presence of a platinum catalyst to form n-hexane. When [A] is oxidised vigorously with

$KMnO_4$, a single carboxylic acid containing three carbon atoms is isolated. Give the strucure of [A] and explain the reactions.

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10. How is the structure of an alkene determined?

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11. An olefin was treated with ozone and the resulting ozonide on hydrolysis gave 2-pentanone and acetaldehyde. What is the structure of the original olefin? Write eqations for the raction involved.

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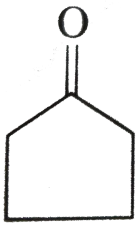
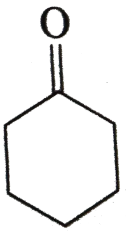
12. Give the product(s) of reductive ozonolysis of the following compounds.

(a) 

(b) 

a)

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13. Write the structure of the isomeric butenes and name them. Give the products obtained on reductive ozonolysis.

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14. Effect the following transformations:

a) $CH_3CH_2CH_2I$ to $CH_3CH_2CH_2CH_2Br$

b) $CH_3CHBrCH_3$ to $CH_3CHClCH_3$

c) $CH_3CH_2CH_2OH$ to $CH_3CHOHCH_2Cl$

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15. Account for the following:

a) The $C \equiv C$ distance is shorter than $C = C$ and $C - C$ distance.

b) The stability of alkenes is in decreasing order of substitution by R.

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16. Write the structural and stereoisomers of pentene, C_5H_{10} and compare their stabilities.

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17. What are the possible products, in order of decreasing yield, obtained from the reaction of 3-bromo-2,3-dimethylpentante with alc. KOH?

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18. Prepare the following from 1-pentene:

i) $CH_3CH_2CH_2DCH_3$ (A)

ii) $CH_3CH_2CH_2CH_2D$ (B)

iii) $CH_3CH_2CH_2CHDCH_2D$ (C)

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19. Give the products formed by the oxidation of hot $KMnO_4$.

$a.$ C_4H_8

$b.$ Cyclobutene ltbr. $c.$ $1-$ Methyl cyclobutene

$d.$ $1,2-$ Dimethyl cyclobutene

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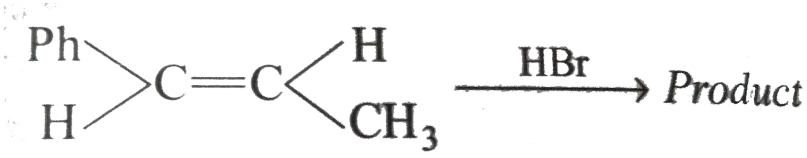
20. Predict the product of the reaction,



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21. How will you synthesis the following?

i) Hexa-1,5-diene from propene

ii) Allene from propene.

iii) 1-Bromopropane from 1,3-dibromopropane.

iv) Cyclohexene from cyclohexane.

v) Buta-1,3-diene from but-1-ene

vi) Hexachloroethane from calcium carbide.

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22. Explain the following:

i) Beta-1,3-diene gives 1,2- and 1,4-addition products.

ii) Addition of HBr to $H_2C = CHCH_2C \equiv CH$ gives $CH_3CHBrCH_2C \equiv CH$.

iii) Alkenes in decreasing order of reactivity towards electrophilic addition.

a) $CICH_2CH = CH_2$

b) $(CH_3)_2C = CH_2$

c) $CH_3CH = CH_2$

d) $H_2C = CHCl$ ltbgt iv) Stereochemical structure of the reaction product of Br_2 with a) cis-2-butene and b) trans-2-butene.

v) Why alkynes are generally less reactive than alkenes shorter than that of n-butane.

vi) The central carbon-carbon bond in buta-1, 3-diene is shorter than that of n-butane.

vii) Arrange following alkenes in decreasing order of stability towards acid-catalysed hydrocarbons.

a) 1-phyenyl-1-butene, 1-phenyl-2-phenyl-2-butene

b) 2-methylpropene, cis-2-butene, trans-2-butene

c) 1-hexene, 2-methyl-1-pentene, 2-hexene.

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23. i) An organic compound, C_4H_6, on ozonolysis gives formaldehyde and glycol. What is this compound?

ii) C_4H_6 can represent various structures, Identify:

a) Which reacts with ammoniacal $AgNO_3$,

b) Which does not react with ammoniacal $AgNO_3$ but by hot aklkaline $KMnO_4$ gives CH_3COOH,

c) Which decolourises Br_2 water and by catalyst hydrogenation (using 1 mol) and subsequent reaction with alkaline $KMnO_4$ gives CH_3COOH and

d) Which by ozonolysis using O_3 / H_2O gives succinic acid.

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24. a) Draw the stereochemical structure of the product in the following reaction.

$$R - C \equiv C - R \xrightarrow[\text{Lindlar's catalyst}]{H_2}$$

b) Write down the structures of the stereoisomers formed when cis-2-butene is reacted with bromine.

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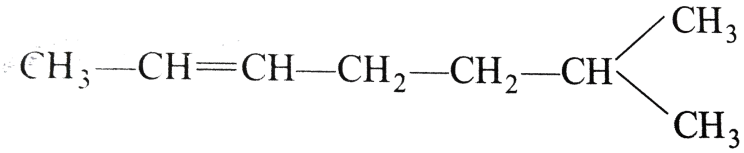
25. Indicate allylic, vinyl, $1^{\circ}, 2^{\circ}, 3^{\circ}$ hydrogen in the following compound. Give the sequence of reactivity for free radical substitution.



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26. Hydrocarbon (X), C_7H_{12}, on reaction with boron hydride followed by treatment with CH_3COOH yields (A). On reductive ozonolysis (A) yields a mixture of two aldehydes, (B) and (C). Of these, only (B) can undergo Cannizzaro reaction. (A) exists in two geometrical isomer, $(A-1)$ and $(A-2)$, of which $(A-2)$ is more stable. Gives structures of (X), (A), (B), (C), $(A-1)$, and $(A-2)$ with proper reasoning.

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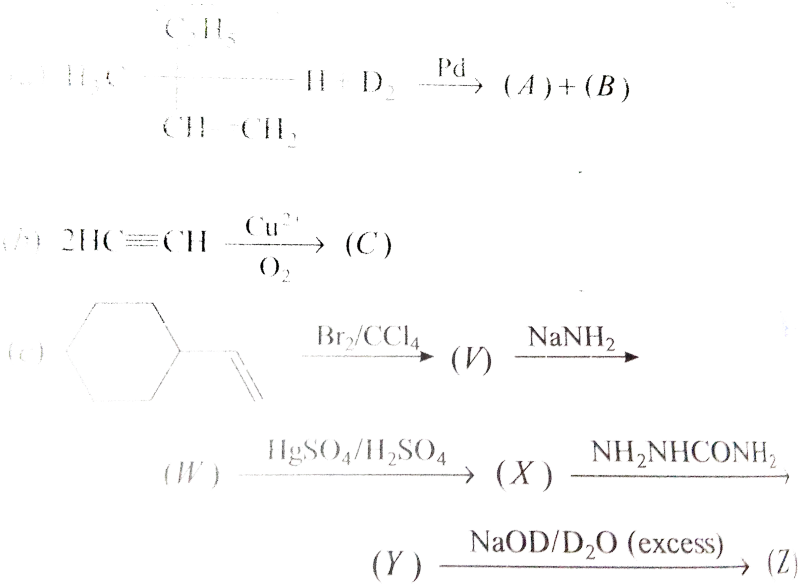
27. Give structures/configuration of the products in the following reactions:



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28. A hydrocarbons C_4H_8, neither decolourised bromine in carbon tetrachloride nor reacted wiith HBr. When heated to 473 K with hydrogen in presence of a nickel catalyst, a new hydrocarbon, C_4H_{10}, was formed. What was the original hydrocarbon?

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29. Give the structures of the major products from 3-ethylpent-2-ene under each of the following conditions.

a) HBr in presence of peroxide.

b) Br_2 / H_2O

c) $Hg(Oac)_2 / H_2O, NaBH_4$.

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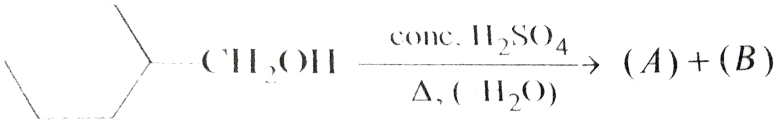
30. Give the major product (A) in the following reaction:



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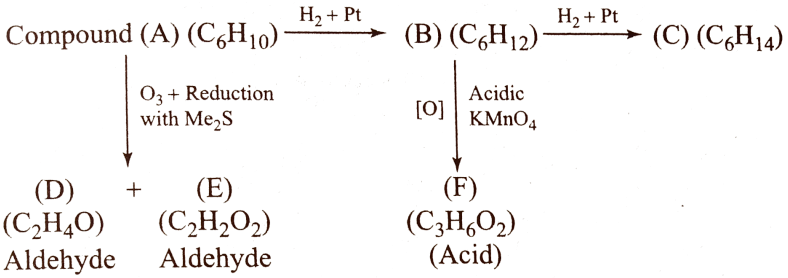
31. Identify (A) to (F) :



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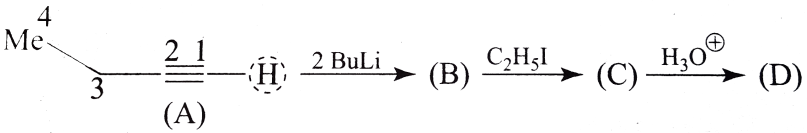
PROBLEMS FOR PRACTICE

1. Explain the formation of products (B), (C), and (D) in the following



reaction.

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2. Complete the following equations:

a) $H_2C = CH - CH_3 + HCl \rightarrow (A)$

b) $CH_3 - CH = C(CH_3)_2 + O_3 \xrightarrow[H_2O]{Zn} (A) + (B)$

c) $H_2C = CH_2 + O_3 \xrightarrow{H_2O} (A) \xrightarrow{NaOH\,(aq)} (B) + (C)$

d) $(CH_3)_3C - CH = CH_2 + HC < o(A)$

d) $MeCH_2C \equiv CH \xrightarrow{NaNH_2} (A) \xrightarrow{Et.Br} (B)$

g) $HC \equiv CH \xrightarrow[(CH_3COO)_2Pb]{H_2, Pd(CaCO_3)} (A) \xrightarrow[\mathbb{C}l_4]{Br_2} (B) \xrightarrow{KOH\,(\text{alc})} (C)$

h) $HC \equiv CH \xrightarrow[H_2SO_4]{HgSO_4, H_2O} (A) \xrightarrow[LiAlH_4]{H} (B) \xrightarrow[443K]{\text{conc}H_2SO_4} (C)$

i) $CH_3CH = (CH_2) \underset{773K}{\overset{Br_2}{A}} \xrightarrow[773K]{Cl_2} (B)$

j) $CH_3CH = CH_2 \xrightarrow[773K]{Br_2} (A) \xrightarrow[\Delta]{KOH\,(\text{alc})} (B)$

k) $H_2C = CH_2 + CH_2 + CH_2 \rightarrow (A)$

l) $CH_3CH = CH_2 + CH_2I_2 \rightarrow (A)$

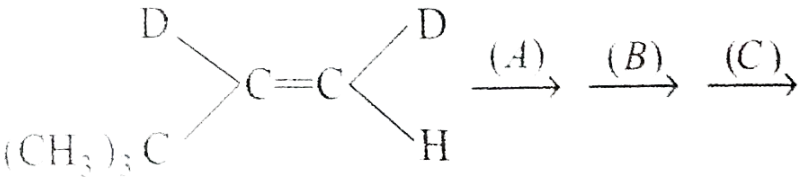
m) $H_2C = CH - CH = CH_2 + H_2 = CH_2 \rightarrow (A) \xrightarrow[Pd]{H_2} (B)$

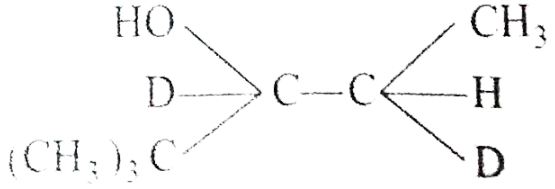
n) $C_3H_7CH = CH_2 \xrightarrow[THF\,/\,H_2O]{Hg(OAc)_2} (A) \xrightarrow{NaBH_4\,/\,NaOH} (B)$

o) $CH_3CH = CH_2 \xrightarrow{BH_3\,/\,THF} (A) \xrightarrow{CH_3COOH} (B)$

p) $C_6H_5CH = CH_2 \xrightarrow{Br_2} (A) \xrightarrow[CH_3I]{3.0\text{equiv}} (B)$

q) $C_6H_5CH_2CH(Cl)C_6H_5 \xrightarrow[\Delta]{KOH\,(\text{alc})} (A)$





r)

(t) $CH_3CH{=}C(CH_3)_2 + HCl \xrightarrow{\text{Peroxide}} (A)$

(u) $HC{\equiv}CH + CH_3MgBr \longrightarrow CH_4 + (A) \xrightarrow{CO_2} (B)$

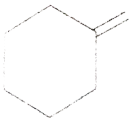
$(B) \xrightarrow{H^+} (C) \xrightarrow[H_2SO_4]{HOH} (D)$

(v) $CH_3CH_2CH{=}CH_2 \xrightarrow{CHCl_3} (A) \xrightarrow{NaOH}$

$(B) \xrightarrow{\text{dil. HCl}} (C)$

(w) $C_6H_5CH{=}CHCH_3 \xrightarrow[H_2O]{Br_2} (A)$

(x)  $+ CH_2{=}CHCl \longrightarrow (A)$

(y)  $\xrightarrow[\text{(ii) } H_2O_2, OH^-]{\text{(i) } BH_3, THF} (A)$

(z) $R{-}CH{=}CH_2 \xrightarrow{(A)} R{-}\underset{\displaystyle Cl}{\underset{|}{CH}}{-}CH_2{-}CCl_3$

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3. Draw all the structural , stereo, and cyclic isomers of C_4H_6.

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4. a) Give the structural formulae of the alkene (C_8H_{16}) which on reductive ozonolysis gives butan-2-one.

b) Write the structure of that compound which on reductive ozonolysis gives propane-1,3-dial.

c) Write the products of the reductive ozonlysis of mesitylene with i) (Zn/CH_3COOH)

ii) $NaBH_4$ or LAH.

d) Give the structural formulae of the alkene which on reductive ozonolysis gives a mixture of 2-methyl-butanal and pentan-2-one.

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5. Answer the following:

a) If the bond order (number of bonds) between two carbon atoms

increases what will happen to bond length and bond energy?

b) What type of reactions usually occur in alkenes?

c) What type of isomerism is exhibited by $CHBr = CHBr$?

d) What type of $H_2C = C = CH_2$ diene is?

e) Which type of mechanism is followed in Markownikoff's rule?

g) What reagent is used in the dehydrohalogenation of alkyl halides?

h) Name two reagents which can be used to test unsaturation?

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6. a) Arrange benzene, n-hexane and ethyne in decreasing order of acidic behaviour. Also give reason for this behaviour.

b) Write the structural formulae and IUPAC names for all the structural isomers of alkenes with molecular formula C_5H_{10}.

c) Write the various types of isomerism shown by alkenes. Give one example of each.

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7. Draw the cis and trans structures of hex-2-ene. Which isomer will have higher b.p. and why?

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8. Two compounds (X) and (Y) of the same molecular formula. C_4H_6 gave the following reactions:

i) Both discharged colour of Br_2 in $C(Cl_4)$.

ii) (X) gives a precipate with ammonicial $AgNO_3$ and on oxidation gives propanoic acid and CO_2.

iii) (Y) does not give precipitate with ammoniacal $AgNO_3$ and on oxidation gives oxliac acid and CO_2.

What is the structural formula of (X) and (Y).

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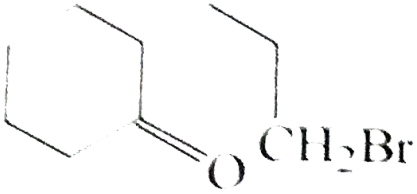
9. Identify the products of the following reactions:

(a) 

$\xrightarrow[\Delta]{(Ph)_3P}$?

(b) 

$+ CH_3I + AgOH \xrightarrow{\Delta}$?

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10. How will you synthesis? ltbrlt a) Vinyl chloride from acetylene

b) But-1-yne form acetylene

c) But-2-one from acetylene

d) Butan-2-one from acetylene

e) Chloroprene from acetylene

f) Propane from isopropyl alcohol

g) 2,3-Dimethylbutane from propene

h) n-Hexane from propene

i) Cyclohexene from cyclohexane

j) Vinyl acetate from ethyl alcohol

k) Cyclohea-1,3-diene from cyclohexene

l) Buta-1,3-diene from butane.

m) 3-Ethylpent-1-yne from pent-1-yne

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11. How will you obtain the following from propene?

a) n-Propyl bromide

b) n-Propyl alcohol

c) Isopropyl alcohol

d) 1,2-Dichloropropane

e) Acetylene

f) Allene (Propadiene)

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12. How will you differentiate the following? A) Ethylene and ethane

b) Ethylene and acetylene

c) Ethane and ethyne

d) But-1-ene and but-1-yne

e) But-2-yne and but-1-yne

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13. a) A gaseous mixutre consists ethane and ehylene. How are the individual members recovered?

A gaseous mixture consists of ethylene and acetylene. How both are separated from each other?

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14. Explain the mechanism of the following reactions:

a) Addition of bromine and ethylene.

b) Addition of HBr on ethylene.

c) Dehydration of an alcohol.

d) Addition of HBr on buta-1,3-diene.

e) Addition of HCl on 3,3-dimethylbut-1-ene.

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15. Deduce the structures of the compounds which yeild the following products on reductive ozonolysis.

a) CH_3CHO and $HCHO$

b) $(CH_3)_2CO$ and $HCHO$

c) $(CH_3)_2CO$ and CH_3CHO

d) $(CH_3)_2CO$ only

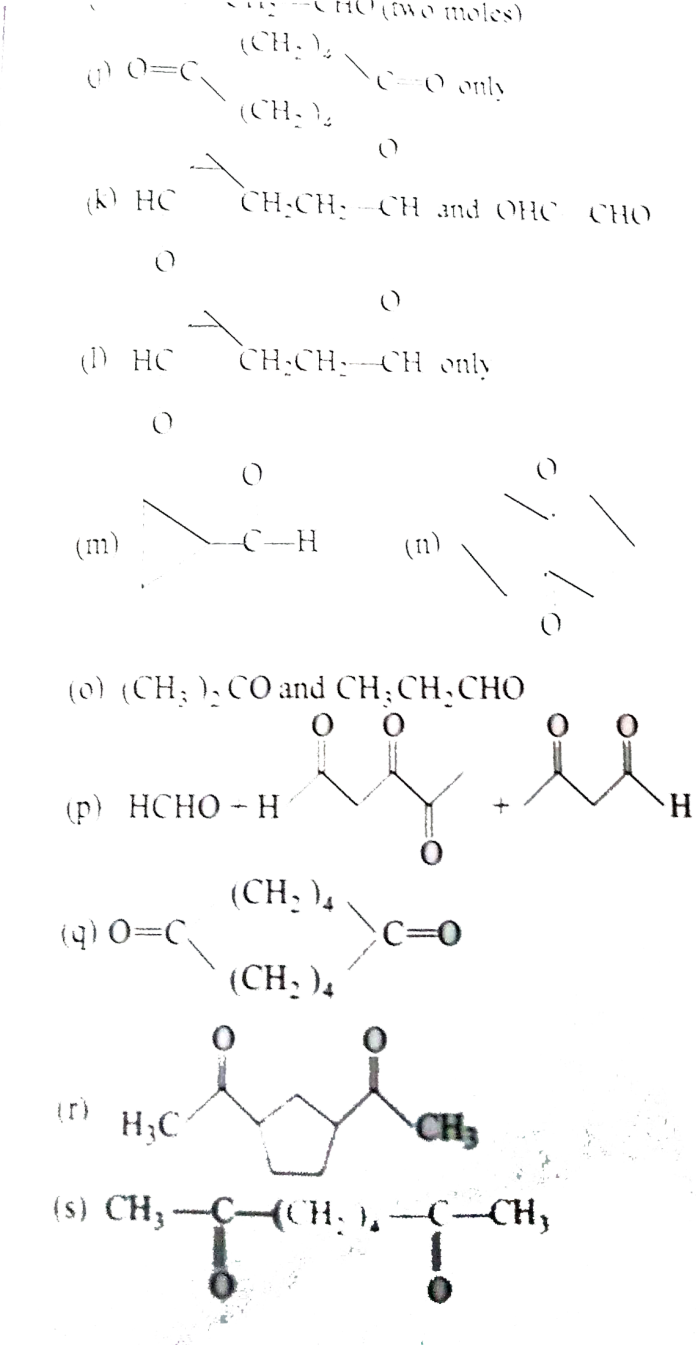
e) $CH_3CH_2-\underset{\underset{CH_3}{|}}{C}=O$ (two moles)

f) HCHO and $O=CH-\underset{\underset{CH_3}{|}}{CH}(CH_3)_2$

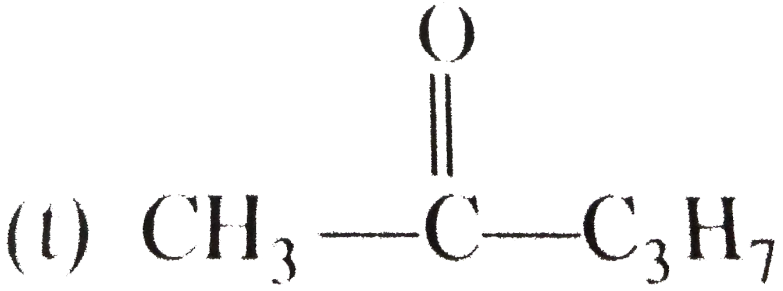
g) $CH_3CH_2\underset{\underset{C_2H_5}{|}}{C}=O$ and $OHC-CHO$ and $OHC(CH_2)CH_3$

h) $OHC-CH_2CH_2CH_2CHO$ only

i) $OHC-CH_2-CHO$ (two moles)


(two moles)
(j) O=C (CH2)4 C=O only
(CH2)4
(k) HC CH2CH2—CH and OHC CHO
O
(l) HC CH2CH2—CH only
(m)
(n)
(o) (CH3)2CO and CH3CH2CHO
(p) HCHO + H
(q) O=C (CH2)4 C=O
(CH2)4
(r) H3C CH3
(s) CH3—C—(CH2)4—C—CH3

j)



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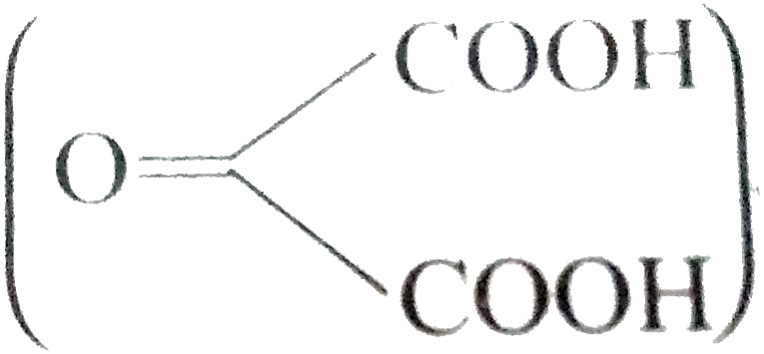
16. a) Compound (A) C_8H_{12} on oxidation gives an acid (B) $C_4H_6O_2$. One molecule of compound (A) reacts with 3 mole of H_2 in presence of platinum catalyst to give octane. Identify compound (A).



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17. Explain the following:

a) Why alkenes are more reactive than alkanes?

b) Acetylene reacts with ammoniacal silver nitrate solution or ammoniacal cuprous chlroide solution or sodamide to form an acetylide while ethylene does not.

c) But-2-ene shows geometrical isomerism but but-1-ene does not show.

d) Why has but-1-yne a larger dipole moment (0.80 D) than but-1-ene (0.40D) ?

e) Wjhuy alkylnes are slightly more soluble in water than alkenes and alkanes?

f) Cyclopropane is more reactive than cyclobutane.

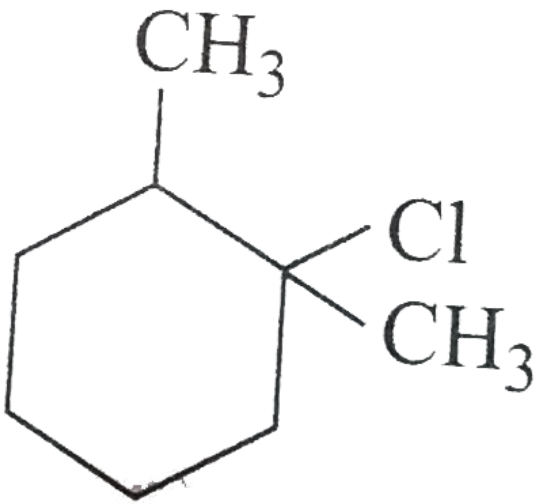
g) Cyclopentane is more reactive than cyclobutane.

h) Which isomer of $C_4H_)(9)Br$ yeilds only a single alkene on dehydrobromination?

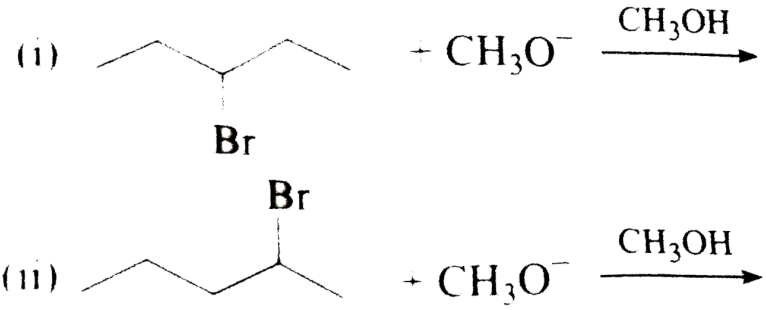
i) Write the products of dehydrochlorination of the following:

(j) Which of the following reactions would provide a better synthesis of 2-pentene?

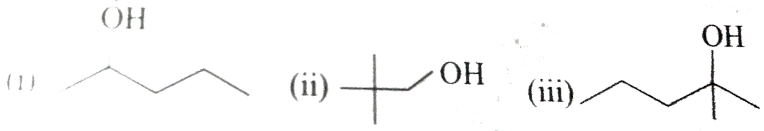
k) Write the major products of dehydration of



l) Comparison of heat of hydrogenation for the following alkenes:

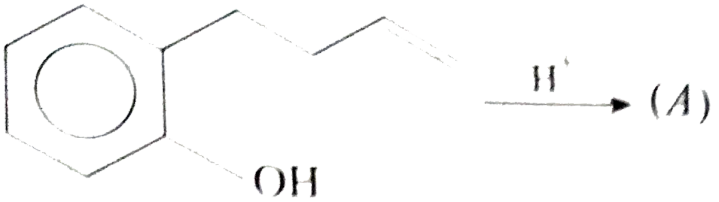


m) Write the intermolecular step and give the product of the following reactioni:



n) Give the structures of an optically active alkene (A) having the lowest

molecular mass, which on catalyst hydrogenation gives an optically inactive compound (B).



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Match type

1. Match the following:

[A]	(a) Dehydrohalogenation	(1) Poisonous gas
	(b) $n CH_2=CH_2 \rightarrow$ $\left[CH_2 \quad CH_2 \right]_n$	(2) Westron
	(c) Ozonolysis	(3) Alkaline potassium permanganate
	(d) Mustard gas	(4) But-2-ene
	(e) Acetylene tetrachloride	(5) 2-Chlorovinyldichloro-arsenic
	(f) Baeyer's reagent	(6) Alcoholic KOH
	(g) Geometrical isomerism	(7) Structure of alkene
	(h) Lewisite	(8) Polymerisation
[B]	(a) C_nH_{2n}	(1) Formaldehyde
	(b) C_nH_{2n-2}	(2) Plastic
	(c) Alkyl halide + Alc. KOH	(3) Allene
	(d) Polythene	(4) Thiophene
	(e) $C_2H_4 + O_3/H_2O$	(5) Alkene
	(f) $H_2C=C=CH_2$	(6) Pyrrole
	(g) $C_2H_2 + S$	(7) Alkyne
	(h) $C_2H_2 + NH_3$	(8) Dehydrohalogenation

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PROBLEMS BASED ON STRUCTURE AND PROPERTIES

1. An organic compound [A] C_6H_{10}, on reduction first gives [B] C_6H_{12}, and finally [C] C_6H_{14}. [A] on ozonolysis followed by hydrolysis gives two aldehydes [D] C_2H_4O, and [E] C_2H_2O. Oxidation of [B] with acidified

$KMnO_4$ gives acid [F] $C_4H_8O_2$. Determine the structures of the compounds [A] to [F] with proper reasoning.

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2. (A), (B) and (C) are isomeric heptenes, (A) on ozonolysis gives ethanal and pentanal, (B) on ozonolysis gives ethanol and pentam-3-one, while (C) on like treatment yeilds propanone and butanone. Give the structural formulae and IUPAC names of (A), (B) and (C).

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3. An organic compound $(E)(C_5H_8)$, on hydrogenation gives a compound $(F)(C_5H_{12})$. Compound (E) on ozonolysis gives formaldehyde and $2-$ ketopropanal. Deduce the structure of the compouns (E).

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4. Compound (A) on treatment with $NaNH_2$ followed by CH_3CH_2Br gave compound 'B' produced compound C, which on ozonolysis gave a carbonyl compound 'D', (C_3H_6O). Compound 'D' did not response to iodoform test with I_2/KI and NaOH. Find out the structures of 'A','B','C' and 'D'.

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5. A hydrocarbon (A) of the formula C_7H_{12} on ozonolysis gives a compound (B) which undergo aldol condensation giving 1-acetylcyclopentene. Identify (A) and (B).

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6. Hydrocarbon (A) C_6H_{10}, on treatment with H_2/Ni, H_2/ Lindlar's catalylst and Na/liquid NH_3 forms three different reduction products (B), (C) and (D) respectiveluy. (A) does not form any salt with ammonial $AgNO_3$ solution, but forms a salt (E) on heating with $NaNH_2$ in an inert

solvent. Compound (E) reacts with CH_3I to give (F). Compound (D) on oxidative ozonolysis gives n-butanoic acid along with other product.

Give structures of (A) to (F) with proper reasoning.

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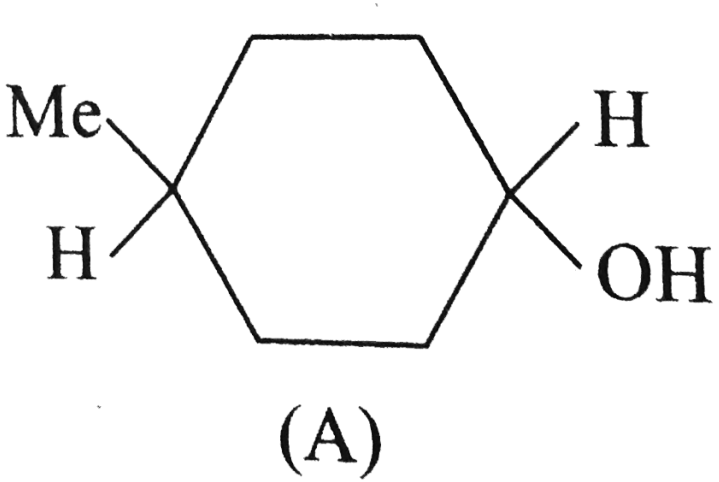

(A)

7.

Dehydration of (A) with conc. H_2SO_4 gives a compound that exists in two isomeric forms. Give the structurest of both the isomers.

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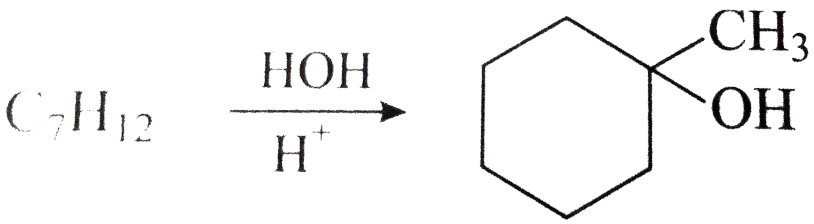

8.

What are the possible isomers of formula C_7H_{12} which gives above product?

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9. Identify (X), (Y) and (Z) in the following synthetic scheme and write their structures.

$$CH_3CH_3 - C \equiv \overset{i}{C}hNaNH_2 \xrightarrow[CH_3CH_2Br]{} (X) \xrightarrow{H_2/Pd-BaSO_4} (Y) \xrightarrow{\text{alkaline}KMnO_4}$$

Is the compound (Z) optically active? Justify your answer.

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10. An alkane (A) $C_{16}H_{16}$ on ozonolysisi gives only one products (B) C_8H_8O. Compound (B) or reaction with $NaOH/I_2$ yields sodium

benzoate. Comopund (B) reacts with KOH/NH_2NH_2 yielding a hydrogen (C) $C_8H(10)$. Write the structures of compounds (B) and (C). Based on this infromation two their structures and identify the isomer which on catalytic hydrpgenation $(H_2/Pd-C)$ gives a racemic mixture.

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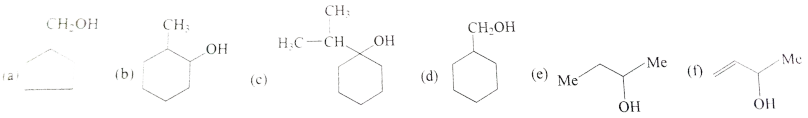
BRAIN STORMING PROBLEMS

1. Write down the products when following compounds are dehydrated:



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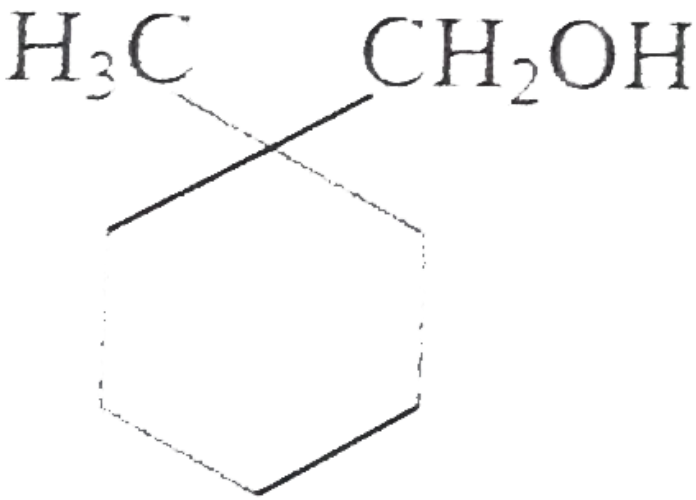
2. Write down dehydration products of the following compound.



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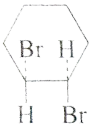
3. Complete the following reactions:

(i) 

$\xrightarrow[\Delta]{\text{Zn/alcohol}}$?

(ii) $(CH_3)_3C—Cl \xrightarrow[\Delta]{CH_3COO}$?

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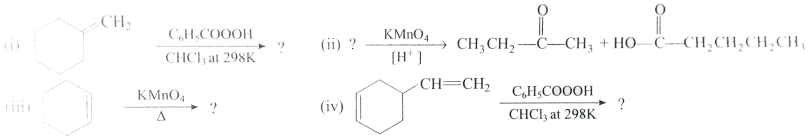
4. Complete the following reactions:



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5. Give the products with their stereoisomers, if any.

a) $Me - \equiv - Me \xrightarrow[C_2H_5OH]{(Na)\ /\ \text{liq.}\ NH_3}$

b) $Me - \equiv - Me \xrightarrow{H_2\ /\ \text{Poisoned Pd}}$

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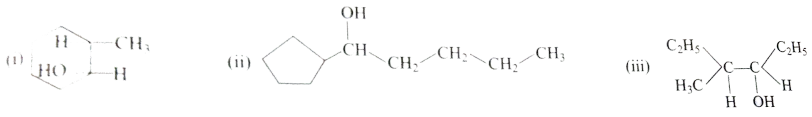
6. Give the structures of components which give following products on hydroboration-oxidation:



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7. An unsaturated compound C_6H_{12} A) decolourless Br_2. Water and on oxidation by acidified $KMnO_4$ gives optically active carboxylic acid C_4H_9COOH (B). Give the structure of (A) and (B).

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8. A compound C_5H_9Br (A) does not decolourie Baeyer's reagent or Br_2 water. (A) on treatment with alcoholic KOH forms (B) C_5H_8 which reacts with Baeyer's reagent and Br_2 water. Ozonolysis of (B) forms (C) $C_5H_8O_2$. Identify (A),(B),(C) and explain reactions.

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9. Give the structure of polyisoprene (natural rubber). Write down the ozonolysis of polyisoprene.

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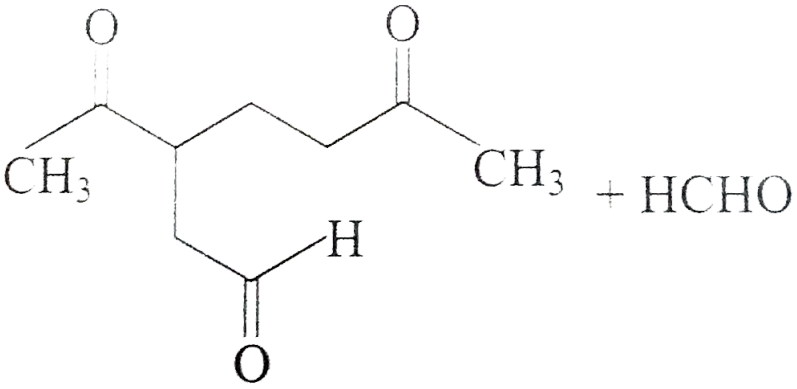
10. Limonene $(C_{10}H_{16})$ is a naturally occuring hydrocarbon. It absorbs 2 molecules of hydrogen for each molecule during hydrogenation. On ozonolysis followed by zinc and dust and steam hydrolysis, it gives one mole of formaldehyde and one mole of tricarbonyl compound of following structure.



Give probable structure of limonene if it has a six membrane ring.

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11. Hydrocarbon (A) $(C = 87.2\,\%)$ on hydrogenation forms (B) $(C = 84.1\,\%)$. Ozonolysis of (A) forms acetic acid, acetone and pyruvic

acid

$CH_3 - \overset{O}{\overset{||}{C}} - COOH$. What are (A) and (B) ?

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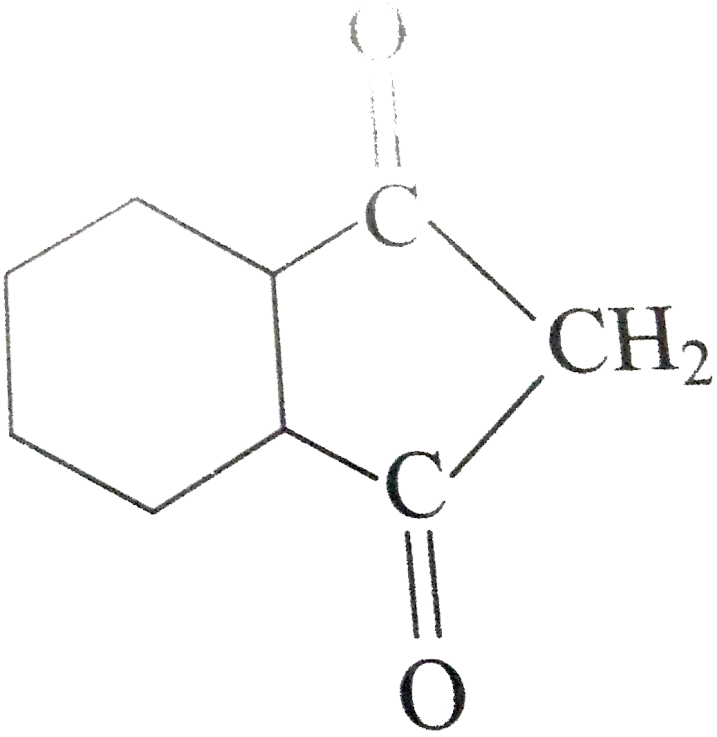
12. $C_{11}H_{16}$ (A) reacts with two equivalent of H_2 and on reductive ozonolysis gives two equivalent formaldeyde and (B) of the following structure.



Identify structure of (A).

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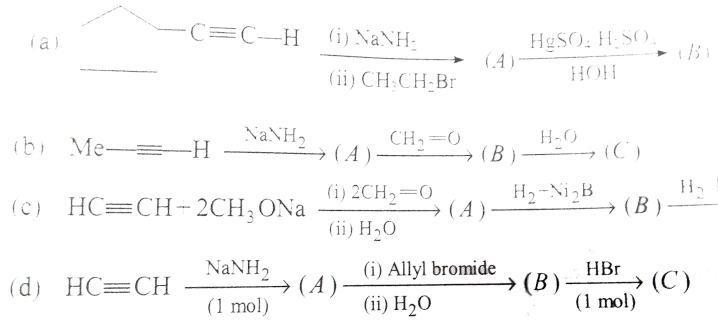
13. Complete the following reaction:



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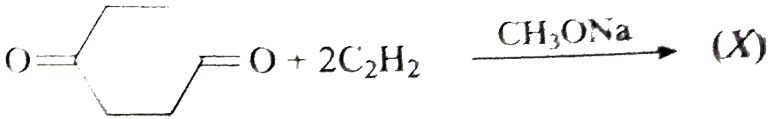
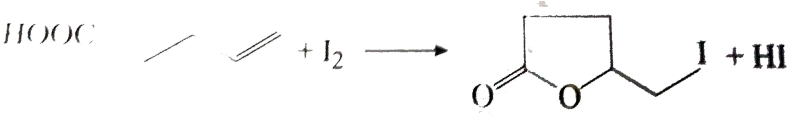
14. a) Identify the product in the following reactions:



b) Give the possible mechanism for the following iodolactonization:



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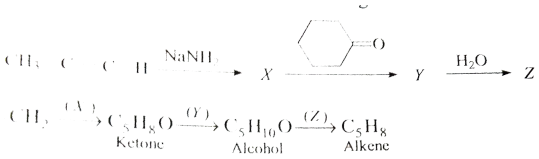
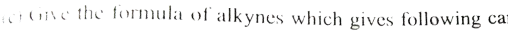
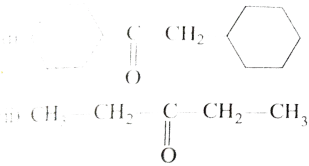
15. a) Identify the products among the following:





(c) Give the formula of alkynes which gives following carbonyl compounds on hydration :



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16. Explain why the addition of HI to 3,3-dimethylbut-1-ene gives 2-iodo-2,3-dimethylbutane as the major product and not the 1-iodo-3,3-dimethylbutane.

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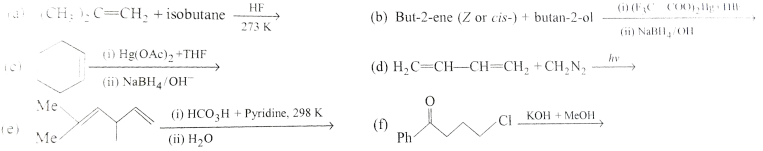
17. Complete the following reactions:



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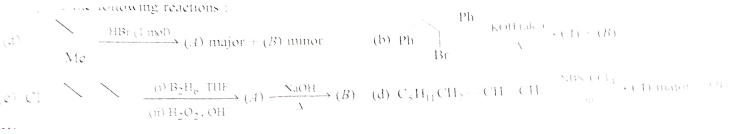
18. Complete the following reactions:



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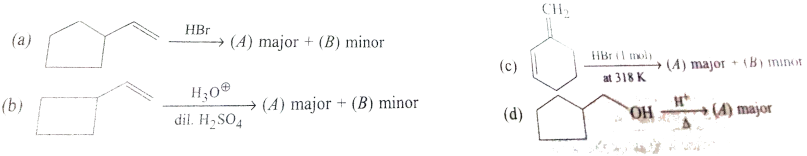
19. Complete the following reactions:



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OBJECTIVE QUESTIONS

1. When ethyl iodide is treated with alcoholic potash, we get:

A. ethyl alcohol

B. ethane

C. acetylene

D. ethylene

Answer: D

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2. Ethylene is produced by:

A. dehydration of acetic acid

B. electrolysis of methyl alcohol

C. mixing acetic acid and calcium formate.

D. Passing C_2H_5OH vapours over hot Al_2O_3

Answer: D

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3. A gas decolourises alkaline $KMnO_4$ solution but does not give precipitate with silver nitrate. It is:

A. CH_4

B. C_2H_6

C. C_2H_4

D. C_2H_2

Answer: C

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4. Acetylene on treatment with dil. H_2SO_4 having $HgSO_4$ gives:

A. acetaldehyde

B. acetic acid

C. ethanol

D. ethylene

Answer: A

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5. Which of the following reagents distinguish ethylene from acetylene?

A. Ammoniacal cuprous chloride

B. Br_2 water

C. Alkaline $KMnO_4$ solution

D. Chlorine dissolved in $C(Cl_4)$

Answer: A

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6. Which of the following not only decolourless alkaline potassium permagnete but also gives rest precipitate with ammoniacal cuprous chloridie solution?

A. Ethane

B. Methane

C. Ethene

D. Acetylene

Answer: D

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7. The most reactive hydrocarbon is

A. Ehene

B. ethyne

C. ethane

D. methane

Answer: A

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8. Aqueous solution of an organic compound 'A' on electrolysis liberates aceylene and CO_2 at anode. 'A' is

A. potassium citrate

B. potassium acetate

C. potassium succinate

D. Potassium maleate

Answer: D

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9. Baeyer's reagent is:

A. alkaline potassium permanganate

B. acidic potassium permanganate

C. neutral potassium permanganate

D. alkalinie potassium manganate

Answer: A

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10. The negative part of the addendum adds on to the carbon atom joined to the least number of hydrogen atoms. This statemet is called.

A. Saytzeff rule

B. Kharasch effect

C. Markownikoff's rule

D. Anti - Saytzeff rule

Answer: C

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11. Products of the following reaction.

$Me_2C - CHCH_3 \underset{ii.\,(CH_3)_2}{\overset{i.\,O_3}{S}} \rightarrow$? are

A. $Me_2CO + CH_3CHO$

B. $CH_3CHO + CH_3COOH$

C. $Me_2CO + CH_3COOH$

D. $2Me_2CO$

Answer: A

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12. Ethyl alcohol is heated with conc. H_2SO_4 at 170°C. The product formed is:

A. $CH_3COOHCH_3$

B. C_2H_6

C. C_2H_4

D. C_2H_2

Answer: C

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13. Total number of isomeric alkene possible with compound having molecular formula C_4H_8 is

A. 2

B. 3

C. 4

D. 5

Answer: C

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14. When ethyleneis passsed through alkaline $KMnO_4$ solution, we get,

A. ethanol

B. glycol

C. oxalic acid

D. acctaldehyde

Answer: B

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15. But-2-ene can be obtained by reacting:

A. 1,3-dibromopropane with zinc

B. ethyl bromide with sodium

C. ethyl bromide with sodium

D. n-butyl alcohol with alcoholic KOH

Answer: C

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16. On electrolysis of potassium succinate solution, the hydrocarbons obtained is:

A. ethene

B. ethane

C. ethyne

D. all of these

Answer: A

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17. Ethylene combines with sulphur monochloride to form.

A. ethyl chloride

B. ethylene chloride

C. mustard gas

D. ethylidene chloride

Answer: C

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18. Ethylene reacts with air under pressure in presence of silver catallyst at 523 K to form:

A. ethylene glycol

B. formaldehyde

C. acetaldehyde

D. epoxide

Answer: D

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19. Which of the following gives white precipitate with ammoniacal $AgNO_3$?

A. C_2H_6

B. C_2H_4

C. C_2H_2

D. C_3H_8

Answer: C

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20. Chloroform or iodoform on heating with silver powder gives:

A. CH_4

B. C_2H_4

C. C_2H_6

D. C_2H_2

Answer: D

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21. Benzene is a polymer of:

A. methane

B. acetylene

C. ethane

D. ethylene

Answer: B

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22. Acetylene on ozonolysis gives:

A. Glycol

B. glyoxal and formic acid

C. formaldehyde

D. none of the above

Answer: B

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23. Chromic acid oxidises acetylene into:

A. oxalic acid

B. acetic acid

C. acetaldehyde

D. $CO_2 + H_2O$

Answer: B

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24. Ethylene can be converted into alcohol by treatment of:

A. aq. KOH

B. Zn/HCl

C. H_2SO_4 as catalyst

D. moist silver oxide

Answer: C

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25. Addition of $HOCl$ to ethyene gives:

A. ethyl chloride

B. vinyl chloride

C. dichloroacetaldehyde

D. ethylidene chloride

Answer: C

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26. When acetylen reacted with hydroxylic acid in presence of $HgCl_{20}$ the product obtained is

A. methyl chloride

B. vinyl chloride

C. formaldehyde

D. acetaldehyde

Answer: B

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27. When propyne is treated with aqueous H_2SO_4 in presence of $HgSO_4$, the major product is

A. propanone

B. 2-propanol

C. propane

D. ethyne

Answer: A

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28. The catalyst used in the Wacker process of oxidation of ethene to ethanol is:

A. $PdCl_2$

B. V_2O_5

C. nickel complexes

D. $TiCl_4$ and $Al(CH_3)(3)$

Answer: A

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29. In the reaction,

$HC \equiv CH + 2AgNO_3 \xrightarrow{NH_4OH} X + 2NH_4NO_3 + 2H_2O$ 'X' is:

A. Ag_2C_3

B. Ag_2C

C. AgC

D. AgOH

Answer: A

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30. When $1, 1, 2, 2 -$ tetrabomopropane is heated with zinc powder in alcohol, which is formed :

A. Alkyne

B. Alkene

C. Alkane

D. None of the these

Answer: A

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31. The end product of the following sequences of operations is:

$$CaC_2 \xrightarrow{H_2O} (A) \xrightarrow[HgSO_4]{H_2SO_4} (B) \xrightarrow[LiAlH_4]{H} (C)$$

A. methyl alcohol

B. ethyl alcohol

C. acetaldehyde

D. ethylene

Answer: B

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32. The name of the poisonous gas formed by the interaction of accetylene and arsenci trichloride is:

A. phosgene

B. lewisite

C. mustard gas

D. westron

Answer: B

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33. Acetylene when treated with Cl_2 in $C(Cl_4)$ forms:

A. mustard gas

B. lewisite

C. westrosol

D. westron

Answer: D

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34. Acetylene is not used to prepare:

A. Westron

B. westrosol

C. lewistite

D. mustard gas

Answer: D

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35. In the following reaction

$$H_3C - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - CH = CH_2 \xrightarrow{H_2O\,/\,H^{\oplus}} \underset{\text{Major product}}{A} \quad \underset{\text{Minor product}}{B}$$

The major product is

A. $H_3C - \overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}} - \underset{\displaystyle OH}{\overset{|}{C}}H - CH_3$

B. $H_3C - \overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}} - \underset{\displaystyle CH_3}{\overset{|}{C}}H - CH_3$

C. $\underset{\displaystyle OH}{\overset{|}{C}}H_2 - \overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}} - CH_2 - CH_3$

D. $H_3C - \overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}} - CH_3 - \underset{\displaystyle OH}{\overset{|}{CH_2}}$

Answer: B

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36. Among the alkenes, which one produces tertiary butyl alcohol on acid hydration?

A. $CH_3CH_2CH = CH_2$

B. $CH_3CH = CHCH_3$

C. $(CH_3)_2C = CH_2$

D. $CH_3CH = CH_2$

Answer: C

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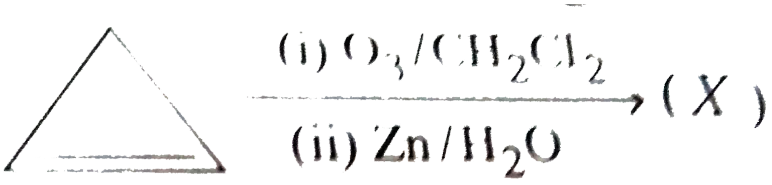
37. Final product (X) of the following reaction is:



A. methanol

B. propane-1,3-dioic acid

C. ethanol

D. propane-1,3-dial

Answer: D

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38. The main product of the given reaction:

But-2-ene + chloroform $\xrightarrow[\text{Hydrolysis}]{NaOH}$ is:

A. Butanoic acid

B. 2-methylbutanoic acid

C. 2-methylbutanoic acid

D. butane-1,4-diol

Answer: C

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39. Which one of the following gives a red precipitate with ammoniacal solution of cuprous chloride?

A. $H_2C = CH_2$

B. $HC \equiv CH$

C. $H_3C - CH_3$

D. $H_3C - C \equiv C - CH_3$

Answer: B

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40. In the reactions $HC \equiv CH \xrightarrow[(2)\,CH_3CH_2Br]{(1)\,NaNH_2/liq.NH_3} X$

$X \xrightarrow[(2)\,CH_3CH_2Br]{(1)\,NaNH_2/liq.NH_3} Y$, X and Y are :

A. X= 2-butyne, Y=2-hexyne

B. X=2-butyne, Y=3-hexyne

C. X=1-butyne, Y=2-hexyne

D. X=1-butyne, Y=3-hexyne

Answer: D

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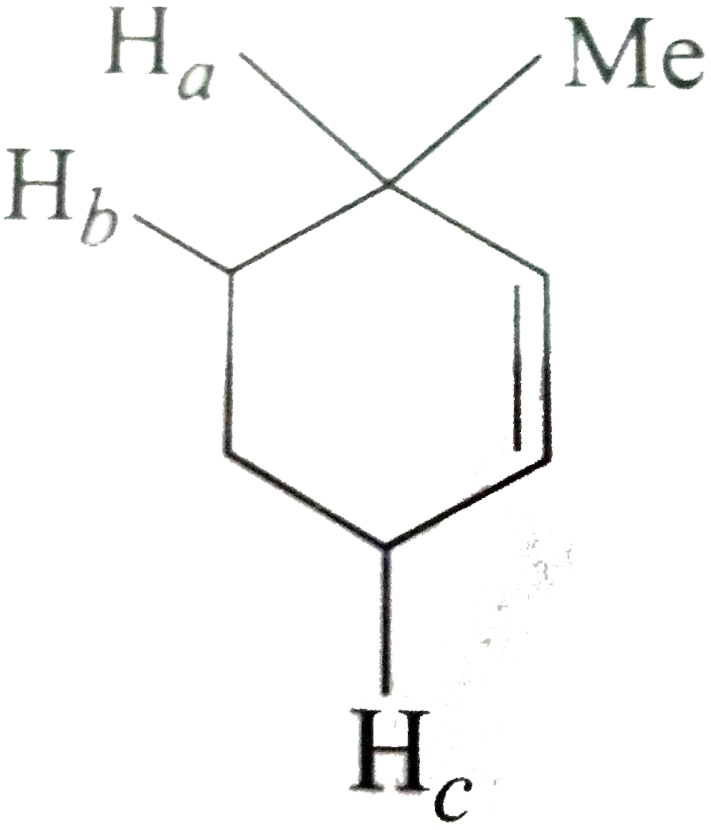
41. The order of decreasing ease of abstraction of hydrogen atoms in the following molecule



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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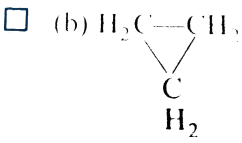
42. Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction?

A. $CH_3CH_2CH_2Br$

B. 

C. $H_2C = C = O$

D. $CH_3CH_2CH_2OH$

Answer: C

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43. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of

A. a vinyl group

B. two ethylenic double bonds

C. an isopropyl group

D. an acetylenic triple bond

Answer: A

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44. The nodal plane in the π-bond of ethene is located in:

A. the molecular plane

B. a plane parallel to the molecular plane

C. a plane perpendicular to the molecular plane which bisects the C-C σ bond at right angle

D. a plane perpendicular to the molecular plane which contains the C-C σ bond.

Answer: A

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45. Identify (B) and (D) in the following sequence of reactions:

$$H_2C = CH_2 \xrightarrow{\text{conc. } H_2SO_4} (A) \xrightarrow[\Delta]{H_2O} (B) \xrightarrow{PB_3} (C) \xrightarrow{(D)} (H_2C = CH_2)$$

A. CH_3OH and C_2H_5Br

B. $C_2H_5HSO_4$ and alc. KOH

C. C_2H_5OH and alc. KOH

D. $C_2H_5HSO_4$ and aq. KOH

Answer: C

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46. Conjugated double bond is present in:

A. propylene

B. isobutylene

C. butylene

D. butadiene

Answer: D

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47. Which of the following reagents will be able to distinguish between $1-$ butyne and $2-$ butyne ?

A. $NaNH_2$

B. HCl

C. O_2

D. Br_2

Answer: A

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48. In the reaction given below, X is

Neopentyl alcohol $\xrightarrow{H_2SO_4} X$

A. 2-methylpentane

B. Neopentane

C. 2-methylpent-2-ene

D. 2-methylbut-2-ene

Answer: D

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49. Which of the following will have least hindered rotation about carbon-carbon bond?

A. Ethylene

B. Accetylene

C. ethane

D. Hexachloroethane

Answer: C

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50. The olefin which on ozonolysis gives CH_3CH_2CHO and CH_3CHO is

A. 1-butene

B. 2-butene

C. 1-penene

D. 2-pentene

Answer: D

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51. Propene was oxidised by aqueous $KMnO_4$ to give a compound (A), Treatment of compound (A) with thionyl chloride gave:

A. 1-chloropropanone

B. 2-chloropropanol

C. 1,2-dichloropropane

D. 2-chloropropanoic acid

Answer: C

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52. What is Lindlar's Catalyst

A. Pt in ethanol

B. Pd + $BaSO_4$

C. Ni in ethanol

D. Na in liquid NH_3

Answer: B

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53. Reaction of HBr with propene in absence of peroxide is a/an:

A. electrophilic addition

B. electrophilic substitution

C. nucleophilic addition

D. nucleophilic substitution

Answer: A

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54. 1-butyne on reaction with hot alkaline $KMnO_4$ gives:

A. $CH_3CH_2CH_2COOH$

B. CH_3CH_2COOH

C. $CH_3CH_2COOH + CO_2$

D. $CH_3CH_2COOH + HCOOH$

Answer: D

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55. When C_2H_2, CH_4 and C_2H_4 passes through a test tube which have ammoniacal Cu_2Cl_2, find out which gas comes out unaffected from test tube?

A. C_2H_2 and CH_4

B. C_2H_2 and C_2H_4

C. C_2H_2

D. C_2H_4 and CH_4

Answer: D

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56. When propene is treated with chlorine at 500°C, allyl chlroide is formed as the main product. The mechanism of the reaction is:

A. free radical addition

B. free radical substitution

C. electrophilic addition

D. electrophilic substitution

Answer: B

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57. Mustard gas is:

A. $COCl_2$

B. $C(Cl_3)NO_3$

C. $\underset{\underset{Cl}{|}}{CH_2} - CH_2 - S - CH_2 - \underset{\underset{Cl}{|}}{CH_2}$

D. $CHCl_2NO_2$

Answer: C

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58. To prepare 2-butyne from 2,2,3,3- tetrachlorobutane, use is made of:

A. Zinc

B. sodamide

C. alc. KOH

D. aq. Of KOH

Answer: A

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59. Indicate the organic structure for the product expected when 2-methylpropene is heated with acetyl chloride in the presence of anhydrous $ZnCl_2$.

A. $(CH_3)_2C(Cl)CH_2OC(CH_3)$

B. $(CH_3)_2CHCH_2O\mathbb{C}H_3$

C. $CH_3COCH(CH_3)_2$

D. none of the above

Answer: A

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60. Anti-Markownikoff's addition of HBr is not observed in-

A. propene

B. 1-butene

C. 2-butene

D. 2-pentene

Answer: C

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61. Catalyst used in the dimerization of acetylene to prepare chloroprene is

A. $HgSO_4 + H_2SO_4$

B. Cu_2Cl_2

C. $Cu_2Cl_2 + NH_4OH$

D. $Cu_2Cl_2 + NH_4Cl$

Answer: D

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62. Ammoniacal silver nitrate forms a white precipitate easily with:

A. $CH_3CH = CH_2$

B. $CH_3 - C \equiv CH$

C. $Cu_2Cl_2 + NH_4OH$

D. $Cu_2Cl_2 + NH_4Cl$

Answer: B

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63. Structural formula for lewisite is:

A. $\begin{matrix} CHCl \\ || \\ CHAsCl_3 \end{matrix}$

B. $\begin{matrix} CHCl \\ || \\ CHAsCI \end{matrix}$

C. $\begin{matrix} CHCl \\ || \\ CHAsCl_2 \end{matrix}$

D. $\begin{matrix} CH_2 \\ || \\ CHAsCl_2 \end{matrix}$

Answer: C

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64. An olefin may be converted into alocohol by:

A. B_2H_6 and H_2O_2

B. $LiAIH_4$

C. alkaline $KMnO_4$

D. HOCl

Answer: A

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65. Propene is more reactive than ethene towards HBr because:

A. propene can more readily undergo a free radical chain reaction.

B. propene gives rise to more stable carbonium ion

C. the double bond in case of propene is unstable

D. the methyl group attached to double bond withdraws electrons and facilitates the attack.

Answer: B

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66. Acetylene when passed through cuprous chloride in presence of ammonium chloride forms:

A. benzene

B. vinyl acetylene

C. allyl chlroide

D. allene

Answer: B

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67. Which of the following alkylnes is most acidic?

A. $CH_3 - C \equiv CH$

B. $CH_3 - C \equiv C - CH_3$

C. $CH_3 - CH_2 - C \equiv CH$

D. $HC \equiv CH$

Answer: D

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68. Acetylenic hydrocarbons are acidic because

A. sigma electron density of C-H bond in acetylene is nearer to carbon which has $50\ \%$ s-character.

B. accetylene has only one hydrogen on each carbon

C. acetylene contains least number of hydrogen among the possible hydrocarbons having two carbons

D. acetylene resembles acetic acid.

Answer: A

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69. Sample of 2,3-dibromo-3-methylpentane is heated with zinc dust. The resulting products is isolated and heated with HI in the presence of phosphorus. Indicate which is the structure that represents the final product in the reaction:

A. $H_2C = CH - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

B. $CH_3 - CH_2 - \underset{\underset{CH_3}{|}}{C}\ H - CH_2 - CH_3$

C. $CH_3 - CHI - \underset{\underset{CH_3}{|}}{C}\ H - CH_2 - CH_3$

D. none of the above

Answer: B

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70. Which of the following reactions will yield $2, 2-$ dibromopropane ?

A. $H_2C = CHBr + HBr$

B. $CH_3C \equiv C(CH_3) + 2HBr$

C. $CH_3C \equiv CH + 2HBr$

D. $CH_3CH = CH + 2HBr$

Answer: C

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71. Propyne on ozone treatment followed by oxidative degradation gives:

A. 2 moles of HCOOH

B. 2 moles of CH_3COOH

C. 2-oxopropanal

D. $CH_3COOH + HCOOH$

Answer: D

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72. Ozonolysis product of cyclobutene is:

A. Glycol

B. dimethylglyoxal

C. succinaldehyde

D. methanal

Answer: C

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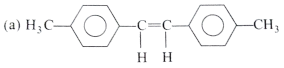
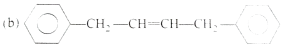
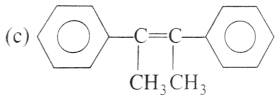
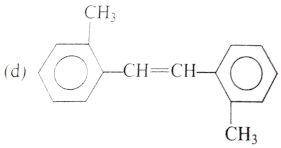
73. An alkene (A) $C_{16}H_{16}$ on ozonolysis gives only one product (B) C_8H_8O . Compound (B) on reaction with NH_2OH, H_2SO_4 and heating gives N-methyl benzamide. The compound (A) is:

A. 

B. 

C. 

D. 

Answer: C

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74. A hydrocarbon 'A' (C_4H_8) on reaction HCl gives a compound 'B', (C_4H_9Cl) which on reaction with 1 mol of NH_3 gives compounds 'C' $(C_4H_{11}N)$. On reacting with $NaNO_2$ and HCl followed by treatment with

water compound 'C' yields an optically active alcohol, 'D'. Ozonolysis of 'A' given 2mols of acetyldehyde. Identify compound 'A' to 'D'. Explain the reaction involved.

A. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

B. $CH_3CH_2 - CH - CH_3$

C. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2OH$

D. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CHO$

Answer: B

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75. $H_2C = CH_2 + HOCl \rightarrow \ldots\ldots\ldots\ldots + \ldots\ldots\ldots \rightarrow$

ethylene chlorohydrin. Fill in the blanks in the above reaction with:

A. $CH_2OH - CH_2^-$

B. $CH_2Cl - CH_2 + OH^+$

C. $CH_2OH - CH_2^+ + (Cl)^-$

D. $CH_2Cl - Cl^+ + OH^-$

Answer: D

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76. Upon ozonolysis, molecule of a hydrcarbon produces of ethanal and one molecule of ethane dial. Identify the hydrocarbon.

A. 2,4-hexadiene

B. 1.4-hexadiene

C. 1,3-hexadiene

D. 1,4-cyclohexadiene

Answer: A

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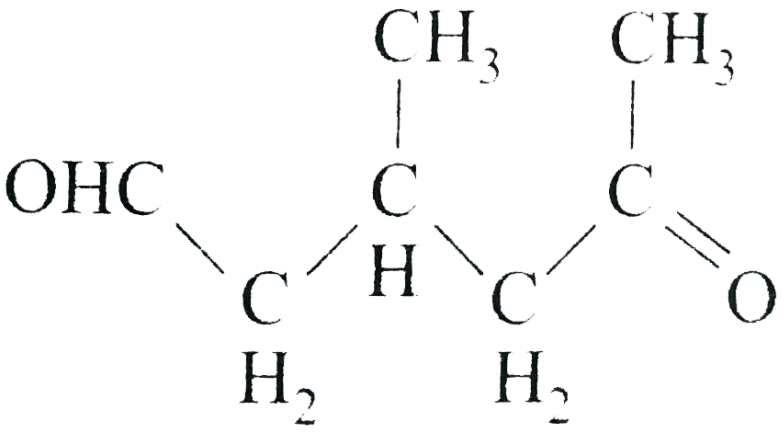
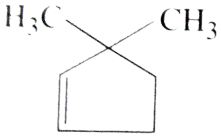
77. A single compound of the structure.

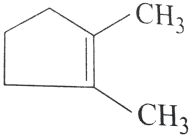


is obtained from ozonolysis of which of the following cyclic compounds?

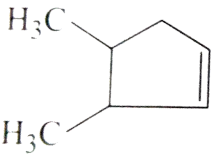
A. (a)



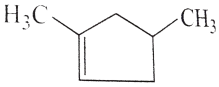
B. (b)



C. (c)



D. (d)



Answer: D

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78. Two organic compound X and Y on analysis gave the same percentage composition, namely C $=\frac{12}{13} \times 100\,\%$ and $H = (1/13) \times 100\,\%$. However, compound 'X' decolourises bromine water while compound 'Y' does not. Two compounds 'X' and 'Y' may be respectively.

A. ethylene and benzene

B. acetylene and ethylene

C. acetylene and benzene

D. toluene and benzene

Answer: C

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79. What are the starting materials to get 2-methylpropene as the major product?

A. sodium methoxide and sec-butyl bromide

B. sodium ethoxide and sec-butyl bromide

C. Sodium tert-butoxide and ethyl bromide

D. Sodium methoxide and tert-butyl bromide

Answer: D

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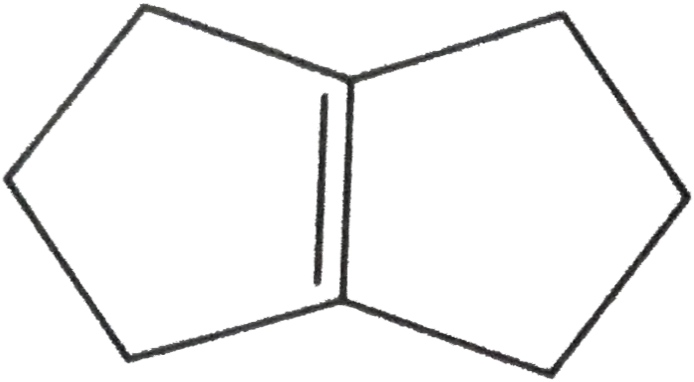
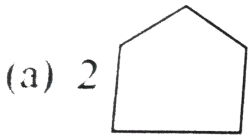
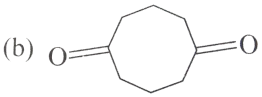
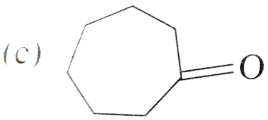
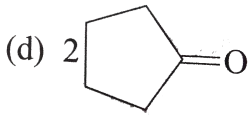
80. Ozonolysis of the following compound



A. 

B. 

C. 

D. 

Answer: B

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81. Cyclopentene on treatment with alkaline $KMnO_4$ gives

A. cyclopentanol

B. trans-1,2-cyclopentanediol

C. cis-1,2-cyclopentanediol

D. mixture of (b) and (c)

Answer: C

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82. A hydrocarbon of formula C_6H_{10}, absorbs only one molecule of H_2 upon catalytic hydrogenation. Upon ozonolysis the hydrocarbons yeilds. $OHC - CH_2 - CH_2 - CH_2 - CHO$ the compound is:

A. cyclohexene

B. cyclohexane

C. benzene

D. cyclobutane

Answer: A

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83. Diels-Alder reaction is used to synthesis a ring of:

A. four carbon atoms

B. five carbon atoms

C. three carbon atoms

D. six carbon atoms

Answer: D

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84. Terminal (α, ω) dihalides on heating with zinc or sodium forms:

A. alkenes

B. alkynes

C. alkanes

D. cycloalkanes

Answer: D

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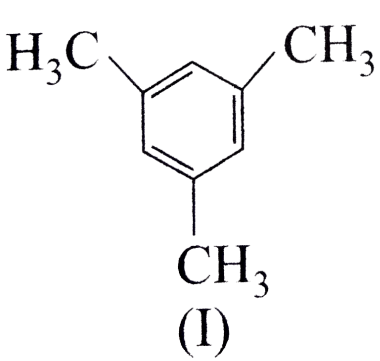
85. Given :



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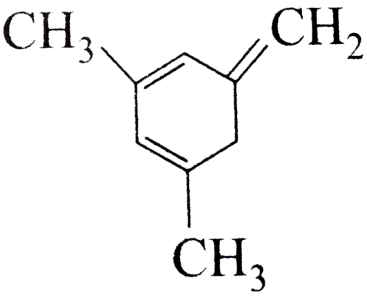
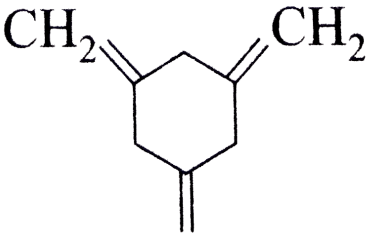


(II)



(III)

The enthalpy of the hydrogenation of these compounds will be in the order as :

A. II gt III gt I

B. III gt II gt I

C. I gt II gt III

D. II gt I gt III

Answer: B

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86. Which of the following reagents will you choose for the given reactions?

$$H_2C = CH_2 + H_2O + O \rightarrow \underset{|}{\overset{OH}{CH_2C}} - \underset{|}{\overset{OH}{CH_2}}$$

A. Dil. $KMnO_4$, at 273 K

B. Alkaline $KMnO_4$, high temperature

C. Acid and $K_2Cr_2O_7$ at room temperature

D. Acid and $KMnO_4$ at room temperature.

Answer: A

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87. In the presence of platinum catalyst, hydrocarbon (A) adds hyrogen to form n-hexane. When hydrogen bromide is added to (A) instead of hydrogen, only a single bromo compound is formed. Which of the following is (A)?

A. $H_2C = CH - CH_2 - CH_2 - CH_2$

B. $CH_3 - CH = CH - CH_2 - CH_2 - CH_3$

C. $CH_3 - CH_2 - CH = CH - CH_2 - CH_3$

D. $CH_3 - CH_2 - CH_2 - CH = CH - CH_3$

Answer: C

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88. The alkene $R - CH = CH_2$ reacts readily with B_2H_6 and formed the product B which on oxidation with alkaline hydrogen peroxide produces

A. $R - \underset{|}{\underset{OH}{CH}} - \underset{|}{\underset{OH}{CH_2}}$

B. $R - CH_2 - CHO$

C. RCH_2CH_2OH

D. $R - \underset{\underset{O}{||}}{C} - CH_3$

Answer: C

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89. The intermediate during the addition of HCl to propene in the presence of peroxide is :

A. CH_3CHCH_2Cl

B. $CH_3CH^+CH_3$

C. $CH_3CH_2CH_2$

D. $CH_3CH_2CH_2$

Answer: B

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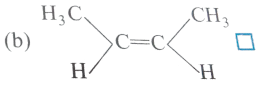
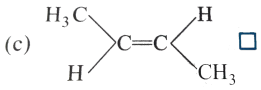
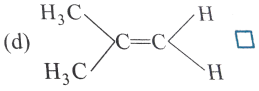
90. The compound which reacts with HBr obeying Markownikoff's rule is:

A. $H_2C = CH_2$

B. 

C. 

D. 

Answer: D

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91. The reaction of propene with HBr in presence of peroxide proceeds through the intermediate:

A. $H_3C - CH^+CH_3$

B. $H_3C - \dot{C}H - CH_2Br$

C. $H_3C - \underset{\underset{Br}{|}}{CH} - \dot{C}H_2$

D. $H_3C - CH_2 - CH_2^+$

Answer: B

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92. Cyclohexadiene contains how many degree of unsaturation?

A. 1

B. 2

C. 3

D. 6

Answer: C

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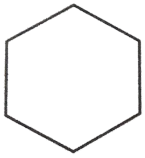
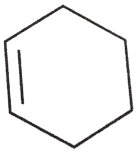
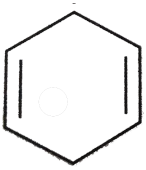
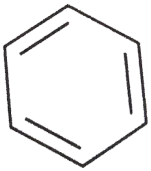
93. Acetylene contains same degrees of unsaturation as:

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: B

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94. Four degree of unsaturation are present in which of the compounds given below?

A. But-1-yne

B. But-2-yne

C. Buta-1,3-diene

D. Toluene

Answer: D

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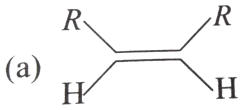
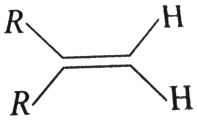
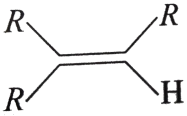
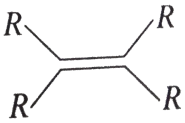
95. Which one of the following alkenes will react faster with H_2 under catalyst hydrogenation condtion?

A.



B. (b) 

C. (c) 

D. (d) 

Answer: A

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96. Propyne and propene can be distinguished by :

A. conc. H_2SO_4

B. Br_2 in $C(Cl_4)$

C. $AgNO_3$ in ammonia

D. dil. $KMnO_4$

Answer: C

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97. An alkene combines with a conjusted diene to give an unconguated cycloalkadiene. The most likely title of this reaction is:

A. Schotten-Baumann reaction

B. Hoffmann-bromamide-reaction

C. Diels-Alder reaction

D. Pinacol-Pinacolone rearrangement.

Answer: C

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98. When cyclohexane is poured in water, it floats because:

A. in boat from

B. in chair form

C. in crown form

D. less dense than water.

Answer: D

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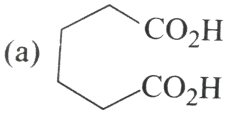
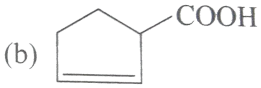
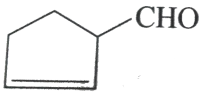
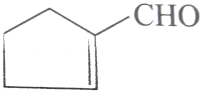
99. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on furhter treatment with aqueous KOH yields compound F. Compound F is

A. 

B. 

C. (c) 

D. (d) 

Answer: D

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100. During debromination of meso — dibromobutane, the major compound formed is

A. n-butane

B. 1-butene

C. cis-2-butene

D. trans-2-butene

Answer: D

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101. Addition of bromine to buta-1,3-diene gives:

A. 1,2-addition product only

B. 1,4-addition product only

C. both 1,2 and 1,4-addition products.

D. no reaction

Answer: C

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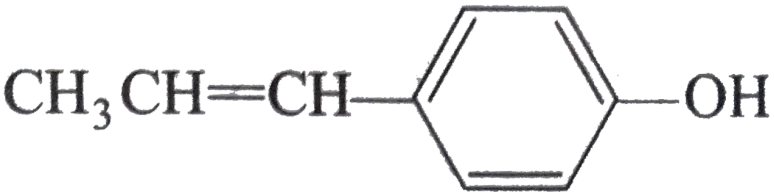
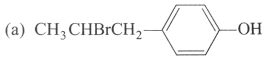
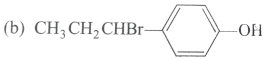
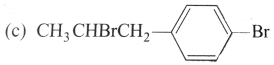
102. The reaction of

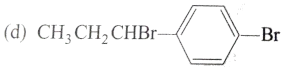


with HBr gives:

A. 

B. 

C. 

D. 

Answer: B

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103. The product(s) obtained via oxymercuration $(HgSO_4 + H_2SO_4)$ of 1-butyne would be:

A. $CH_3CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

B. $CH_3CH_2CH_2CHO$

C. $CH_3CH_2CHO + HCHO$

D. $CH_3CH_2COOH + HCOOH$

Answer: A

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104. The reaction of propene with HOCl proceeds via the addition of :

A. H^+ in the first step.

B. Cl^+ in the first step

C. OH^- in the first step

D. Cl^+ and OH^- in the single step

Answer: B

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105. Which of these will not react with acetylene?

A. NaOH

B. Ammoniacal $AgNO_3$

C. Na

D. HCl

Answer: A

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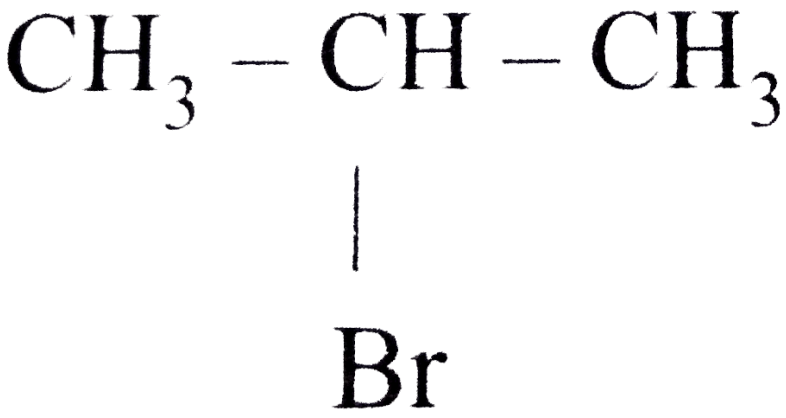
106. Identify the set of reagents / reaction conditions $'X'$ and $'Y'$ in the following set of transformations.

$CH_3 - CH_2CH_2Br \xrightarrow{X} Product \xrightarrow{Y}$



A. X= dilute aqueous NaOH, 20° C Y= HBr/acetic acid, 20° C

B. X= conc. Alcoholic NaOH, 80° C Y=HBr/Acetic acid, 20° C

C. X=dilute aqueous NaOH, 20° C Y=$B_2/CHCl_3$, 0° C

D. X=conc. Alcoholic NaOH, 80° C Y=$Br_2\,/\,CHCl_3$, 0° C

Answer: B

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107. In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti-Markovnikov's addition to alkenes because:

A. both are highly ionic

B. one is oxidising and other is reducing

C. one of the steps is endothermic in both the cases

D. all the steps are exothermic in both the cases.

Answer: C

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108. Which is the best reagent among the following to convert but-2-yne to trans-but-2-ene?

A. H_2 / Pd-charcoal

B. $H_2 / \text{Raney nickel}$

C. $H_2 / Pd - BaSO_4$

D. $Na / \text{liq. } NH_3$

Answer: D

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109. Consider the following statements, a hydrocarbon of moilecular formula C_5H_{10} is a:

I) mono substituted alkene

II) disubstituted alkene

III) trisubstitued alkene

Which of the following statements are correct?

A. I, II and III

B. I and II

C. II and III

D. I and III

Answer: A

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110. Identify a reagent from the following list which can easily distinguish between 1-butyne and 2-butyne.

A. bromine, $C(Cl_4)$

B. H_2, Lindlar's catalyst

C. dil. H_2SO_4, $HgSO_4$

D. ammoniacal Cu_2Cl_2 solution.

Answer: D

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111. But-1-ene may be converted to butane by a reaction with:

A. Zn-HCl

B. Sn-HCl

C. Zn-Hg

D. Pd/H_2

Answer: D

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112. Correct statement about 1.3-dibutene:

A. conjugated double bonds are present

B. reacts with HBr

C. forms polymers

D. all of the above

Answer: D

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113. Acetylene reacts with HCN in the presence of $Ba(CN)_2$ to yield :

A. 1,1-dicyanoethane

B. 1,2-dicyanoethane

C. vinyl cyanide

D. none of these

Answer: C

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114. Which one of the following has the minimum boiling point?

A. n-Butane

B. 1-Butyne

C. 1-Butene

D. Isobutane

Answer: D

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115. Which of the following alkenes will give an optically active alcohol when treated with $(H_2O)/H_2SO_4$?

A. 1-Butene

B. Ethene

C. Propene

D. 2-Methylpropene

Answer: A

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116. $HC \equiv CH$ reacts with acetic acid in the presence of Hg^{2g+} ions to give

A. $\begin{matrix} CH_2(OO(C)CH_3) \\ | \\ CH_2(OO(C)CH_3) \end{matrix}$

B. $CH_3CH_2(OOC - CH_3)$

C. $CH_3CH(OOC - CH_3)_2$

D. $CH_3CH(OOC - CH_3)_2$

Answer: C

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117. $2-$ Phenyl propene on acidic hydration gives ,

A. 3-phenyl-2-propanol

B. 1-phenyl-1-2-propanal

C. 2-phenyl-2-propanol

D. 2-phenyl-1-propanol

Answer: C

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118. Which of the following used for conversion of 2-hexyne into trans-2-hexene?

A. $H_2 / Pd / BaSO_4$

B. H_2, PtO_2

C. $NaBH_4$

D. $Li - \frac{NH_3}{C_2H_5OH}$

Answer: D

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119. Which of the following gives propyne on hydrolysis ?

A. Al_4C_3

B. Mg_2C_3

C. B_4C

D. La_4C_3

Answer: B

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120. When 2-butyne is treated with $H_2 / Pd - BaSO_4$, the product formed will be:

A. cis-2-butene

B. trans-2-butene

C. 1-butene

D. 2-hydroxybutane

Answer: A

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121. In the reaction,

$$CH_3C \equiv C - CH_3 \xrightarrow[(ii)\, Zn/H_2O]{(i)\, X} CH_3 - \underset{\underset{O}{||}}{C} - \underset{\underset{O}{||}}{C} - CH_3,$$ X is:

A. HNO_3

B. O_2

C. O_3

D. $KMnO_4$

Answer: C

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122. Reaction of one molecule of HBr with one molecule of 1,3-butadiene at 40° C gives predominantly.

A. 3-bromobutene under kinetically controlled condition

B. 1-bromo-2-butene under thermodynamically controlled conditions.

C. 3-bromobutene under thermodynamically controlled conditions

D. 1-bromo-2-butene under kinetically controlled conditions.

Answer: B

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123. Which of the reagents on reaction with cyclohexanol gives best yield of cyclohexene?

A. Conc. H_3PO_4

B. Conc. HCl

C. Con. HBr

D. Con. HCl with $ZnCl_2$

Answer: A

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124. Acid catalysed hydration of alkenes except ethene leads to the formation of

A. primary alcohol

B. secondary or tertiary alcohol

C. misture of primary and secondary alcohols

D. mixture of secondary and tertiary alcohols

Answer: B

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125. Elimination of bromine from 2-bromobutane results in hte formation of:

A. equimolar mixture of 1- and 2-butene

B. predominantly-2-butene

C. predominantly-1-butene

D. predominantly-2-butyne

Answer: B

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126. When 3-phenylpropene reacts with HBr in the presence of peroxide, hte major product formula is:

A. 1-bromo-3-phenylpropane

B. 2-bromo-1-phenylpropane

C. 3-(o-bromophenyl)propane

D. 1,2-(dibromo-3-phenylpropene

Answer: A

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127. 3-phenyl propene on reaction with HBr in the presence of peroxide, the major product formed is:

A. $C_6H_5CH_2CH(Br)CH_3$

B. $C_6H_5CH(Br)CH_2CH_3$

C. $C_6H_5CH_2CH_2CH_2Br$

D. $C_6H_5CH(Br)CH=CH_2$

Answer: B

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128. $CH \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} A \xrightarrow[H_2O]{CH_3MgBr} B \xrightarrow{P/Br_2} C.$ Here C is :

A. $CH_3CH(Br)CH_3$

B. $CH_3CH_2CH_2Br$

C. $CH_2 = CHBr$

D. $BrHC = CH - CH_3$

Answer: A

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129. One mole of an unsaturated hydrocarbons on ozonolysis gives one mole each of CH_3CHO, $HCHO$ and $OHC - CHO$. The hydrocarbon is:

A. $CH_3CH_2 - C \equiv C - CH_3$

B. $HC \equiv C - CH_2CH_2CH_3$

C. $CH_3CH = CHCH = CH_2$

D. $H_2C = CH - CH_2 - CH = CH_2$

Answer: C

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130. Addition of Br_2 to Z-but-2-ene gives:

A. (R,R)-2,3-dibromobutane only

B. (S,S)-2-3-dibromobutane only

C. (R,S)-2,3-dibromobutane only

D. (R,S)-1,2-dibromobutane

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131. The major product obtained by the addition reaction of HBr to 4-methylpent-1-ene in the presence of peroxide is:

A. 2-bromo-2-methylpentane

B. 2-bromo-4-methylpentane

C. 1-bromo-4-methylpentane

D. 4-bromo-2-methylpentane

Answer: C

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132. An alkene on reductive ozonolysis gives two molecules of $CH_2(CHO)_2$. The alkene is:

A. 2,4-hexadiene

B. 1,3-cyclohexadiene

C. 1,4-cyclohexadiene

D. 1-methyl-1,3-cyclopentadiene

Answer: C

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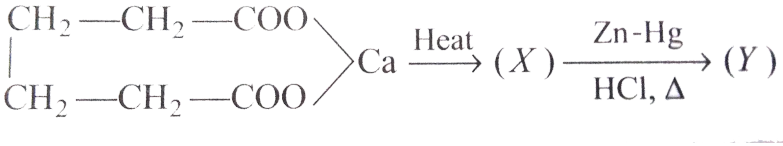
133. Identity the product (Y) in the following reaction sequence:



A. Cyclobutane

B. cyclopentane

C. pentane

D. cyclopentanone

Answer: B

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134. Which of the following cycloakanes has lowest heat of combustion per-CH_2- group per mole ?

A. Cyclopropane

B. Cyclobutane

C. Cyclopentane

D. Cyclohexane

Answer: D

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135. HBr reacts with $H_2C = CH - OCH_3$ under anhydrous conditions at room temperature to give:

A. CH_3CHO and CH_3Br

B. $BrCH_2CHO$ and CH_3OH

C. $H_3C - CHBr - OCH_3$

D. $H_3C - CHBr - OCH_3$

Answer: D

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136. Which product is formed when trans-2-phenyl-1-bromocyclopentane is treated with alcoholic KOH?

A. 4-phenyl cyclopentene

B. 2-phenyl cylcopentane

C. 1-phenyl cyclopentene

D. 3-phenyl cyclopentene

Answer: D

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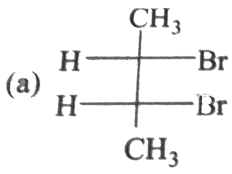
137. trans-2-Butene $+ Br_2$ gives:

A.



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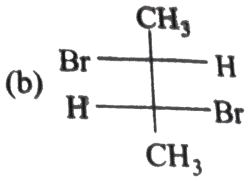

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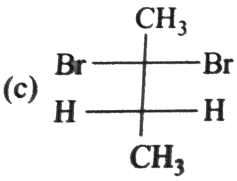

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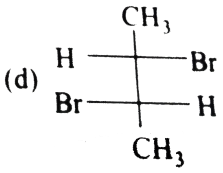

Answer: A

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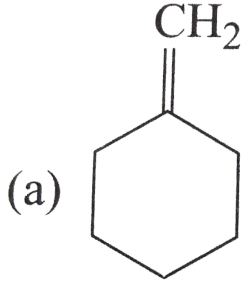
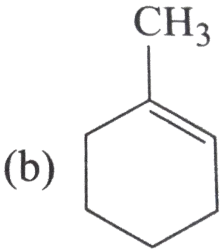
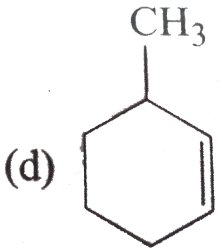
138. In the reaction with HCl, an alkene reacts in accordance with Markownikoff's rule to give a product 1-chloro-1-methylcyclohexane. The possible alkene is:

A. 

B. 

C. both (A) and (B)

D. 

Answer: C

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139. Which of the following reagents, which heated with ethyl chloride, forms ethylene?

A. Aqueous KOH

B. Zn/HCl

C. Alcoholic KOH

D. HI

Answer: C

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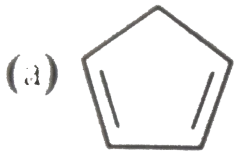
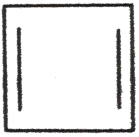
140. Ozonolysis products of an olefin are OHC-CHO and OHC-$CH_2 - CH_2 - CHO$, the olefin is:

A. 

B. (b) 

C. (c) 

D. (d) 

Answer: C

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141. What is formed when calcium carbide reacts with heavy water?

A. C_2D_2

B. CaD_2

C. CaD_2O

D. CD_2

Answer: A

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142. A molecule (X) has (i) four sigma bonds formed by hte overlap of sp^2 and s orbitals, (ii) one sigma bond formed by sp^2 and sp^2 -orbitals nad (iii) on π-bond formed by p_z and p_z orbitals. Which of the following is X?

A. C_2H_6

B. C_2H_3Cl

C. $C_2H_2Cl_2$

D. C_2H_4

Answer: D

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143. $RCH = CH_2 \xrightarrow[C_2H_5OH]{Na/NH_2(l)} RCH_2CH_3$

The reaction is called as:

A. Fisher-speier reaction

B. Clemmensen reduction

C. Birch reduction

D. Arndt-Eistern synthesis

Answer: C

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144. $CH_3CH = CH_2 + NOCl \rightarrow P$

Identify the product.

A. $CH_3 - \underset{\underset{Cl}{|}}{CH} - \underset{\underset{NO_2}{|}}{CH_2}$

B. $CH_2 - \underset{\underset{NO}{|}}{CH} - \underset{\underset{Cl}{|}}{CH_2}$

C. $CH_3CH_2-\underset{Cl}{\overset{NO}{\underset{|}{\overset{|}{C}}}}H$

D. $\underset{NO}{\underset{|}{CH_2}}-CH_2-\underset{Cl}{\underset{|}{CH_2}}$

Answer: A

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145. Identitfy 'B' in the following reactions:

$$H_2C=CH_2+HCl\xrightarrow{\text{Anhyd. }AlCl_3}(A)+2H\xrightarrow[C_2H_5OH]{Zn-Cu}(B)+HCl$$

A. CH_4

B. C_2H_6

C. C_2H_5Cl

D. C_2H_5OH

Answer: B

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146. The product C is

$$CH_3.CH_2.C \equiv CH + HCl \rightarrow B \xrightarrow{HI} C$$

A. $CH_3CH_2 - \overset{I}{\underset{|}{-}}CH - CH_2Cl$

B. $CH_3CH_2 - \overset{I}{\underset{Cl}{\overset{|}{\underset{|}{C}}}} - CH_3$

C. $CH_3 - \underset{Cl}{\underset{|}{CH}} - CH_2CH_2I$

D. $CH_3CH_2CH_2 - \overset{I}{\underset{Cl}{\overset{|}{\underset{|}{C}}}} - H$

Answer: B

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147. $CaC_2 + H_2O \rightarrow (X) \xrightarrow{O_3 / H_2O} HCOOH$, (X) is:

A. C_2H_4

B. C_2H_2

C. C_2H_6

D. $Ca(OH)_2$

Answer: B

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148. $B \xleftarrow[Catalyst]{Lindlar's} R-C=C-R \xrightarrow{Na/Nh_3}$

A and B are geometrical isomers (R-CH-R)of which type?

A. A is cis and B is trans

B. A is trans and B is cis

C. A and B are cis

D. A and B are trans

Answer: B

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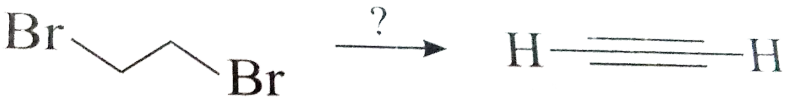
149. The reagent(s) for the following conversion,



is/are:

A. alcoholic KOH

B. alcoholic KOH followed by $NaNH_2$

C. alcoholilc KOH followed by $NaNH_2$

D. Zn/CH_3OH

Answer: B

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150. Arrange the following according to the increasing order of stability:

Propene(I), cis-but-2-ene (II), trans-but-2-ene (III), 1,3-dimethylbut-2-ene (IV), ethene (V)

A. $V < IV < III < II < I$

B. $V < IV < III < I < II$

C. $V < I < II < III < IV$

D. None of these.

Answer: C

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151. Identify the products in the following reaction

$$3CH_3CH = CH_2 \xrightarrow{BH_3} X \xrightarrow{H_2O_2 / OH^-} \text{products} + H_3BO_3$$

A. $CH_3CHO + CH_3OH$

B. $CH_3CHOHCH_3$

C. CH_3CH_2CHO

D. $CH_3CH_2OH + CH_3OH$

Answer: A

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152. A hydrocarbon of molecular formula, C_6H_{10} reacts with sodamine and the same on ozonolysis followed by hydrogen peroxide oxidation gives two molecules of carboxyclic acids, one being optically active. Then the hydrocarbon may be:

A. 1-hexane

B. 2-hexane

C. 3-hexane

D. 3-methyl-1-pentyne

Answer: D

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153. $2, 3 -$ Dimethyl $- 2 -$ butene can be prepared by heating which of the following compounds with a strong acid ?

A. $(CH_3)_3C - CH = CH_2$

B. $(CH_3)_2CH - \underset{\underset{CH_3}{|}}{CH} - CH = CH_2$

C. $(CH_3)_2C = CH - CH_2 - CH_3$

D. $(CH_3)_2CH - CH_2 - CH = CH_2$

Answer: A

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154. What will be the increasing order of the stability of the following alkenes?

i) $H_2C = CH_2$

ii) $CH_3CH = CH_2$

iii) $CH_3CH_2CH = CH_2$

iv) $(CH_3)_2CHCH = CH_2$

v) $(C)CH = CH_2$

A. $I < IV < III < II < V$

B. $V < IV < III < II < I$

C. $V < I < IV < III < II$

D. $IV < III < II < V < I$

Answer: A

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155. The isomerism of 1-butyne to 2-butyne can be achieved by treatment with:

A. $NaNH_2$

B. ammoniacal $AgNO_3$

C. HCl

D. ammoniacal Cu_2Cl_2

Answer: A

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156. The angle strain in cyclobutane is:

A. $19^\circ 22'$

B. $9^\circ 44'$

C. $24^\circ 44'$

D. $29^\circ 16'$

Answer: B

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157. A mixture of 1-chlorobutane and 2-chlorobutane when treated with alcoholic KOH gives:

A. 1-butene

B. 2-butene

C. isobutylene

D. mixture of 1-butene + 2 butene

Answer: D

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158. Acetylene and HCHO react in presence of copper acetylide catalyst to form:

A. 1-butyne-1,4-diol

B. 2-butyne,1,2-diol

C. 2-butyne-1,4-diol

D. none of these

Answer: C

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159. The major product formed when $3,3-$ dimethylbutan$-2-ol$ is heated with conc. Sulphuric acid is

A. 2,3-dimethyl-2-butne

B. 2,3-dimethyl-1-butene

C. 3,3-dimethyl-1-butene

D. cis- and trans-isomers of 2,3-dimethyl-1-butene

Answer: A

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160. $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH=CH_2+HBr\rightarrow 'A'$

'A' (predominantly) is:

A. $CH_3-\underset{\underset{Br}{|}}{CH}-\underset{\underset{CH_3}{|}}{C}\,H-CH_3$

B. $CH_3-\underset{\underset{CH_3}{|}}{C}\,H-\underset{\underset{Br}{|}}{CH}-CH_3$

C. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2Br$

D. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{Br}{|}}{C}} - CH_2CH_3$

Answer: D

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161. The hydrocarbon, which can react with sodium in liquid ammonia is

A. $CH_3CH_2C \equiv C - CH_2CH_3$

B. $CH_3CH = CHCH_3$

C. $CH_3CH_2C \equiv CH$

D. $CH_3CH_2CH_2C \equiv (C)CH_2CH_3$

Answer: C

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162. Oxidation of 1-butene with hot $KMnO_4$ solution produces:

A. $CH_3CH_2COOH + HCOOH$

B. $CH_3CH_2COOH + CO_2$

C. $CH_3COOH + CO_2$

D. $(CH_3)_2C = O + CO_2$

Answer: B

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163. Ammong the following the one which can exist in free state as a stable compound is:

A. C_7H_9O

B. $C_8H_{12}O$

C. $C_6H_{11}O$

D. $C_{10}H_{17}O_2$

Answer: B

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164. A compound 'X' on ozonolysis followed by reduction gives an aldehyde, C_2H_4O and 2-butanoic. Compound 'X' is:

A. 3-methylpent-2-ene

B. 3-methylpent-3-ene

C. 3-methylhex-3-ene

D. 3-ethylpent-3-ene

Answer: A

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165. the number of alkynes possible with molecular formula C_5H_8 is :

A. 6

B. 5

C. 4

D. 3

Answer: D

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166. Hydration of which one of the following yields a ketone

A. Propyne

B. Ethene

C. Propene

D. Ethyne

Answer: A

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167. One molecule of alkene 'X' on ozonolysis gave one mole of acetone. The IUPAC name of 'X' is

A. 2-methyl-1-butene

B. 2-methyl-2-butene

C. 2-butene

D. 1-butene

Answer: B

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168. One mole of alkene on ozonolysis gives 2 moles of butanone. The alkene is :

A. $3, 4 -$ dimethyl hex$- 2 -$ ene

B. $2, 3 -$ dimethyl hex$- 3 -$ ene

C. $3, 4 -$ dimethyl hex$-3-$ ene

D. $2, 3 -$ dimethyl hex$-2-$ ene

Answer: C

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169. Identify the alkyne in the following sequence of reactions:

Alkyne $\xrightarrow[\text{Lindlar's catalyst}]{H_2} (A) \xrightarrow{\text{Ozonolysis}} (B) \xleftarrow[\text{Process}]{\text{Wacker}} (H_2C) = CH_2$

A. $H_3C - C \equiv C - CH_3$

B. $H_3C - CH_2 - C \equiv CH$

C. $H_2C = CH - C \equiv CH$

D. $HC \equiv C - CH_2 - C \equiv CH$

Answer: A

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170. In the following reactions,

$$RCH_2CH = CH_2 + (ICI) \rightarrow (A)$$

Markownikoff's product (A) is:

A. $RCH_2\underset{\underset{Cl}{|}}{CH} - CH_2I$

B. $RCH_2 - \underset{\underset{I}{|}}{CH} - CH_2Cl$

C. $RCH_2 - \underset{\underset{I}{|}}{CH} = CH_2$

D. $RCH = CHCH_2I$

Answer: A

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171. The additon of HBr to 2-pentene gives

A. 2-bromopentane only

B. 3-bromopentane only

C. 2-bromopentane and 3-bromopentane

D. 1-bromopentane and 3-bromopentane

Answer: C

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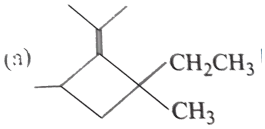
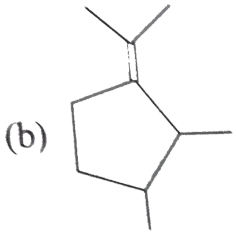
172. $Me_2C = CHCH_2 - \underset{\underset{Me}{|}}{C} = CH - CH_3 \xrightarrow{H^+} 'P'$

The main product 'P' is:

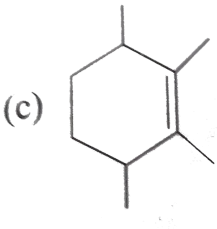
A.

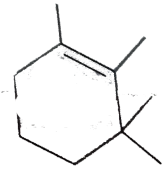


B.



C.



(d) 

D.

Answer: D

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173. One per cent composition of an organic compound A is carbon= $85.71\,\%$ and hydrogen $= 14.29\,\%$. Its vapour density is 14. Consider the following reaction sequences.

$A \xrightarrow{Cl_2 / H_2O} (B) \xrightarrow[H_3O^+]{KCN / EtOH} C,$ Identify C.

A. $CH_3 - \underset{OH}{\underset{|}{C}}\, O_2H$

B. $HO - CH_2 - CH_2 - CO_2H$

C. $HO - CH_2 - CO_2H$

D. $CH_3CH_2 - CO_2H$

Answer: B

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174. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is:

A. ethene

B. propene

C. 1-butene

D. 2-butene

Answer: D

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175. The decreasing order of acidic character among ethane(I), ethene(II), ethyne(III) and propyne (V) is:

A. $I > II > III > IV$

B. $II > III > I > IV$

C. $III > IV > II > I$

D. $IV > III > II > I$

Answer: C

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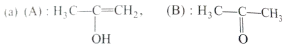
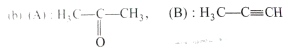
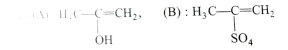
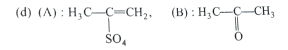
176. Predict the correct intermediate and product in the following reaction:

$$H_3C - C \equiv Ch \xrightarrow[HgSO_4]{H_2O, H_2SO_4} \text{Intermediate} \rightarrow \text{Product}$$

A. 

B. 

C. 

D. 

Answer: A

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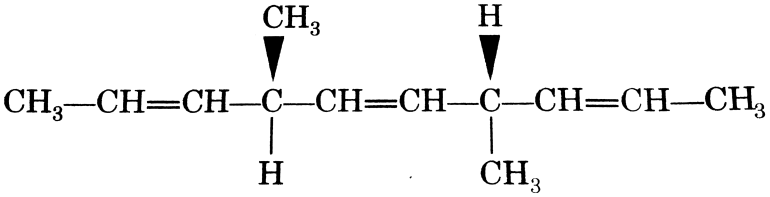
177. The number of optically active products obtained from the complete ozonolysis of the given compound



is :

A. 2

B. 1

C. 0

D. 4

Answer: C

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178. In the following reaction, the product 'R' is:

$$CaC_2 \xrightarrow{H_2O} P \xrightarrow[\text{tube}]{\text{hot iron}} Q \xrightarrow[AlCl_3]{CH_3Cl} R$$

A. benzene

B. ethylbenzene

C. toluene

D. n-propyl benzene

Answer: C

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179. Name the reagent used to bring about the following transformation, but-2-ene to ethanol:

A. $K_2Cr_2O_7$ in acidic medium

B. CrO_2Cl_2 / H_3O^+

C. PCC

D. $O_3 / H_2O - Zn$ dust and $LiAlH_4$

Answer: D

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180. Identify the product in the reaction

$Ph - C \equiv kC - Me \xrightarrow{H_3O^+, Hg^{2+}}$?

A. $PhCH_2CH_2CHO$

B. $PhCOCH_2CH_3$

C. $PhCH_2COCH_3$

D. $PhCOCOMe$

Answer: B

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181. The major product formed when 2-bromo-methylbutane is refluxed with ethanolic KOH is:

A. 2-methylbut-1-ene

B. 2-methylbut-2-ene

C. 2-methylbutan-1-ol

D. 2-methylbutan-2-ol

Answer: B

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182. Identify Z in the sequence of reactions :

$$CH_3CH_2CH = CH_2 \xrightarrow[H_2O_2]{HBr} Y \xrightarrow{C_2H_5ONa} Z$$

A. $CH_3 - (CH_2)_3 - O - CH_2CH_3$

B. $(CH_3)_2CH - O - CH_2CH_3$

C. $CH_3(CH_2)_4 - O - CH_3$

D. $CH_3CH_2 - CH(CH_3) - O - CH_2CH_3$

Answer: A

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183. The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alklyne. The bromo alkane and alkyne respectively are:

A. $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$

B. $BrCH_2CH_2CH_3$ and $CH_2C \equiv CH$

C. $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3C \equiv CH$

D. $BrCH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$

Answer: D

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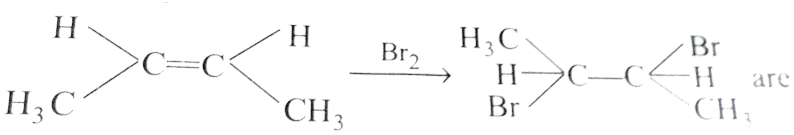
184. Products of the reactions:



A. meso-compound

B. racemic mixture

C. mixture of racemic and meso-compounds

D. none of the above

Answer: B

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185. The major organic compound formed by the reaction of 1,1,1-trichloroethane with silver power is .

A. ethene

B. acetylene

C. 2-butene

D. 2-butyne

Answer: D

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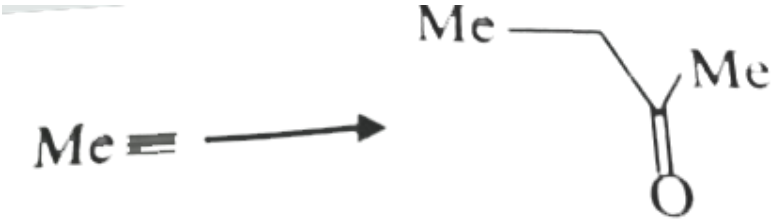
186. The reagents to carry out of the following conversion are :



A. $HgSO_4$ / dil. H_2SO_4

B. BH, H_2O_2 / $NaOH$

C. $NaNH_2$ / CH_3I, $\frac{HgSO_4}{\text{dil}} H_2SO_4$

D. OsO_4, HIO_4

Answer: C

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187. When but-2-yne is treated with Na in liquid ammonia:

A. cis-2-butene is obtained

B. trans-2-butene is formed

C. n-butane is the major product

D. it rearranges to but-1-yne

Answer: B

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188. The products obtained by the ozonolysis of 2-ethyl but-1-ene are:

A. ethanol and propanone

B. ethanal and butanal

C. ethanal and 3-pentanone

D. methanal and 3-pentanone

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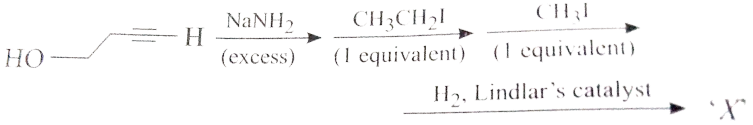
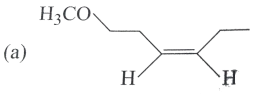
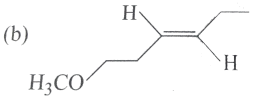
189. In the following sequential transformation, considering only the major products formed in each step, what is the product 'X'?



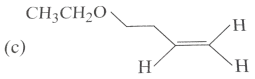
A.



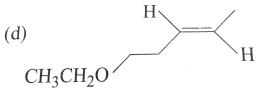
B.



C.



D.



Answer: A

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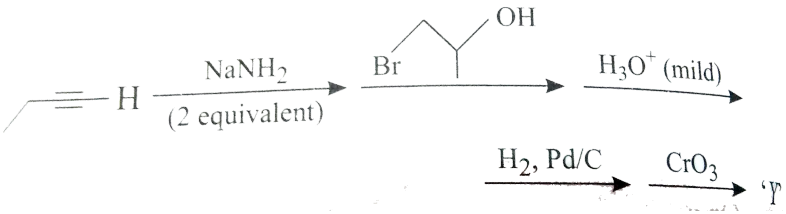
190. In the following sequential transformation, considering only the major products formed in each step, what is the correct statement with respect to product 'Y' is?



A. It gives a positive Tollen's test and is a functional isomer of 'X'

B. It gives a positive Tollen's test and is a geometrical isomer of 'X'

C. it gives a positive iodoform test and is a functional isomer of 'X'

D. It gives a positive iodoform test and is a geometrical isomer of 'X'

Answer: C

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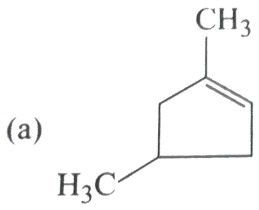
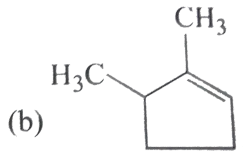
191. The compound which would yield $5-$ Oxo$-2-$ methylhexanal on reductive ozonolysis

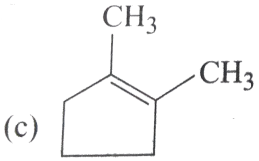
A.



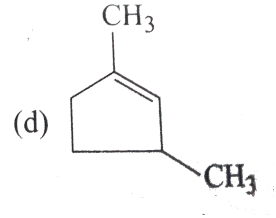
B.



C.



D.



Answer: D

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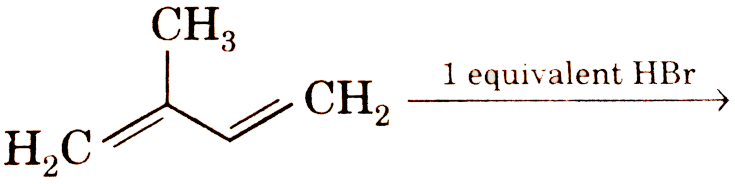
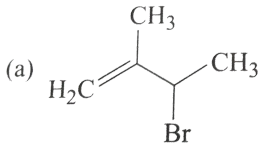
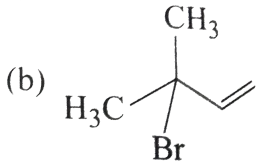
192. In the following reaction , the major product is :



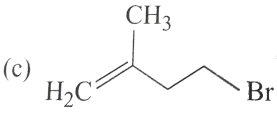
A.



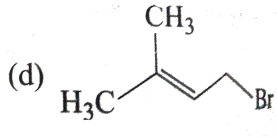
B.



C.



D.



Answer: D

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193. The reaction of propene with $HOCI(CI_2 + H_2O)$ proceeds through the intermediate:

A. $CH_3CH - CH_2 - OH$

B. $CH_3 - CH^+ - CH_2 - Cl$

C. $CH_3 - CH(OH) - CH_2$

D. $CH_3 - CHCl - CH_2$

Answer: B

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194. 3-menthyl-pent-2-ene on reaction with HBr in presence of peroxide forms an addition product. The number of possible stereoisomers for the product is

A. six

B. zero

C. two

D. four

Answer: D

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(LEVEL B) OBJECTIVE QUESTIONS

1. In which case the product formed is in accordance of anti Markownikoff's rule?

A. $CH_3 - CH = CH_2 \xrightarrow{HCl \,/\, \text{Peroxide}}$

B. $CH_3 - CH = CH - CH_3 \xrightarrow[\text{Peroxide}]{HBr}$

C. $(CH_3)_2C = CH_2 \xrightarrow{NOCl}$

D. $(CH_3)_2C = CH_2 \xrightarrow{HBr \,/\, \text{Peroxide}}$

Answer: D

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2. In which of the following cases, the correct product is not written?

A. $CH_3 - CH = CH_2 \xrightarrow{BrCl} (CH_3) - \overset{Cl}{\overset{|}{C}}H - \overset{Br}{\overset{|}{C}}H_2$

B. $(CH_3)_2CH = CH_2 \xrightarrow[H_2O]{Cl_2} (CH_3)_2CH(OH)CH_2Cl$

C. $(CH_3)_2CH - CH = CH_2 \xrightarrow{\text{Hydroboration -oxidation}} (CH_3)_2CH - CH_2CH$

D. $(C)Cl_3CH = CH_2 \xrightarrow{HCl} (C)Cl_3 - CH_2 - CH_2 - Cl$

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3. cis-2-Butene on reaction with Baeyer's reagent gives:

A. meso-geminal diol

B. racemic-vicinal diol

C. meso-vicinal diol

D. none of these

Answer: C

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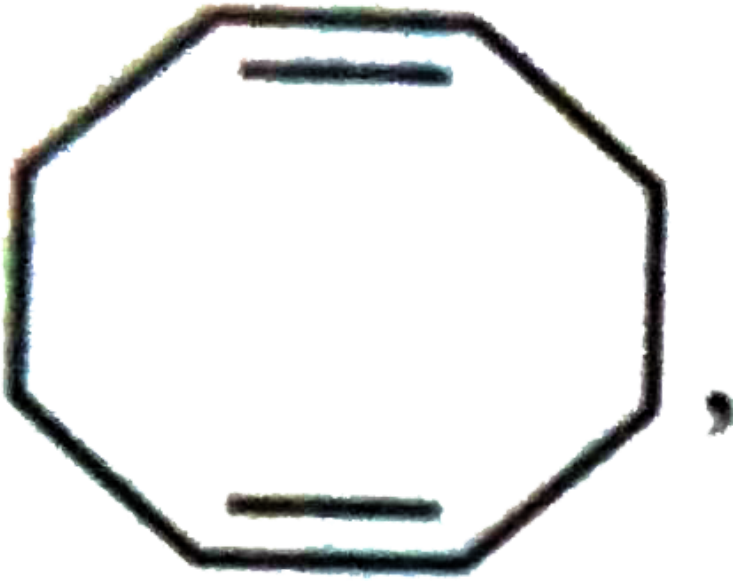
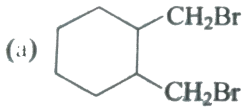
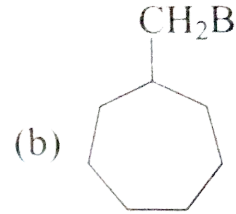
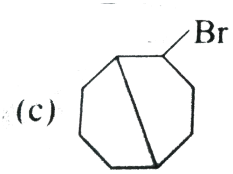
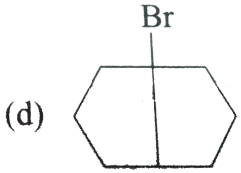


4. , on reaction with HBr and peroxide gives:

A. 

B. 

C. 

D. 

Answer: C

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5. A hydrocarbon has the formula C_3H_4. To find out whether it contains two double bond or a triple bond, the following test is preffered:

A. passed through ammoniacal $AgNO_3$

B. treated with Fehling's solution

C. treated with Baeyer's reagent

D. treated with Br_2 water

Answer: A

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6. Which among the following alkenes will be oxidised by SeO_2?

A. $CH_2 = CH_2$

B. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{C}H - CH = CH_2$

C. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{C} - CH = CH_2$

D. $CH_3 - \underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{C} - CH = CH - \underset{\underset{CH_3}{|}}{\overset{CH_3}{|}}{C} - CH_3$

Answer: B

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7. Match the list-I and list-II and select the correct answer from the codes given below the lists:

A. $CH_3—CH=CH_2 \xrightarrow[\text{(ii) HCOOH}]{\text{(i) } BH_3\text{-THF}}$ 1. *n*-propylamine

B. $CH_3—CH=CH_2 \xrightarrow[\text{(ii) } AgNO_3]{\text{(i) } BH_3\text{-THF}}$ 2. *n*-propylbromide

C. $CH_3—CH=CH_2 \xrightarrow[\text{(ii) } NH_4Cl,\ HOH]{\text{(i) } BH_3\text{-THF}}$ 3. *n*-hexane

D. $CH_3—CH=CH_2 \xrightarrow[\text{(ii) } Br_2]{\text{(i) } BH_3\text{-THF}}$ 4. *n*-propane

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8. A hydrocarbon of formula C_6H_{10}, absorbs only one molecule of H_2 upon catalytic hydrogenation. Upon ozonolysis the hydrocarbons yeilds. $OHC-CH_2-CH_2-CH_2-CH_2-CHO$ the compound is:

A. cyclohexane

B. cyclohexyne

C. cyclohexene

D. cyclobutane

Answer: C

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9. Match list-I with List-II and select the correct answer using the codes given below the lists:

List-I Reaction	List-II Reagent
A. $CH_3-CH=CH_2 \longrightarrow CH_3-CHBr-CH_3$	1. HBr
B. $CH_3-CH=CH_2 \longrightarrow CH_3-CH_2-CH_2Br$	2. NBS
C. $CH_3-CH=CH_2 \longrightarrow BrCH_2-CH=CH_2$	3. Br_2/CCl_4
D. $CH_3-CH=CH_2 \longrightarrow CH_3-CHBr-CH_2Br$	4. HBr (peroxide)

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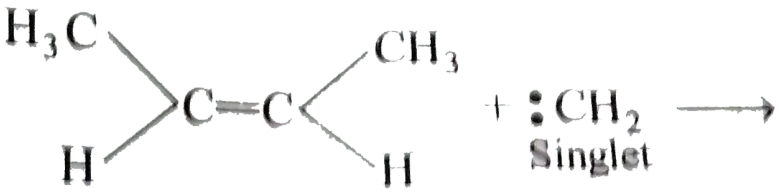
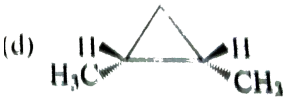
10. The major product formed in the following reactions is:



A. 

B. 

C. 

D. 

Answer: A

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11. Alkyne (A) on catalyst hydration gives only one ketone while alkylne (B) gives only aldehyde. (A) and (B) may be:

A. pent-2-yne, acetylene

B. oct-3-yne, propyne

C. pent-2-yne, but-1-yne

D. but-1-yne,propyne

Answer: A

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12. The catalyst used in the manufactures of polythene by Ziegler-Natta method is:

A. $TiCl_4$, $(C_6H_5)_3Al$

B. $TiCl_4$, $(C_2H_5)_3Al$

C. TiO_2

D. Titanium metal

Answer: B

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13. Intermediate in hydration of alkene is:

A. free radical

B. carbene

C. carbonium ion

D. carbanion

Answer: C

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14. Two organic compound A and B both containing only carbon and hydrogen, on quanctities analysis gave the same percentage composition by weight:

$C = (12/13) \times 100\,\%$, $H = (1/3) \times 100\,\%$

A decoulourises bromine water but B does not. A and B respectively are

A. C_6H_6, C_2H_2

B. C_2H_2, C_6H_6

C. C_2H_4, C_2H_6

D. C_2H_2, C_3H_8

Answer: B

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15. In the given reaction,

$$CH_3 - C \equiv C - CH_3 \xrightarrow{Na/NH_3(\text{liq})} X$$

Compound (X) will be:

A. butane

B. trans-2-butene

C. cis-2-butene

D. 1-butene

Answer: B

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16. 3,5-dimethyl cyclopentene, on ozonolysis, yeilds:

A. only an aldehyde

B. only a ketone

C. an aldehyde and a ketone

D. a dialdehyde

Answer: D

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17. A compound C_4H_8 decolourizes a $KMnO_4$ solution. How many structures are possible for this compound?

A. 3

B. 4

C. 2

D. 5

Answer: B

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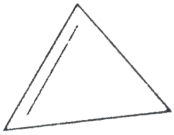
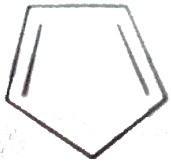
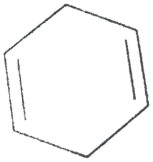
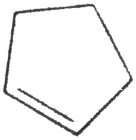
18. Which of the following will be most acidic?

A. (a) 

B. (b) 

C. (c) 

(d) 

D.

Answer: B

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19. The relative stablility of the compounds:

`(GRB_ORG_CHM_P1_C07_E01_260_Q01.png" width="80%">

A. $I > II > III > IV > V > VI$

B. $VI > V > IV > III > II > I$

C. $I > III > V > II > IV > VI$

D. $II > I > IV > III > V > VI$

Answer: A

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20. Alkenes can be converted to carbonyl compound in one step by:

A. Wacker process

B. Oxymercuration-demercuration

C. Hydroboration oxidation

D. Witting reaction

Answer: A

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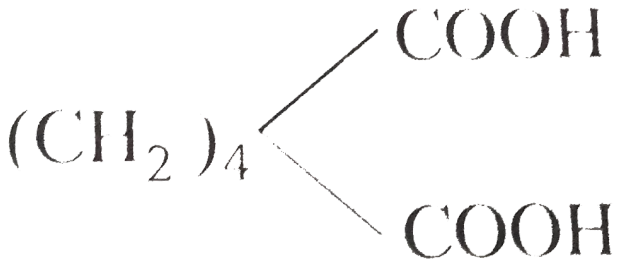
21. Unknown compound (A) on oxidation with hot basic $KMnO_4$ gives only one compound whose structure is given below,

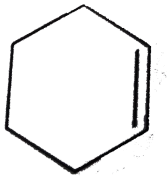


Compound (A) will be:

A. $CH_3 - C \equiv C - (CH_2)_4 - C \equiv C - CH_3$

B. $CH_3 - CH = CH - (CH_2)_4 - CH = CH_2$

C. $CH_3 - CH = CH - (CH_2)_4 - CH = CH - CH_3$

D. (d) 

Answer: D

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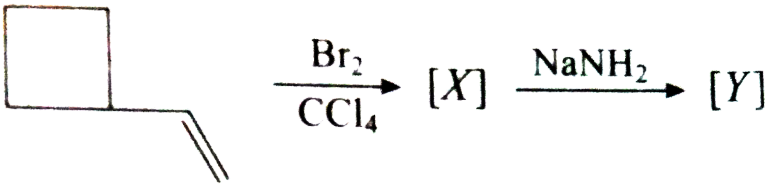
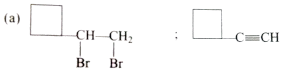
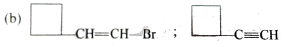
22.

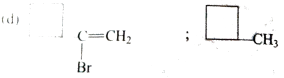


Compounds [X] and [Y] are respectively:

A. 

B. 

C. 

D. 

Answer: A

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23. The number of stuctural and configuration isomers of a bromo compound, C_5H_9Br formed on addition of HBr to 2-pentyne respectively are:

A. 4 and 3

B. 2 and 4

C. 4 and 2

D. 2 and 7

Answer: B

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24. $H_2C = CH - CH \equiv CH$ on reaction with one mole DBr gives:

A. $CH_2 = CH - CBr = CHD$

B. $CH_2(Br) - CHDC \equiv CH$

C. $DCH_2 - CHBrC \equiv CH$

D. $CH_2 = CH - CD = CHBr$

Answer: A

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25. Ionic addition of bromine to cis-2-butene yields:

A. meso-2,3-dibromobutane

B. racemic -2,3-dibromobutane

C. d-2,3-dibromobutane

D. l-2,3-dibromobutane

Answer: B

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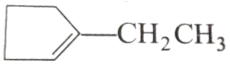
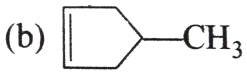
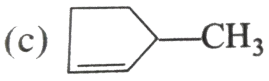
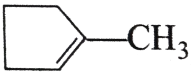
26. 5-oxohexanal is obtained by ozonolysis of:

A. 

B. 

C. 

D. (d) 

Answer: D

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27. Cycloalkane formed when 1,4-dibromopentane is heated with sodium is:

A. methyl cyclobutane

B. cyclopentane

C. methyl cyclopentane

D. cyclobutane

Answer: A

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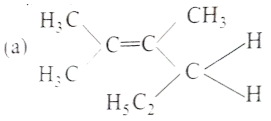
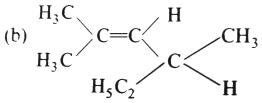
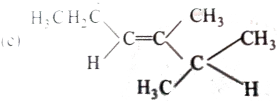
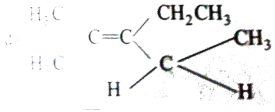
28. An optically active compound having molecular formula C_8H_{16} on ozonolysis gives acetonic as one of the products. The structure of the compound is:

A. 

B. 

C. 

D. 

Answer: B

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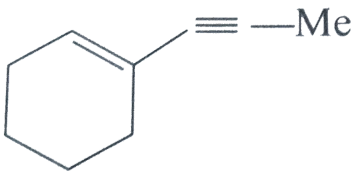
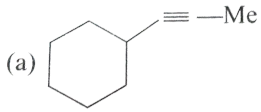
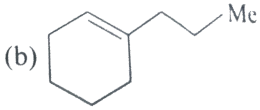


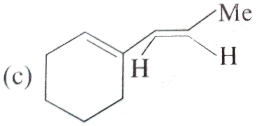
$\xrightarrow[\text{catalyst}]{H_2 + \text{Lindlar's}}$ (A)

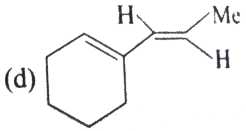
29.

The product (A) is:

A. 

B. 

C. 

D. 

Answer: C

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SET II This set contains the questions with more ..

1. Which of the following reactions are expected to give

$$CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH=CH_2$$ in yeilds of more than $50\,\%$?

A. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow[\Delta]{H_2SO_4}$

B. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{Br}{|}}{CH}-CH_3 \xrightarrow[\Delta]{(CH_3)_3CO^-K^+}$

C. $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{Br}{|}}{CH}-CH_3 \xrightarrow[\text{Acetone}]{Zn}$

D. None of the above

Answer: B::C

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2. Addition polymerisation can be brought about by:

A. free radicals

B. cations

C. anions

D. none of these

Answer: A::B::C

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3. Which of the following contains acidic hydrogen?

A. Ethene

B. Ethane

C. Ethyne

D. But-1-yne

Answer: C::D

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4. Which are the possible intermediates in the following reactions?

$$CH_3CH_2CH = CH_2 \xrightarrow[NaNH_2\,(383-433K)]{\frac{1}{2}Br_2/\,(C)\,Cl_4} (CH_3CH_2C \equiv CH$$

A. $CH_3CH_2 - \underset{\underset{Br}{|}}{CH} - CH_2Br$

B. $CH_3CH_2CH = CHBr$

C. $CH_3CH_2\underset{\underset{Br}{|}}{C} = CH_2$

D. None of these

Answer: A::B::C

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5. Which of the following statement are not correct for alkanes?

A. All C-H and C-C bonds have a length of $1.112Å$ and $1.54Å$ resepectively

B. All bond angles are tetrahedral, having a value of 109.5°

C. The C-C bond chain is linear and not zig-zig

D. All alkanes exhibit isomerisms.

Answer: C::D

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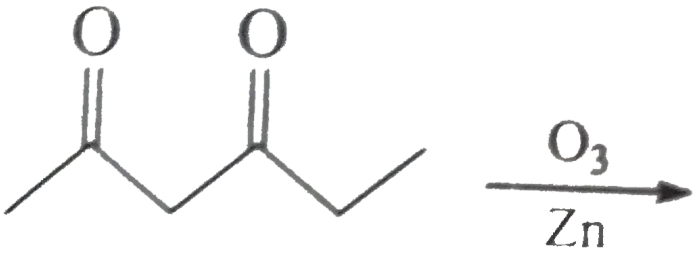
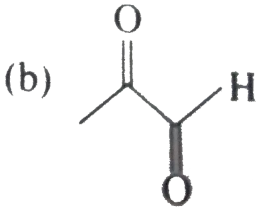


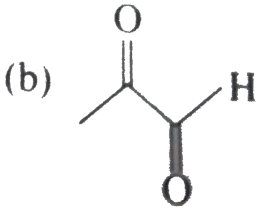
6.

A. CH_3COOH

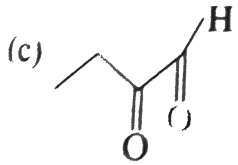


B.

C.



D.



Answer: A::B::C::D

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7. Which of the following will reach with sodium metal?

A. Ethyne

B. But-1-yne

C. But-2-yne

D. Ethane

Answer: A::B

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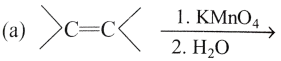
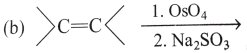
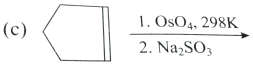
8. Which of the following will give cis-diols?

A. 

B. 

C. 

D. 

Answer: A::B::C

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9. The exacts representation(s) of molecular formula C_6H_8 containing sp, sp^2 and sp^3 -hybrid-states of carbon atoms is/are:

A. $H_2C = CH - CH = CH - CH = CH_2$

B. $H_2C = CH - C \equiv C - CH_2 - CH_3$

C. $CH_3 - CH = C = CH - CH = CH_2$

D. $HC \equiv C - CH_2 - CH_2 - CH = CH_2$

Answer: B::C::D

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10. Which of the following reagents can be used to distinguish between propene and propyne?

A. Schiff's reagent

B. Lucas reagent

C. Grignard reagent

D. Ammoniacal $AgNO_3$

Answer: C::D

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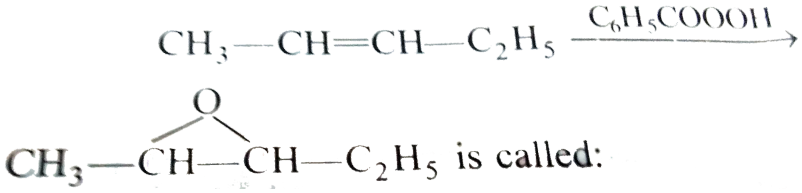
11. The reaction,



is called:

A. hydroxylation

B. ozonolysis

C. Prileschaiev's reaction

D. epoxidation

Answer: C::D

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12. The reagent used for the following reaction is/are:

$$CH_3 - CH = CH - C_2H_5 \rightarrow CH_3CHO + C_2H_5CHO$$

A. O_3 and Zn stem

B. Baeyer's reagent

C. $\frac{KMnO_4}{H_2}SO_4$

D. Lemieux reagent

Answer: A::D

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13. Which of the following on reductive ozonolysis give only glyoxal?

A. Ethylene

B. Benzene

C. Tolune

D. Acetylene

Answer: B::D

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14. Aqueous solution of the following compounds are electrolysed . Acetylene gas is obtained from

A. Sodium fumerate

B. Sodium maleate

C. Sodium acetate

D. Calcium carbide

Answer: A::D

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15. Anti-Markownikoff's addition of HBr is/are observed in:

A. propene

B. but-1-ene

C. but-2-ene

D. pent-3-ene

Answer: A::B::D

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16. What product(s) results when two moles of hydrogen chloride react with 4-methyl-2-pentyne?

A. 3,3-Dichloro-2-methylpentane

B. 2-Chloro-4-methylpentane

C. 2,2-Dichloro-4-methylpentane

D. 3-Chloro-4-methylpentane

Answer: A::C

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17. Which is/are correct statements about oxymercuration demercuration?

A. The rearrangement takes place

B. In the first step $(OAc)_2$ and H_2O are added to the double bond.

C. In the second step $NaBH_4$ reduces -Hg$(Oac)_2$ group to hydrogen

D. The net reaction is addition of water according to Markownikoff's rule

Answer: B::C::D

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18. Hexa-2,4-diene on ozonolysis by using $O_3/(C)Cl_4$ followed by Zn/H_2O gives:

A. acetaldehyde

B. glyoxal

C. formaldehyde

D. propanaldehyde

Answer: A::B::D

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19. Alkenes can be preapred by:

A. dehydrohalogenation of alkyl halide

B. Sabatier-Sanderen's reduction of alkynes

C. dehydration of alcohols with conc. H_2SO_4 at 443 K

D. treatment of 3° alkyl halide at 573 K

Answer: A::C::D

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20. The compound(s) which will give propylene on dehydration with conc. H_2SO_4 at 440K is/are:

A. isobutyl alcohol

B. n-propyl alocohol

C. isopropyl alcohol

D. n-butyl alcohol

Answer: B::C

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21. Presence of unsaturation in organic compounds can be tested with:

A. Br_2 water

B. Baeyer's reagent

C. Tollens reagent

D. Grignard reagent

Answer: A::B

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22. $2-$ Hexyne gives trans $-2-$ hexene on treatment with :

A. Li/NH_3

B. $Pd/BaSO_4$

C. $LiAlH_4$

D. Pt/H_2

Answer: A::C

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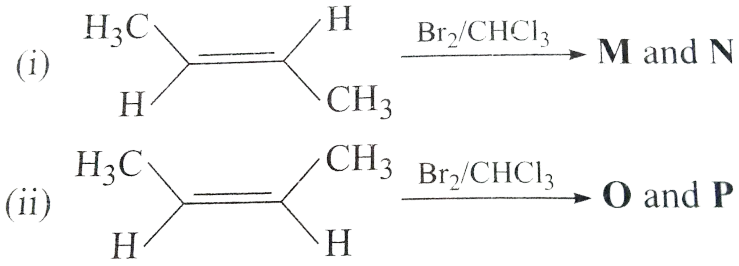
23. The correct statement(s) for the following addition reactions is (are):



A. (M and O) and (N and P) are two pairs of diastereomers

B. Bromination proceeds through trans-addition in both the reactions

C. O and P are identical molecules

D. (M and O) and (N and P) are two pairs of enantiomers

Answer: A::B

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ASSERTION-REASON TYPES QUESTIONS

1. Assertion: Addition of Br_2 to 1-butane gives two optical isomers.

Reason: The product contains one asymmetric carbon atoms.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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2. Assertion : Dimethyl sulphide is commonly used for the reduction of an ozonide of compound.

Reason : It reduces the ozonide giving water soluble dimethyl sulphoxide and excess of it evaporates.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

Answer: A

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3. A) Additionof HCl to propene in presence of peroxide gives 1-chloropropane.

R) The reaction occurs by carbonium ion intermediate.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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4. A) Addition of HBr to 1-butene in presence of peroxide produces 1-bromobutane.

R) It involves the formation of primary radical.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is incorrect.

D. If (A) is incorrect but (R) is correct.

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5. A) Reduction of but-2-yne by Na/liq. NH_3 gives 'trans' but-2-ene.

R) It is an example of 'anti' addition.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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6. A) Propene is more reactive than ethene towards electrophilic addition reactions.

R) Electron density of double bond increases due to hyperconjugation of methyl group.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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7. A) 1-chlorobutane on heating with alcoholic KOH undergoes dehydrogenation to yeild but-1-ene.

R) It is elimination reaction involving carbonium ion intermediate.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is incorrect.

D. If (A) is incorrect but (R) is correct.

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8. A) Acidity of C-H bond lies in following sequences

$HC \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

R) Percentage character of 's' orbital in these compounds lie in following sequences.

$H - C \equiv CH > CH_2 = CH_2 > CH_3 - CH_3$

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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9. A) Addition of bromine to trans-but-2-ene yields meso-2,3-dibromo butane.

R) Bromine addition to an alkene is an electrophilic addition.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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10. A) Addition of HBr on 2-butene gives two isomeric products.

R) Addition of HBr on 2-butene follows Markownikoff's rule.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. Both (A) and (R) are incorrect.

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11. A) C-H bond in ethyne is shorter than C-H bonds in ethene.

R) Carbon atom in ethene is sp-hybridised while it is sp^2 in ethyne.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is incorrect.

D. If (A) is incorrect but (R) is correct.

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12. A) But-1-yne is acidic in nature.

R) It is terminal alkyne.

A. If both (A) and (R) are correct and (R) is correct explanation of (A).

B. If both (A) and (R) are correct and (R) is not correct explanation of (A).

C. If (A) is correct but (R) is correct.

D. If (A) is incorrect but (R) is correct.

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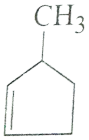
MATRIX MATCH TYPE QUESTIONS:

1. Match the following:

Column I (Isomeric hydrocarbons)	Column II (Products)
(a) 	(p) Three products on ozonolysis
(b) $C_4H_9—C\equiv C—H$	(q) Absorb 1 mole H_2 in presence of Ni catalyst
(c) $C_2H_5CH=CHCH=CHCH_3$	(r) Absorb 2 moles H_2 in presence of Ni catalyst
(d) 	(s) $O=\underset{\displaystyle H}{\overset{\displaystyle |}{C}}—(CH_2)_4—\underset{\displaystyle H}{\overset{\displaystyle |}{C}}=O$ (On ozonolysis)

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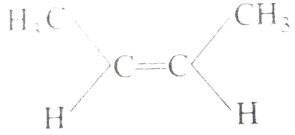
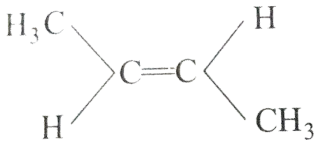
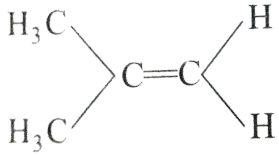
2. Match the following:

Column I (Compounds)	Column II (Properties)
(a) $H_2C=CH_2$	(p) Do not show geometrical isomerism
(b) 	(q) Reacts with HBr according to Markownikoff's rule
(c) 	(r) Symmetrical molecule
(d) 	(s) Decolourise Baeyer's reagent

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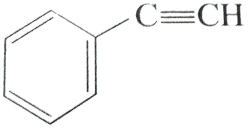
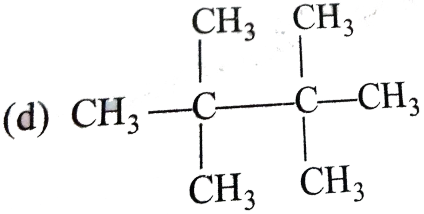
3. Match the following:

Column I (Compounds)	Column II (Reagents)
(a) $CH_3-CH=CH_2$	(p) No suitable analytical reagent
(b) $CH_3-C\equiv C-H$	(q) Ammoniacal $AgNO_3$
(c) 	(r) Br_2/CCl_4
(d) 	(s) Ozonolysis

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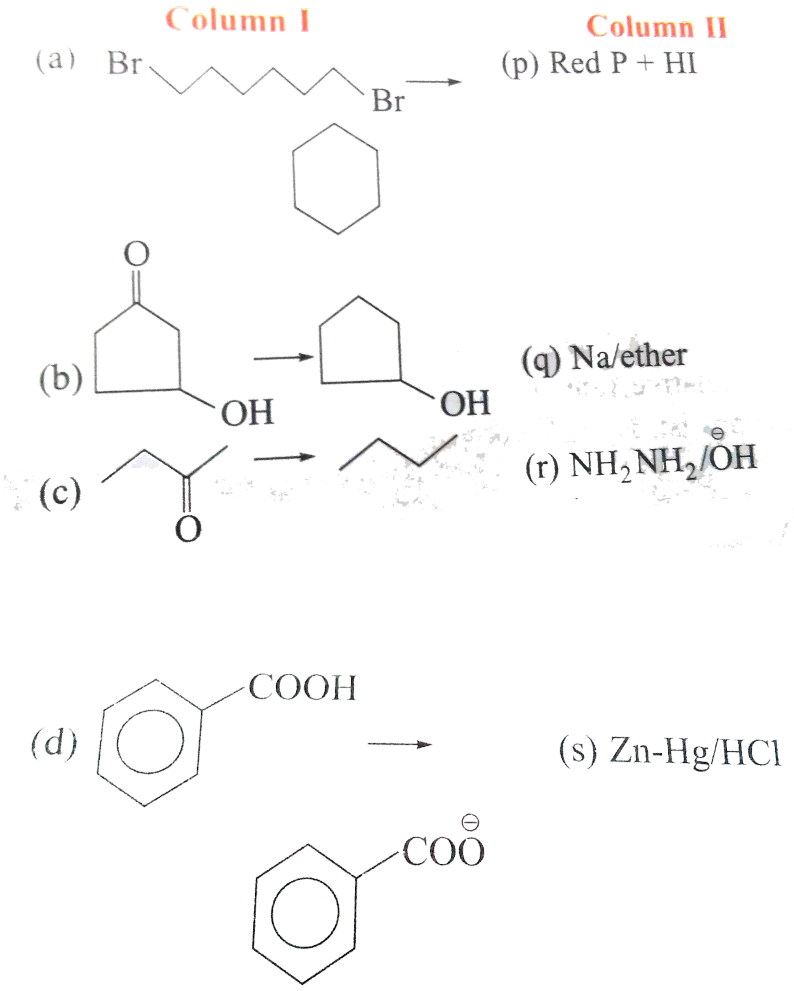
4. Match the following:



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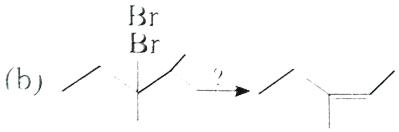
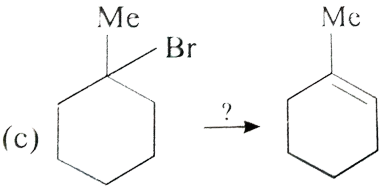
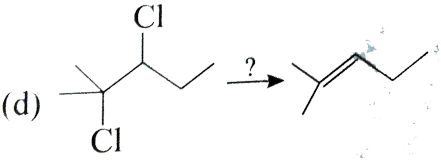
5. Match the following:

Column I (Reactant and product)	Column II (Reagents)
(a) 	(p) KI + Acetone
(b) 	(q) $Zn + CH_3COOH$
(c) 	(r) $C_2H_5ONa + C_2H_5OH$
(d) 	(s) $NaOH + CH_3OH$

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6. Match the following:

Column I (Reactions)	Column II (Product)
(a) Pent-2-yne $\xrightarrow[\text{(ii) } H_2O_2/OH^-]{\text{(i) } BH_3/THF}$	(p) Pentan-2,3-dione
(b) Pent-2-yne $\xrightarrow[HgSO_4]{\text{dil. } H_2SO_4}$	(q) 2,3-Dibromobutane (racemic)
(c) Pent-2-yne $\xrightarrow[\text{(ii) } H_2O_2+OH^-]{\text{(i) } Sia_2BH}$	(r) Pentan-2-one
(d) Pent-2-yne $\xrightarrow{\text{aq. } KMnO_4}$	(s) Pentan-3-one
(e) But-2-yne $\xrightarrow[\text{(ii) } Br_2]{\text{(i) } H_2+Ni_2B}$	(t) 2,3-dibromobutane (meso)

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LINKED COMPREHENSION TYPE QUESTIONS

1. Hydrogenation of alkenes and alkynes takes place in presence of certain catalysts. In Sabatier Senderen's reaction, the addition of hydrogen takes place I presence of Raney nickel catalyst. Platininm and palladium can also

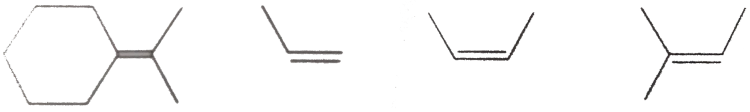
be used as catalyst and used in finley divided state. Experimentally, it is observed that less crowded alkenes adsorb H_2 with faster rate. Controlled hydrogenation of alkyne H_2 with faster rate. Controlled hydrogenation of alkyne in presence of Lindlar's catalyst yields cis product i.e., 'cis' alkene. Thus, in presence of Lindlar's catalyst 'syn' addition takes place. The relative rate of hydrogenation follows the order:

$$C{\equiv}C{-} > \quad > \quad > C{=}O > C_6H_6$$

Non-terminal alkynes are reduced in presence of Na or Li metal dissolved in liquid ammonia. In this reaction, anti-addition of hydrogen results into the trans-product.

Answer the following questions:

The relative rate of catalytic hydrogenation of following alkenes is:



I II III IV

A. II gt III gt IV gt I

B. I gt IV gt III gt II

C. III gt IV gt I gt II

D. II gt IV gt I gt III

Answer: A

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2. Hydrogenation of alkenes and alkynes takes place in presence of certain catalysts. In Sabatier Senderen's reaction, the addition of hydrogen takes place I presence of Raney nickel catalyst. Platininm and palladium can also be used as catalyst and used in finley divided state. Experimentally, it is observed that less crowded alkenes adsorb H_2 with faster rate. Controlled hydrogenation of alkyne H_2 with faster rate. Controlled hydrogenation of alkyne in presence of Lindlar's catalyst yields cis product i.e., 'cis' alkene. Thus, in presence of Lindlar's catalyst 'syn' addition takes place. The relative rate of hydrogenation follows the order:

$$C\equiv C > >C=C< > >C=O > C_6H_6$$

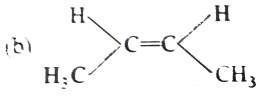
Non-terminal alkynes are reduced in presence of Na or Li metal dissolved in liquid ammonia. In this reaction, anti-addition of hydrogen results into

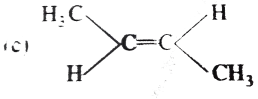
the trans-product.

$$H_3C - C \equiv C - CH_3 + H_2 \xrightarrow[\text{Boiling Quinoline}]{Pd\,/\,CaCO_3} (A)$$

The product (A) will be:

A. $CH_3CH_2CH_2CH_3$

B. 

C. 

D. $CH_3 - CH_2 - CH = CH_2$

Answer: B

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3. Hydrogenation of alkenes and alkynes takes place in presence of certain catalysts. In Sabatier Senderen's reaction, the addition of hydrogen takes place I presence of Raney nickel catalyst. Platininm and palladium can also be used as catalyst and used in finley divided state. Experimentally, it is

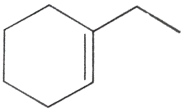
observed that less crowded alkenes adsorb H_2 with faster rate. Controlled hydrogenation of alkyne H_2 with faster rate. Controlled hydrogenation of alkyne in presence of Lindlar's catalyst yields cis product i.e., 'cis' alkene. Thus, in presence of Lindlar's catalyst 'syn' addition takes place. The relative rate of hydrogenation follows the order:

$$C\equiv C > >C=C< > >C=O > C_6H_6$$

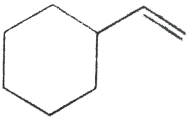
Non-terminal alkynes are reduced in presence of Na or Li metal dissolved in liquid ammonia. In this reaction, anti-addition of hydrogen results into the trans-product.

In which of the following cases, the reaction is most exothermic?

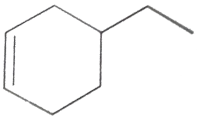
A. (a)

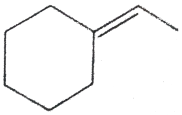


B. (b)



C. (c)



(d) 

D.

Answer: B

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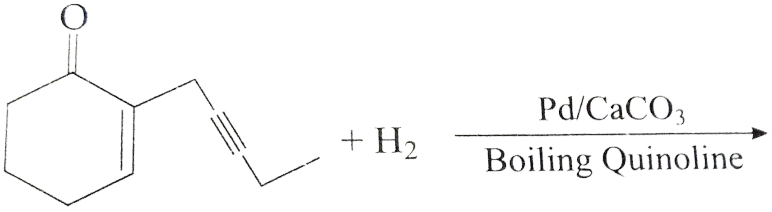
4. Hydrogenation of alkenes and alkynes takes place in presence of certain catalysts. In Sabatier Senderen's reaction, the addition of hydrogen takes place I presence of Raney nickel catalyst. Platininm and palladium can also be used as catalyst and used in finley divided state. Experimentally, it is observed that less crowded alkenes adsorb H_2 with faster rate. Controlled hydrogenation of alkyne H_2 with faster rate. Controlled hydrogenationof alkyne in presence of Lindlar's catalyst yields cis product i.e., 'cis' alkene. Thus, in presence of Lindlar's catalyst 'syn' addition takes place. The relative rate of hydrogenation follows the order:

$$C{\equiv}C > >C{=}C< > >C{=}O > C_6H_6$$

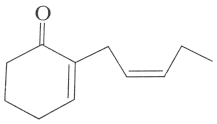
Non-terminal alkynes are reduced in presence of Na or Li metal dissolved

in liquid ammonia. In this reaction, anti-addition of hydrogen results into the trans-product.

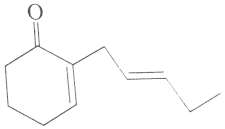
The product of the following reaction is:



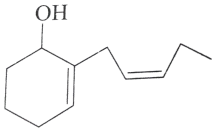
A. (a)



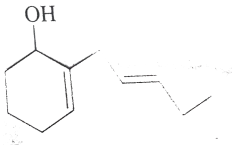
B. (b)



C. (c)



D. (d)



Answer: A

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5. Hydrogenation of alkenes and alkynes takes place in presence of certain catalysts. In Sabatier Senderen's reaction, the addition of hydrogen takes place I presence of Raney nickel catalyst. Platininm and palladium can also be used as catalyst and used in finley divided state. Experimentally, it is observed that less crowded alkenes adsorb H_2 with faster rate. Controlled hydrogenation of alkyne H_2 with faster rate. Controlled hydrognetation of alkyne in presence of Lindlar's catalyst yields cis product i.e., 'cis' alkene. Thus, in presence of Lindlar's catalyst 'syn' addition takes place. The relative rate of hydrogenation follows the order:

Non-terminal alkynes are reduced in presence of Na or Li metal dissolved in liquid ammonia. In this reaction, anti-addition of hydrogen results into the trans-product.

Powdered nickel is more effective than grannular nickel because:

A. Surface area of powdered nickel is maximum

B. Free valencies are large in number

C. Powdered nickel increases the activation energy of the reaction.

D. Powdered nickel increases the intermolecular collision of reactant molecules.

Answer: A::B

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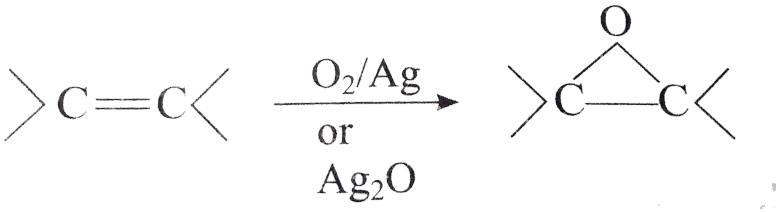
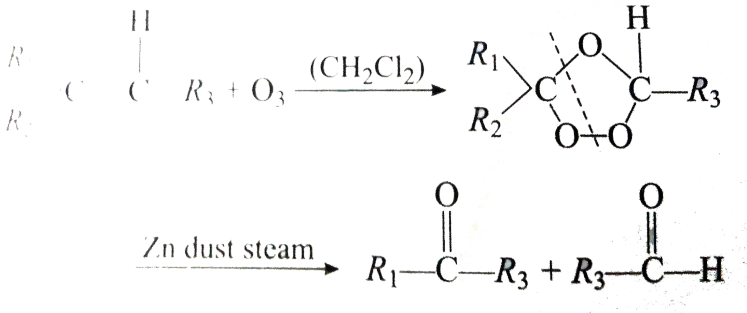
6. Oxidation without clevage of sigma bond takes place in alkenes.



Presence of unsaturation in alkenes is detected by using Baeyer's reagent. Alkenes decolourise pink colour of Baeyer's reagent. In presence of Baeyer's reagent, 'syn' addition of -OH groups takes place on both carbons of double bond. The net reaction can be given as,

$$R-CH=CH-R \xrightarrow[OH^-]{KMnO_4} R-\overset{OH}{\overset{|}{C}}H-\overset{OH}{\overset{|}{C}}H-R$$

Ozonolysis of alkenes gives ozonide, which on further hydrolysis gives aldehyde and/ or ketone.



Answer the following questions:

Liner polyenes on ozonolysis gives two moles of acetaldeyde and one mole of propanedial. Linear polyene will be:

A. alkadiene

B. alkatriene

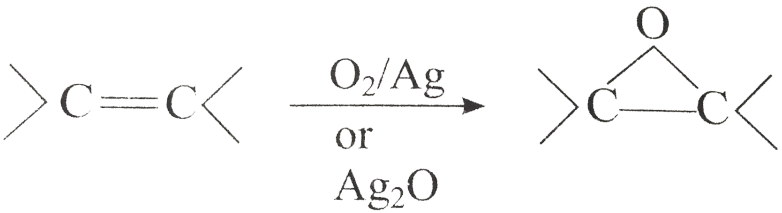
C. alkatetraene

D. alkapentaene

Answer: A

Watch Video Solution

7. Oxidation without clevage of sigma bond takes place in alkenes.



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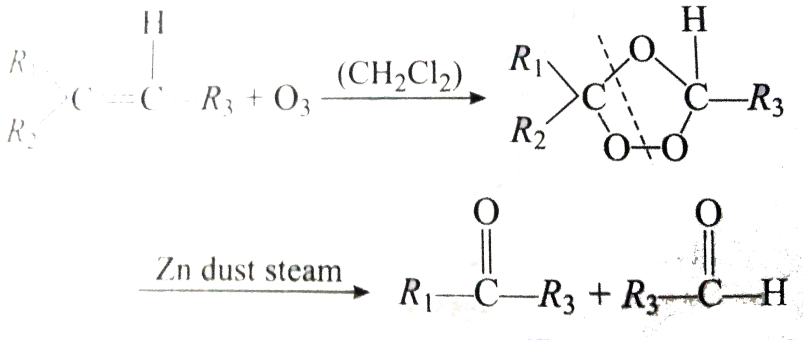

ortho Xylene on reductive ozonolysis will be:

A. $CHO - CHO$ and $CH_3 - \overset{\overset{O}{||}}{C} - CHO$

B. $CH_3 - \overset{\overset{O}{||}}{C} - \overset{\overset{O}{||}}{C} - CH_3$ and $CH_3 - \overset{\overset{O}{||}}{C} - CHO$

C. $CH_3 - \overset{\overset{O}{||}}{C} - \overset{\overset{O}{||}}{C} - CH_3$ and $CHO - CHO$

D. $CH_3 - \overset{\overset{O}{||}}{C} - \overset{\overset{O}{||}}{C} - CH_3$ nad $CH_3 - \overset{\overset{O}{||}}{C} - CHO$ and $CHO - CHO$

Answer: D

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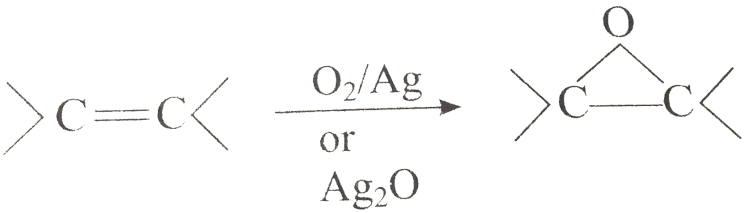
8. Oxidation without clevage of sigma bond takes place in alkenes.



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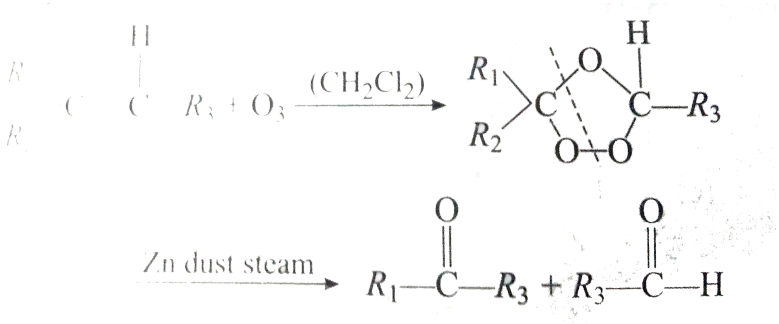
$$R-CH=CH-R \xrightarrow[OH^-]{KMnO_4} R-\overset{OH}{\underset{|}{CH}}-\overset{OH}{\underset{|}{CH}}-R$$

Ozonolysis of alkenes gives ozonide, which on further hydrolysis gives aldehyde and/ or ketone.

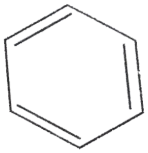


Which of the following will give only formaldehyde on ozonolysis?

A. $H_2C=CH_2$

B. $CH_3-CH=CH_2$

C. $CH_3-CH=CH-CH_3$

D. (d) 

Answer: A

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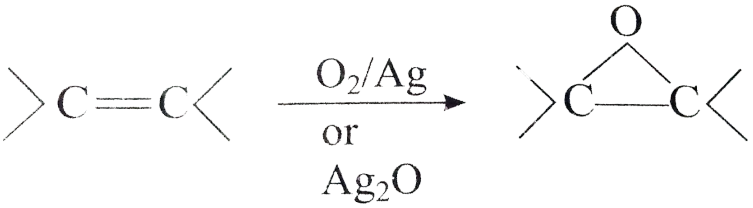
9. Oxidation without clevage of sigma bond takes place in alkenes.



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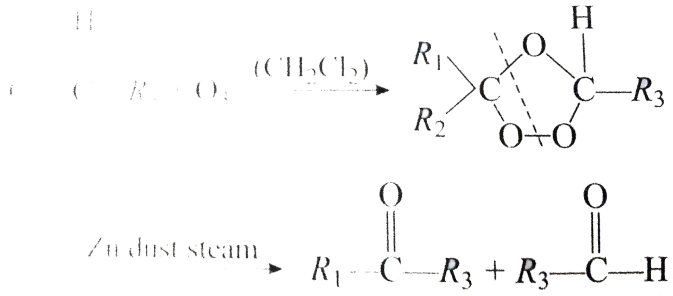
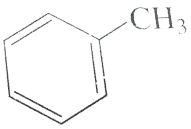


Which of these compounds give glyoxal only on ozonolysis?

(a)

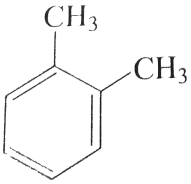
A.

(b)



B.

(c)



C.

D. All of these

Answer: A

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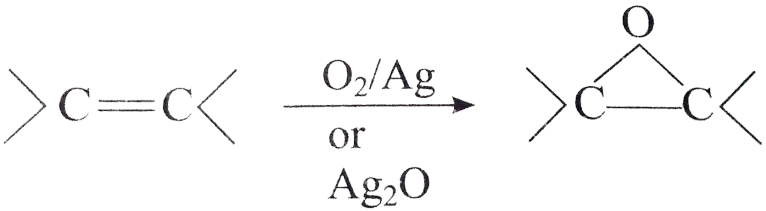
10. Oxidation without clevage of sigma bond takes place in alkenes.



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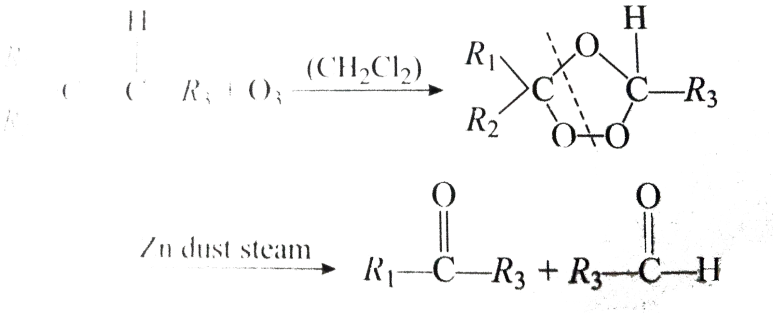
Ozonolysis of alkenes gives ozonide, which on further hydrolysis gives aldehyde and/ or ketone.



Product of ozonolysis gives information about:

A. configuration

B. conformation

C. both of these

D. none of these

Answer: D

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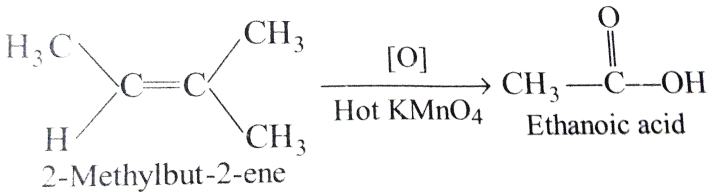
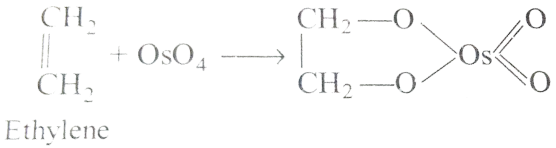
11. Oxidation of alkenes by cleavage with the acidic or alkaline $KmNO_4$ of acidic $K_2Cr_2O_7$ at higher temperature yields products depending upon the nature of alkene. A hot solultion of $KMnO_4$ is a strong oxidising agent which gives only ketones and carboxylic acids and not aldehydes (as they cannot be isolated).

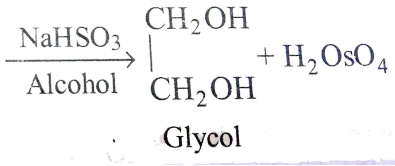


2-Methylbut-2-ene

Oxidation of alkenes with OsO_4 followed by alcoholic $NaHSO_3$ or Na_2SO_3 yeilds glycols.



Ethylene



Glycol

Answer the following questions:

Which of these compounds on oxidation with hot $KMnO_4$ gives only butanoic acid?

A. Oct-3-ene

B. Oct-4-ene

C. Oct-2-ene

D. 3-Methylhep-3-ene

Answer: B

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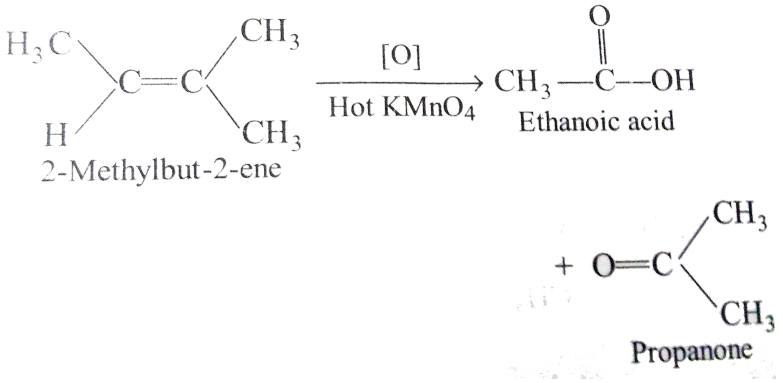
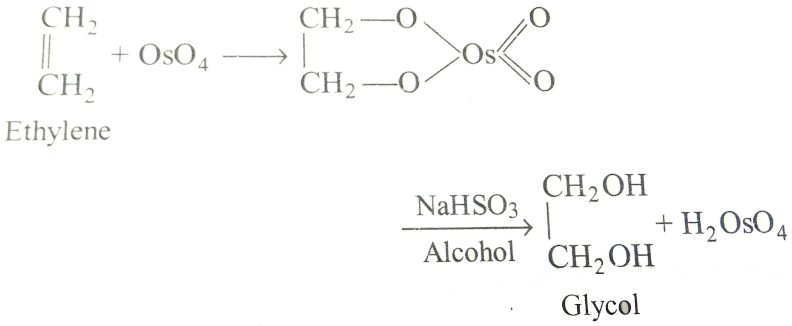
12. Oxidation of alkenes by cleavage with the acidic or alkaline $KmNO_4$ of acidic $K_2Cr_2O_7$ at higher temperature yields products depending upon the nature of alkene. A hot solultion of $KMnO_4$ is a strong oxidising agent which gives only ketones and carboxylic acids and not aldehydes (as they cannot be isolated).



Oxidation of alkenes with OsO_4 followed by alcoholic $NaHSO_3$ or Na_2SO_3 yeilds glycols.



Answer the following questions:

Which of the following compounds on treatment with OsO_4, followed by Na_2SO_3 will give cis-2-methyl butan-2,3-diol?

A. 2-Methyl-2-butene

B. 4-Methyl-2-pentene

C. 2,3-Dimethyl-2-butene

D. 2,2-Dimethyl-2-butene

Answer: A

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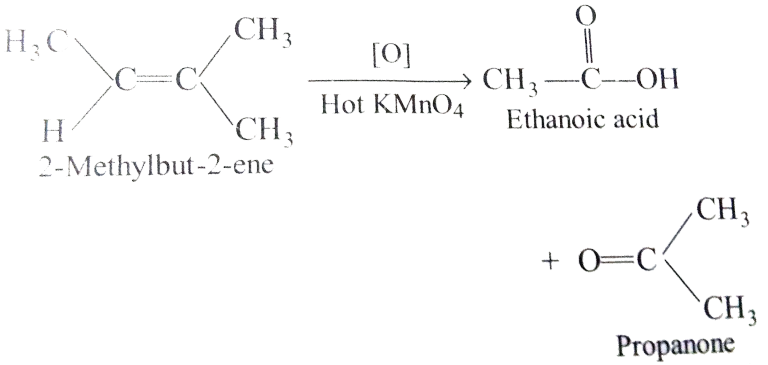
13. Oxidation of alkenes by cleavage with the acidic or alkaline $KmNO_4$ of acidic $K_2Cr_2O_7$ at higher temperature yields products depending upon the nature of alkene. A hot solultion of $KMnO_4$ is a strong oxidising agent which gives only ketones and carboxylic acids and not aldehydes (as they cannot be isolated).



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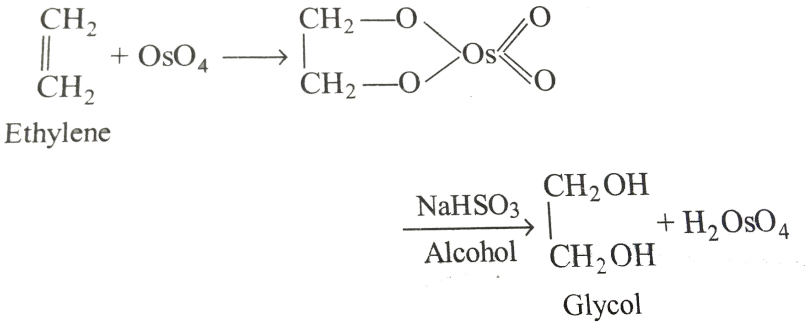

Answer the following questions:

An alkene 1-methyl cyclohexene on oxidation with hot basic $KMnO_4$ gives:

A. heptanoic acid

B. 2-methylhexanoic acid

C. 6-ketoheptanoic acid

D. butanoic acid and acetone

Answer: C

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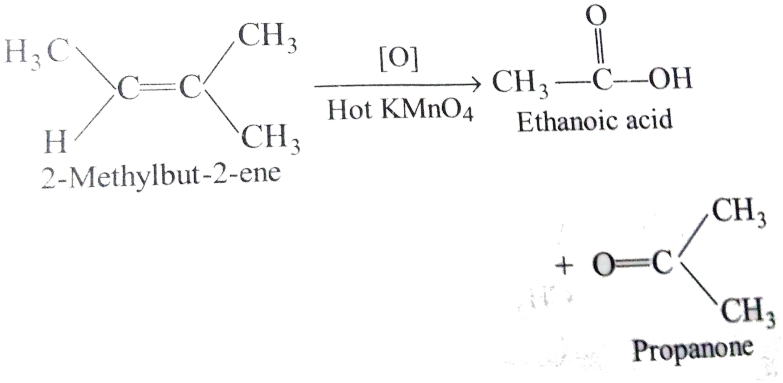
14. Oxidation of alkenes by cleavage with the acidic or alkaline $KmNO_4$ of acidic $K_2Cr_2O_7$ at higher temperature yields products depending upon the nature of alkene. A hot solultion of $KMnO_4$ is a strong oxidising agent which gives only ketones and carboxylic acids and not aldehydes (as they cannot be isolated).



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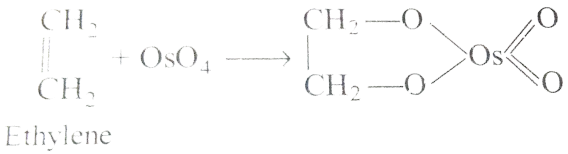
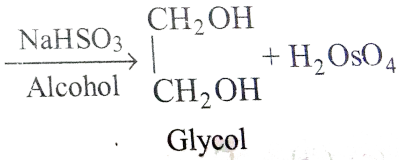


Ethylene



Glycol

Answer the following questions:

Which of the following alkenes on oxidation with hot $KMnO_4$ gives cyclopentanone?

A. 2-Methylcyclopentene

B. Cyclopentene

C. Methylenecyclobutane

D. methylenecyclopentane

Answer: D

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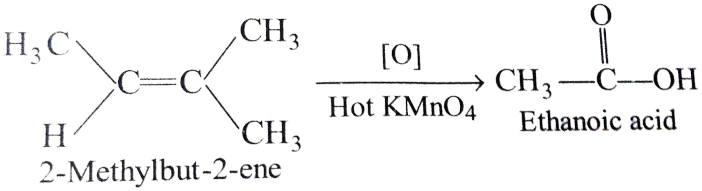
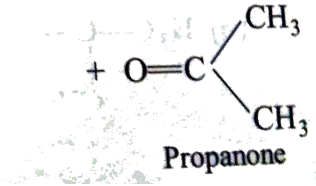
15. Oxidation of alkenes by cleavage with the acidic or alkaline $KmNO_4$ of acidic $K_2Cr_2O_7$ at higher temperature yields products depending upon the nature of alkene. A hot solultion of $KMnO_4$ is a strong oxidising agent which gives only ketones and carboxylic acids and not aldehydes (as they cannot be isolated).



2-Methylbut-2-ene



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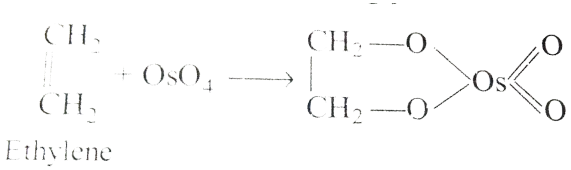
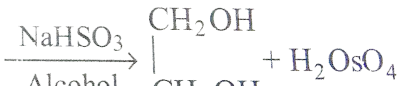


Ethylene



Glycol

Answer the following questions:

An alkene 1,2-dimethyl cyclobutene on oxidation with hot $KMnO_4$ gives:

A. 4-ketopentanoic acid

B. 2,3-diketo cyclohexane

C. hexane-2,5-dione

D. ethanoic acid and butanoic acid

Answer: C

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16. An alkene (A), C_5H_{12} on chlorination at 300° C gives a mixture of four different monochlorinated derivatives,(B), (C), (D) and (E) Two of these derivatives give the same stable alkene (F) on dehydrogenation. On oxidation with hot alkaline $KMnO_4$, followed by acidification, (F) gives two products ketone (G) and carboxyclic acid (H).

Answer the following questions:

The structure of compound (A) is:

A. $CH_3CH_2CH_2CH_2CH_3$

B. $H_3C - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_3$

C. $H_3C - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

D. none of the above.

Answer: C

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17. An alkene (A), C_5H_{12} on chlorination at 300° C gives a mixture of four different monochlorinated derivatives,(B), (C), (D) and (E) Two of these derivatives give the same stable alkene (F) on dehydrogenation. On oxidation with hot alkaline $KMnO_4$, followed by acidification, (F) gives two products ketone (G) and carboxyclic acid (H).

Answer the following questions:

The structure of compounds (G) and (H) are respectively:

A. CH_3COCH_3, CH_3COOH

B. CH_3COCH_3, CH_3CH_2COOH

C. $CH_3CH_2COCH_3, CH_3CH_2COOH$

D. $CH_3CH_2COCH_3, CH_3COOH$

Answer: A

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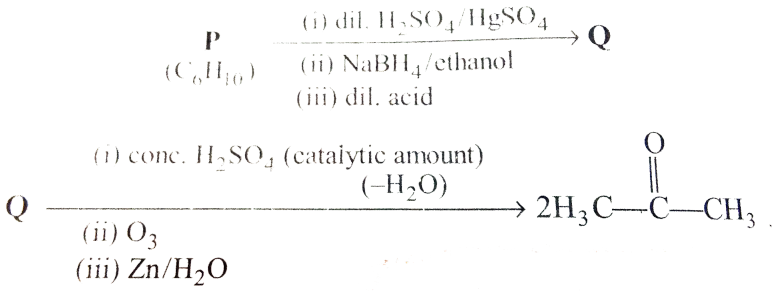
18. An acylic hydrocarbons P, having molecular formula C_6H_{10}, gave acetone as the only organic product through the following sequence of reactions, in which Q is an intermediate organic compound.

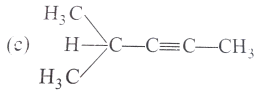


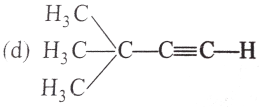
Answer the following questions:

The structure of compound P is:

A. $CH_3CH_2CH_2CH_2 - C \equiv C - H$

B. $H_3C - CH_2 - C \equiv C - CH_2CH_3$

C. 

D. 

Answer: D

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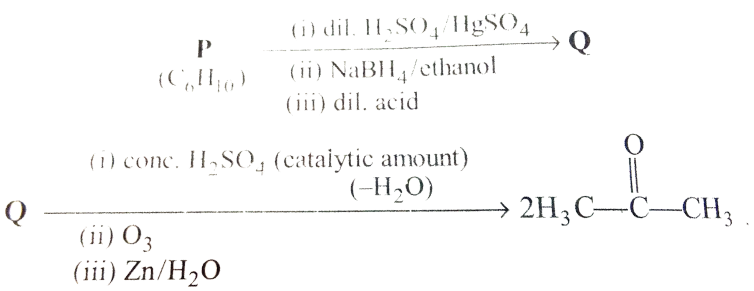
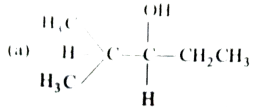


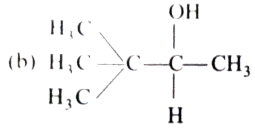
Answer the following questions:

The structure of compound Q is:

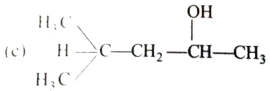
A.



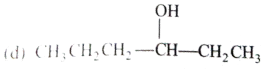
B.



C.



D.



Answer: B

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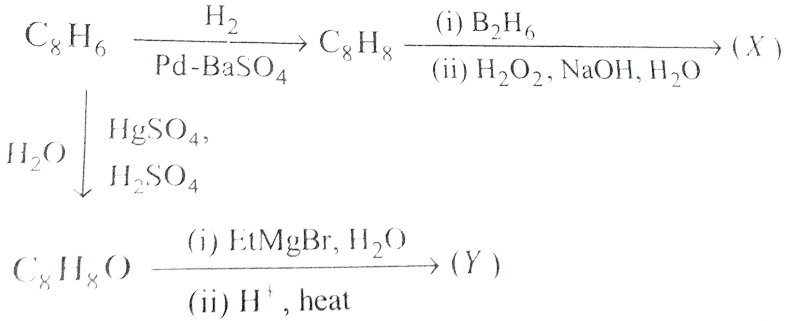
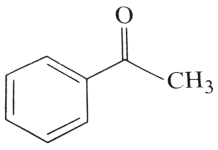
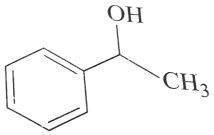
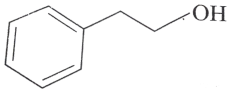
20. In the following reactions

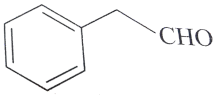


Answer the following questions:

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: C

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21. In the following reactions

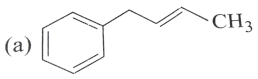
$$C_8H_6 \xrightarrow[Pd\text{-}BaSO_4]{H_2} C_8H_8 \xrightarrow[(ii)\ H_2O_2, NaOH, H_2O]{(i)\ B_2H_6} (X)$$

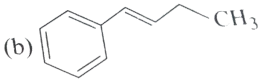
$$H_2O \downarrow \begin{matrix} HgSO_4, \\ H_2SO_4 \end{matrix}$$

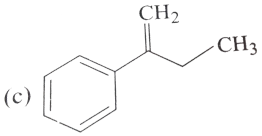
$$C_8H_8O \xrightarrow[(ii)\ H^+, \text{heat}]{(i)\ EtMgBr, H_2O} (Y)$$

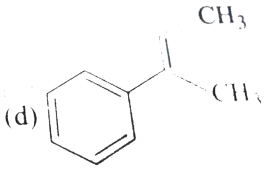
Answer the following questions:

The major compound (Y) is:

A. 

B. 

C. 

D. 

Answer: D

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SINGLE INTEGER ANSWER TYPE QUESTIONS

1. If a mixture containing 1-butene, cis-2-butene and trans-2-butene is treated with perbenzoic acid, how many different isomers of epoxides result?

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2. How many number of cis-trans isomer with molecular formula $C_2BrCIFI$ are?

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3. How many of the following on reductive ozonolysis will give only glyoxal? Ethylene, acetylene, 1,3-butadiene, benzene, o-xylene, m-xylene, p-xylene, cyclobutadiene, cyclooctatetrene.

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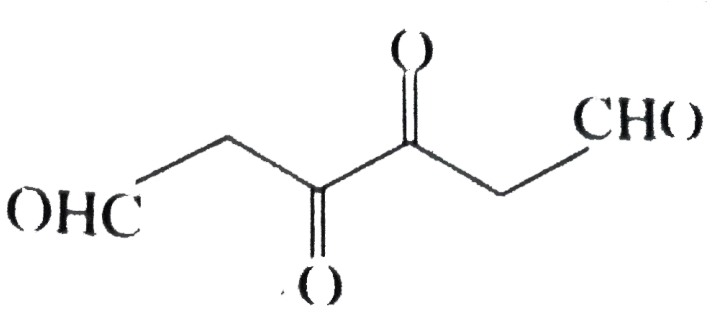
4. How many different six carbon hydrocarbons on reductive ozonolysis give the same product shown below?



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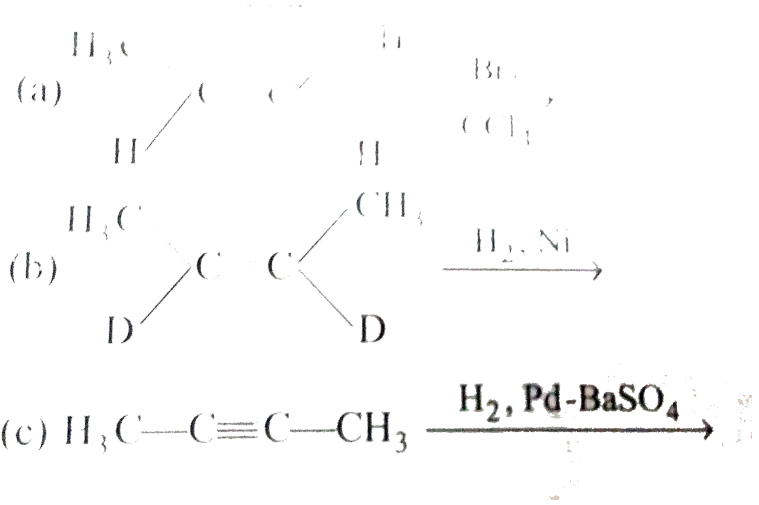
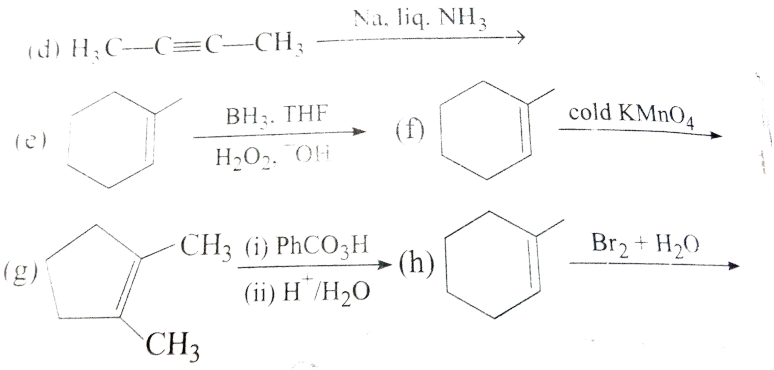
5. How many of the following addition reactions are syn addition reaction.





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6. If trans-2-butene is treated with $Br_2 - H_2O$ containing NaCl and $AlCl_3$, how many different dihalides (including stereoisomers) would result?

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7. If 2-chloro-3-methylpentane is treated with ethanolic KOH solution, how many different alkenes would be formed via E_2 elimininationreaction?

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8. How many number of alkenes are possible by dehydration of 3-bromo-3-cyclopentylhexane using alcoholic KOH?

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9. The following reaction is a x,y-addition reaction.

$$H_2C = CH - CH = CH_2 + HBr \rightarrow H_3C - CH = CH - CH_2Br$$

The value of (x+y) is:

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10. Draw all the structural , stereo, and cyclic isomers of C_4H_6.

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