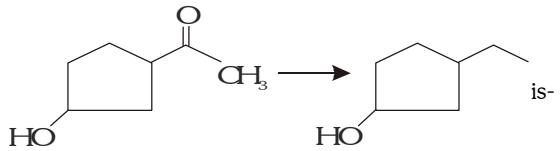
SELECT THE CORRECT ALTERNATIVE (ONLY ONE CORRECT ANSWER)

1. The smallest alkane which can show optical isomerism possesses -

(A) 5 carbons (B) 6 carbons (C) 7 carbons (D) 8 carbons

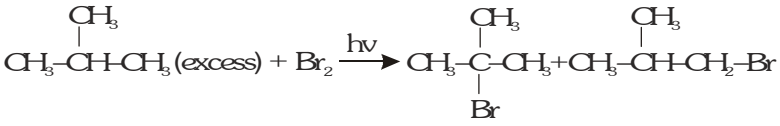
2. The appropriate reagent for the transformation



is-

(A) Zn(Hg)/HCl (B) NH_2NH_2,OH^- (C) H_2/Ni (D) $NaBH_4$

3. The relative reactivity of 1°H, 2°H and 3°H in bromination reaction has been found to be 1 : 82 : 1600 respectively. In the reaction -



(A) (B)

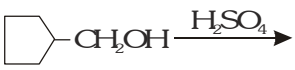
the percentage yields of the products (A) and (B) are expected to be -

(A) 99.4%, 0.6% (B) 50%, 50% (C) 0.6%, 99.4% (D) 80%,20%

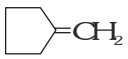
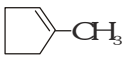
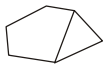
4. The least reactive alkane towards free-radical substitution reactions is-

(A) CH_4 (B) $(CH_3)_3CH$ (C) CH_3CH_3 (D) $CH_3CH_2CH_3$

5. For the reaction



the major product is :

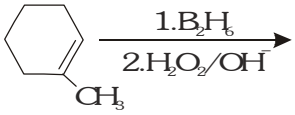
(A)  (B)  (C)  (D) 

6. Propene is allowed to react with B_2D_6 and the product is treated with acetic acid. The final product obtained is -

(A) 1–deuteriopropane (B) 2–deuteriopropane

(C) 1–deuteriopropene (D) 2–deuteriopropene

7. 1–Methylcyclohexene is allowed to react with B_2H_6. The product is then treated with H_2O_2 and NaOH. The reaction is -



The product formed is

(A) 1–methylcyclohexanol (B) 2–methylcyclohexanol

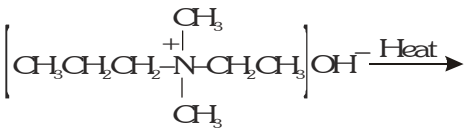
(C) methylcyclohexane (D) cyclohexanol

8. Propene on reaction with ICl produces mainly -

(A) 1–chloro–2–iodopropene (B) 2–chloro–1–iodopropane

(C) (±)–2–chloro–1–iodopropane (D) (±)–1–chloro–2–iodopropane

9. Consider the reaction



Which of the following is formed in major amount

(A) $CH_2=CH_2$ (B) $CH_3CH=CH_2$

(C) Both (A) and (B) in equal amount (D) None, as no reaction takes place

10. In the addition of HBr to propene in the absence of a peroxide, the first step involves the addition of -

(A) H^+ (B) Br^- (C) $H^\bullet$ (D) $Br^\bullet$

11. In the reaction

$CH_3CH_2CH=CH_2 \xrightarrow[2.NaBD_4]{1.Hg(OAc)_2,H_2O}$

the product obtained is -

(A) $CH_3CH_2CHOHCH_2D$ (B) $CH_3CH_2CHDCH_2OH$

(C) $CH_3CH_2CD(OH)CH_3$ (D) $CH_3CH_2CD_2CH_2OH$

12. The major product obtained in the reaction of 1,3-Butadiene with HCl (1 mole) at a higher temperature (100°C or above) is

(A) 3,4–dichloro–1–butene (B) 3–chloro–1–butene

(C) 1–chloro–2–butene (D) 2–chloro–2–butene

13. An optically active hydrocarbon (X) on catalytic hydrogenation gives an optically inactive compound (Y), C_6H_{14}. The hydrocarbon (X) is-

(A) 3–methyl–1–pentene (B) 3–methyl–2–pentene

(C) 2–ethyl–1–butene (D) 3–methylcyclopentene

14. The addition of HCl to 1–phenylpropene gives-

(A) $C_6H_5CHClCH_2CH_3$ (B) $C_6H_5CH_2CHClCH_3$

(C) $C_6H_5CH_2CH_2CH_2Cl$ (D) $C_6H_5CH(CH_3)CH_2Cl$

15. The reduction of 4–octyne with H_2 in the presence of $Pd/CaCO_3$ – quinoline gives-

(A) trans–4–octene (B) cis–4–octene

(C) a mixture of cis–and trans–4–octene (D) a completely reduced product C_8H_{18}

16. The ease of formation of free radicals follows the order -

(A) $3^\circ > 2^\circ > 1^\circ > \dot{C}H_3$ (B) $\dot{C}H_3 > 1^\circ > 2^\circ > 3^\circ$

(C) $1^\circ > 2^\circ > 3^\circ > \dot{C}H_3$ (D) $2^\circ > 1^\circ > 3^\circ > \dot{C}H_3$

17. Which of the following has the lowest heat of hydrogenation per mole -

(A) cis–2–Butene (B) trans–2–Butene (C) 1–Butene (D) 1,3–Butadiene

18. The intermediate formed during the addition of HCl to propene in the presence of peroxide is-

(A) $CH_3\dot{C}HCH_2Cl$ (B) $CH_3CH_2\dot{C}H_2$ (C) $CH_3\overset{+}{C}HCH_3$ (D) $CH_3CH_2\overset{+}{C}H_2$

19. The order of stability of the alkenes

$R_2C=CR_2$, $R_2C=CHR$, $R_2C=CH_2$, $RCH=CHR$, and $RCH=CH_2$

I II III IV V

is -

(A) I > II > III > IV > V (B) I = II > III > IV > V

(C) II > I > IV > III > V (D) V > IV > III > I > II

20. Which of the following will not react with an ammonical silver nitrate solution :

(A) $CH_3C\equiv CH$ (B) $(CH_3)_2CH-C\equiv H$ (C) $CH_3C\equiv CCH_3$ (D) $HC\equiv CH$

CHECK YOUR GRASP	ANSWER KEY	EXERCISE -1

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	C	B	A	A	C	B	B	B	A	A	A	C	A	A	B	A	D	C	A	C

SELECT THE CORRECT ALTERNATIVES (ONE OR MORE THEN ONE CORRECT ANSWERS)

1. Which of the following reactions will result in the formation of a chiral centre in the product -

(A) $CH_3CH=CHCH_3+HBr \longrightarrow$ (B) $CH_3CH=CH_2+HOBr \longrightarrow$

(C) $CH_3CH_2CH=CH_2+HBr \xrightarrow{H_2O_2}$ (D) $CH_3CH_2CH=CH_2+HBr \longrightarrow$

2. Propene on reaction with N–bromosuccinimide in CCl_4 produces -

(A) 1, 2–dibromopropane (B) 3–bromopropene

(C) 1–bromopropene (D) 2–bromopropene

3. cis–2–Butene on reaction with Br_2 in CCl_4 produces mainly -

(A) 1–bromo–2–butene (B) 2,3–dibromobutane

(C) meso–2,3–dibromobutane (D) (±) 2,3–dibromobutane

4. The bond dissociation energies of the following

$CH_3–H$ $CH_3CH_2–H$ $CH_2=CH–CH_2–H$ $C_6H_5–H$

I II III IV

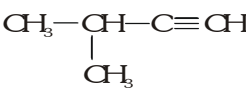
vary in the order :

(A) I > II > III > IV (B) IV > III > II > I (C) IV > I > II > III (D) II > I > IV > III

5. Which of the following decolourises alkaline $KMnO_4$ solution

(A) C_3H_8 (B) C_2H_4 (C) CH_4 (D) CCl_4

6. Compounds capable of reacting with ammonical $AgNO_3$ solution are

(A)  (B) $HC\equiv CH$ (C) 1- Butyne (D) all the above

7. A hydrocarbon which decolourises $KMnO_4$ but does not give any precipitate with ammoniated $AgNO_3$

(A) Benzene (B) Acetylene (C) Butyne (D) 2–Butene

8. Compound 'A' on chlorination gives compound 'B', compound 'B' reacts with alc. KOH gives gas 'C', which decolourise Baeyer reagent. ozonolysis of compound 'C' gives only HCHO compound. 'A' is :

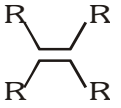
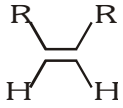
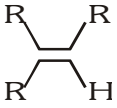
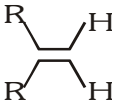
(A) C_2H_6 (B) C_2H_4 (C) C_4H_{10} (D) C_2H_5Cl

9. Which reagent converts propene to 1–propanol

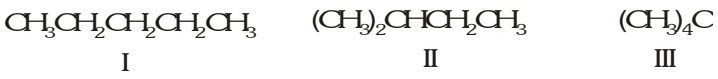
(A) H_2O, H_2SO_4 (B) B_2H_6, H_2O_2, OH^-

(C) $Hg(OAc)_2$,$NaBH_4/H_2O$ (D) Aq. KOH

10. Which one of the following alkenes will react faster with H_2 under catalytic hydrogenation conditions : [R = Alkyl Substituent]

(A)  (B)  (C)  (D) 

11. Arrange the following in order of increase/decrease in boiling point.



I II III

(A) I > II > III (B) II > I > III (C) III > I > II (D) III < II < I

12. What are the products obtained upon the ozonolysis of 2-pentene ?

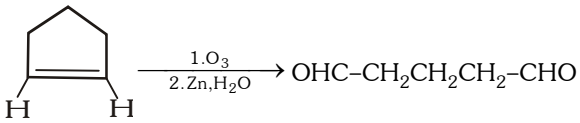
(A) CH_3CH_2CHO (B) CH_3CHO (C) CH_3COCH_3 (D)$CH_3COCH_2CH_3$

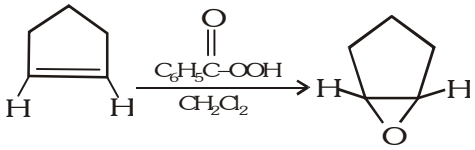
13. Which of the following can be used for the preparation of propane ?

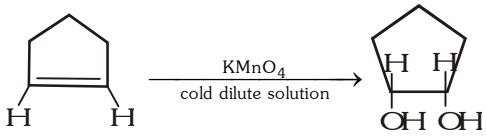
(A) $CH_3CH{=}CH_2 \xrightarrow[2.CH_3COOH]{1.B_2H_6}$ (B) $CH_3CH_2CH_2Cl \xrightarrow[2.H_2O]{1.Mg/\text{ether}}$

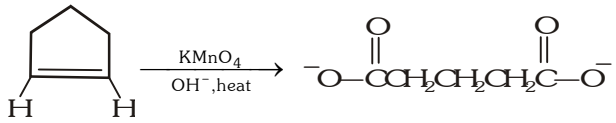
(C) $CH_3CH_2CH_2I \xrightarrow{Red\,P/HI/150°C}$ (D) $CH_3CH_2CH_2COONa \xrightarrow[\Delta]{NaOH/CaO}$

14. Which of the following are correct :

(A) 

(B) 

(C) 

(D) 

15. 2-Bromo-3-phenylpropane can be synthesised by

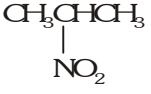
(A) $C_6H_5CH_2CH(OH)CH_3+PBr_3 \longrightarrow$

(B) $C_6H_5CH{=}CHCH_3+HBr+$ benzoyl peroxide $\longrightarrow$

(C) $C_6H_5CH_2CH_2CH_3+Br_2+$ light $\longrightarrow$

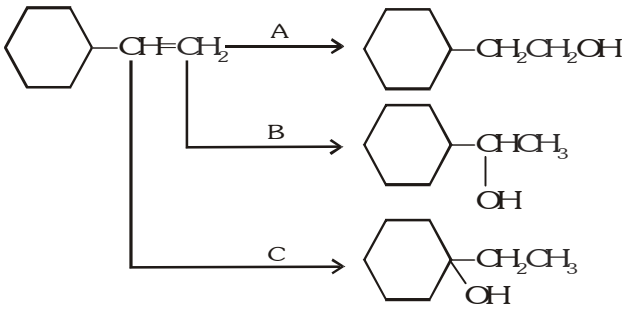
(D) none of these

16. The nitration of propane with concentrated HNO_3 gives :

(A) $CH_3CH_2CH_2NO_2$ (B)  (C) $CH_3CH_2NO_2$ (D) CH_3NO_2

17. Which of the follwing will react with sodium metal :

(A) Ethyne (B) 1-Butyne (C) 2-Butyne (D) Ethane

18. 

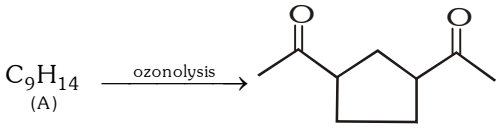
A, B and C are :

(A) simple hydration

(B) hydroboronation, mercuration-demercuration, hydration

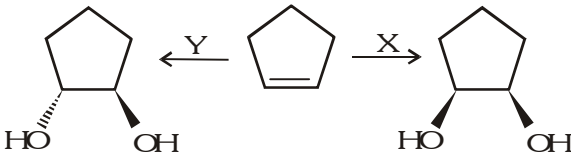
(C) hydration, hydroboronation, mercuration-demercuration

(D) mercuration-demercuration, hydration, hydroboronation

19. 

Hence A is :

(A)  (B)  (C)  (D) 

20. 

Select X and Y out of :

I : MnO_4^-/OH^- II : HCO_3H

(A) X -I, Y- II (B) X -II, Y- I (C) X -I, Y- I (D) X -II, Y- II

BRAIN TEASERS				ANSWER KEY							EXERCISE -2				
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	A, B,D	B	D	C	B	D	D	A	B	B	A, D	A, B	A,BC,D	A,BC,D	A,B
Que.	16	17	18	19	20										
Ans.	A,BC,D	A, B	B	B	A										

EXERCISE–03 MISCELLANEOUS TYPE QUESTIONS

TRUE OR FALSE :

1. Although acetylene acidic in nature it does not react with NaOH/KOH.
2. Although C—H bond in acetylene has greatest bond energy of all C—H bond, yet it is most acidic.
3. $CH_2=\overset{\cdot\cdot}{\underset{\cdot\cdot}{C}}H$ is less basic than $HC\equiv\overset{\cdot\cdot}{\underset{\cdot\cdot}{C}}$
4. —C ≡ C— has two π bond yet it is less reactive than $-\overset{|}{C}=\overset{|}{C}-$ towards electrophilic addition reaction.
5. Partial reduction of alkynes is either syn or anti.

FILL IN THE BLANKS :

1. Out of cis-2 butene and trans-2-butene, ... has the lower melting point.
2. A four-carbon alkyne having weakly acidic character is .....
3. Alkanes undergo ..... reactions whereas alkynes give ..... reaction.
4. ..... is a versatile method for locating the position of the double bond in an alkene.
5. The valence atomic orbital on carbon in silver acetylide is ..... hybridized.

MATCH THE COLUMN

1. Match the column I with column II.

	Column-I		Column-II
(A)	Wurtz reaction	(p)	Electrophilic substitution reaction
(B)	Hydration of alkenes	(q)	Free radical substitution
(C)	Nitration of alkane	(r)	Electrophilic addition reaction
(D)	Reaction of alkene with NBS	(s)	Nucleophilic substitution

2. Match the column I with column II.

Column-I		Column-II	
$CH_3-CH=CH_2$ (A)	$CH_3-CH_2-CH_2Br$	(p)	HBr
$CH_3-CH=CH_2$ (B)	$CH_3-CHBr-CH_3$	(q)	HBr + peroxide
$CH_3-CH=CH_2$ (C)	$CH_3-CHBr-CH_2Br$	(r)	NBS
$CH_3-CH=CH_2$ (D)	$BrCH_2-CH=CH_2$	(s)	Br_2, low temp., dark

3. Match the column I with column II.

	Column-I		Column-II
(A)	Dehydrohalogenation of alkyl halides	(p)	Kolbe reaction
(B)	Electrolysis of sodium salt	(q)	Alc. KOH
(C)	Ozonolysis	(r)	Addition product of ethylene
(D)	Dichloro ethylene	(s)	Sodalime
(E)	Decarboxylation	(t)	Alkene

ASSERTION & REASON QUESTION :

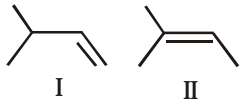
These questions contains, Statement-I (assertion) and Statement-II (reason).

(A) Statement-I is True, Statement-II is True ; Statement-II is a correct explanation for Statement-I

(B) Statement-I is True, Statement-II is True ; Statement-II is NOT a correct explanation for Statement-I

(C) Statement-I is True, Statement-II is False.

(D) Statement-I is False, Statement-II is True.

1. **Statement-I :** Of two isomeric alkenes shown,  II is more stable than I.

Because

Statement-II : The alkene (II) has sp^2-hybridized carbons.

2. **Statement-I :** Addition of HBr to 1-butene gives two optical isomers.

Because

Statement-II : The product contains one asymmetric carbon.

3. **Statement-I :** 1-Butene on reaction with HBr in the presence of a peroxide produces 1-bromobutane.

Because

Statement-II : It involves the formation of a primary radical.

4. **Statement-I :** Addition of Br_2- water containing dissolved NaCl to ethylene gives a mixture of 1, 2-dibromoethane, 1-bromo-2-chloroethane and 2-bromoethanol.

Because

Statement-II : Addition occurs through a carbocation intermediate.

5. **Statement-I :** Addition of bromine to trans-2-butene yields meso-2,3-dibromobutane.

Because

Statement-II : Bromine addition to an alkene is an electrophilic addition.

6. **Statement-I :** Alkynes are more reactive than alkenes towards electrophilic reagents like H^+.

Because

Statement-II : The alkyl carbocation formed from alkene is more stable than the vinyl carbocation formed from alkyne.

7. **Statement-I :** Neopentane forms only one monochlorinated product.

Because

Statement-II : Neopentane has four identical methyl group attached to a quaternary carbon.

8. **Statement-I :** Buta-1,3-diene is less stable than Penta-1, 4-diene.

Because

Statement-II : Buta-1,3-diene has greater number of resonating structures and delocalised electron cloud,

9. **Statement-I :** Iodination of alkanes is carried out in the presence of iodic acid.

Because

Statement-II : Iodic acid removes I_2 gas from the reaction mixture.

10. **Statement-I :** Propene is more reactive than ethene with HCl.

Because

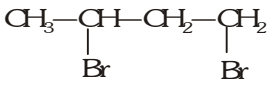
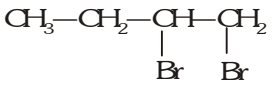
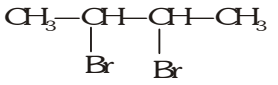
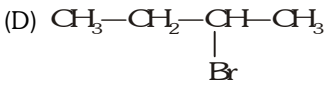
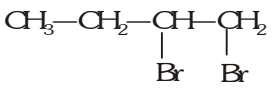
Statement-II : Propene is more stable than ethene.

COMPREHENSION BASED QUESTIONS :

Comprehension # 1

$X(C_4H_9Br) \xrightarrow{alc.KOH} Y \xrightarrow{Br_2} Z$ (Dibromide) $\xrightarrow{NaNH_2} W$ (gas) $\xrightarrow[Sol^n]{AgNO_3}$ white ppt. X, Y and Z are

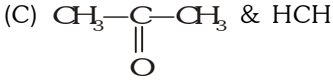
1.

X	Y	Z
(A) $CH_3-CH_2CH_2CH_2Br$	$CH_3-CH=CH-CH_3$	
(B) $CH_3-CH_2CH_2CH_2Br$	$CH_3-CH_2-CH=CH_2$	
(C) $CH_3-CH_2-CH_2-CH_3$	$CH_3-CH=CH-CH_3$	
(D) 	$CH_3-CH=CH-CH_3$	

2. Reductive ozonolysis of Y yields :

(A) 2 moles of CH_3CHO

(B) CH_3CH_2CHO & HCHO

(C)  & HCHO

(D) CH_3CH_2COOH & HCOOH

3. Which of the following statement (s) is/are correct :

(A) Compound W has 2 DU

(B) Y & W are functional isomers

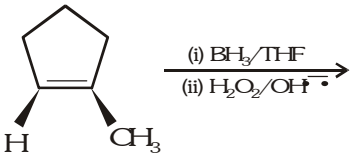
(C) W can be converted into Y with Lindlar catalyst

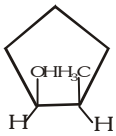
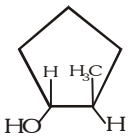
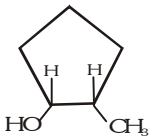
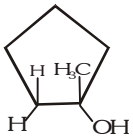
(D) W can be converted into Y with Ni/Pt

Comprehension # 2

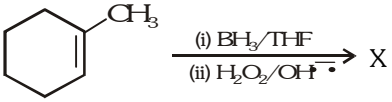
Borane is an electron deficient compound. It has only six valence electrons, so the boron atom lacks an octet. Acquiring an octet is the driving force for the unusual bonding structure found in boron compounds. As an electron deficient compound, BH_3 is a strong electrophile, capable of adding to a double bond. This hydroboration of double bond is though to occur in one step, with the boron atom adding to the less highly substituted end of the double bond. In transition state, the boron atom withdraws electrons from the pi bond and the carbon at the other end of the double bond acquires a partial positive charge. This positive charge is more stable on the more highly substituted carbon atom. The second step is the oxidation of boron atom, removing it from carbon and replacing it with a hydroxyl group by using $H_2O_2/\overset{\ominus}{O}H$.

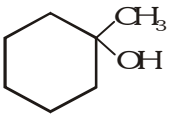
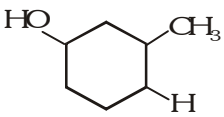
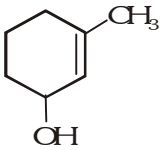
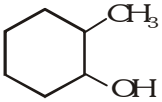
The simultaneous addition of boron and hydrogen to the double bond leads to a syn addition. Oxidation of the trialkyl borane replaces boron with a hydroxyl group in the same stereochemical position. Thus, hydroboration of alkene is an example of stereospecific reaction, in which different stereoisomers of starting compounds react to give different stereoisomers of the product.

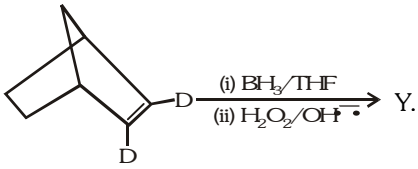
1. What will be the product of following reaction  product :

(A) 
(B) 
(C) 
(D) 

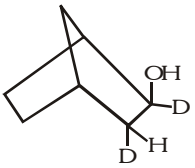
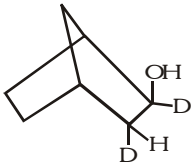
2. Find the product of following reaction

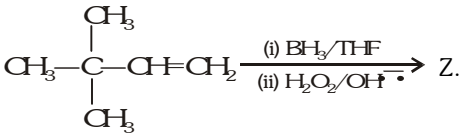


(A) 
(B) 
(C) 
(D) 

3. 

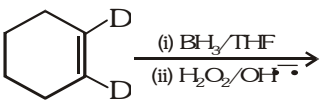
Y is :

(A) Meso 
(B) Racemic 
(C) both
(D) None of these

4. 

Z is :

(A) Optically active 1 -alcohol
(B) Optically active 2 -alcohol
(C) Optically inactive 1 -alcohol
(D) Optically inactive 3 -alcohol

5.  Product. The product is

(A) Threo cyclic alcohol
(B) Erythreo cyclic alcohol
(C) Optically active alcohol
(D) Both (B) and (C)

Comprehension # 3

Hydrocarbon (A) C_6H_{10} on treatment with H_2/Ni, H_2/Lindlar's catalyst or Na/liq. NH_3 forms three different reduction products (B), (C), (D) respectively. (A) does not form any salt with ammonical $AgNO_3$ solution, but (E) forms salt 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.

1. (D) and (C) are

(A) Isomeric alkane (B) Isomeric alkene

(C) Not isomers (D) (C) is an alkene and (D) is salt

2. If (E) is reacted with acetaldehyde followed by acidification, product is

(A) acid (B) ketone (C) ether (D) alcohol

3. (F) on ozonolysis will produce -

(A) acetic aicd (B) formic acid (C) propanoic acid (D) formaldehyde

---

MISCELLANEOUS TYPE QUESTION **ANSWER KEY** EXERCISE -3

- ***True / False***

  1. T **2.** T **3.** F **4.** T **5.** T

- ***Fill in the Blanks***

  1. Cis-2-butene **2.** 1-Butyne **3.** Free radical substitution, electrophilic substitution

  4. Ozonolysis **5.** sp

- ***Match the Column***

  1. (A) → s ; B → r ; (C) → p ; (D) → q **2.** (A) → q ; (B) → p ; (C) → s ; (D) → r

  3. (A) → q ; (B) → p ; (C) → t ; (D) → r ; (E) → s

- ***Assertion - Reason Questions***

  1. C **2.** A **3.** C **4.** A **5.** B **6.** D **7.** A

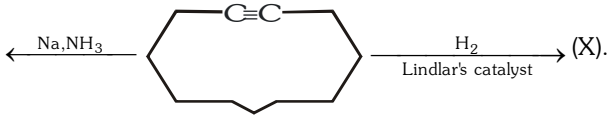
  8. D **9.** C **10.** B

- ***Comprehension Based Questions***

  Comprehension #1 : 1. (B) **2.** (B) **3.** (A, C)

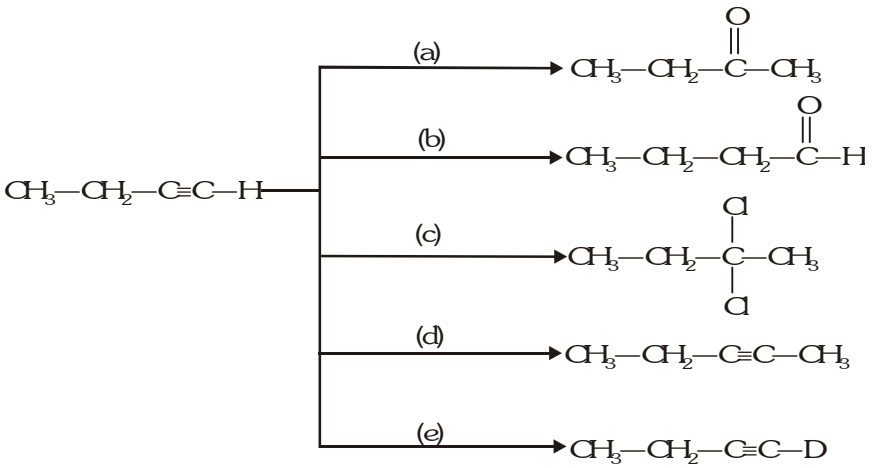
  Comprehension #2 : 1. (B) **2.** (D) **3.** (B) **4.** (C) **5.** (D)

  Comprehension #3 : 1. (B) **2.** (D) **3.** (A)

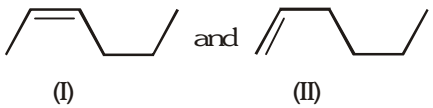
1. (Y)  (X).

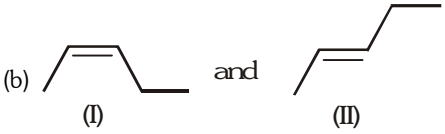
What are X and Y in above reaction.

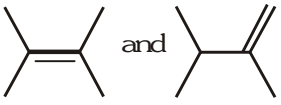
2. Find out reagents involved in following conversions :

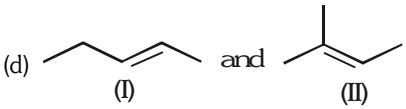


3. Select one from the following pair of isomer that has higher heat of combustion, justifying your choice.

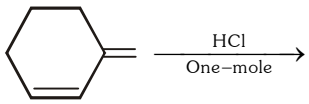
(a) 

(b) 

(c) 

(d) 

4. The reaction of the diene shown below with dry HCl can lead to four products. Provide structural formula of all the products.



5. Write major product in the following reactions :

(a) $F_3C-CH=CH_2 + HI \longrightarrow$

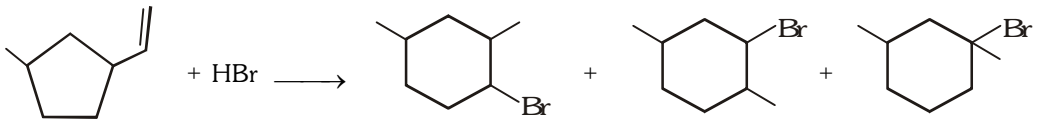
(b) $C_6H_5-CH=CHCH_3 + HBr \xrightarrow{\text{Peroxide}}$

(c) $CH_3CH=\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}-CH_3 + CHBr_3 \xrightarrow{\text{Peroxide}}$

(d) $C_6H_5-CH=CH_2 + B_2H_6 \xrightarrow[NaOH]{H_2O_2}$

(e) $CH_3-CH=CH-CH=CH_2 \xrightarrow[50°C]{HCl}$

6. Propose mechanism :

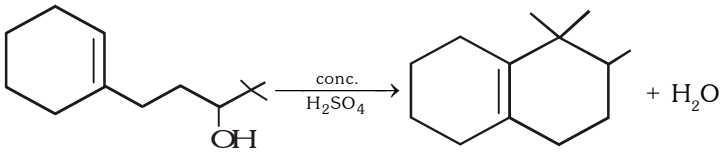


7. A hydrocarbon (A) was found to have vapour density 36. It forms only single mono chlorosubstitution product. Suggest (A).

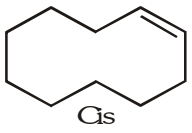
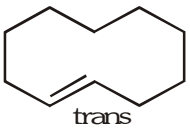
8. An olefin was treated with ozone and the resulting product on reductive hydrolysis gave 2-pentanone and acetaldehyde. What is the structure of olefin ? Write reactions.

9. Why n-Pentane has higher boilign point than neopentane ?

10. Write a plausible mechanism for the following transformation.



CONCEPTUAL SUBJECTIVE EXERCISE — ANSWER KEY — EXERCISE -4(A)

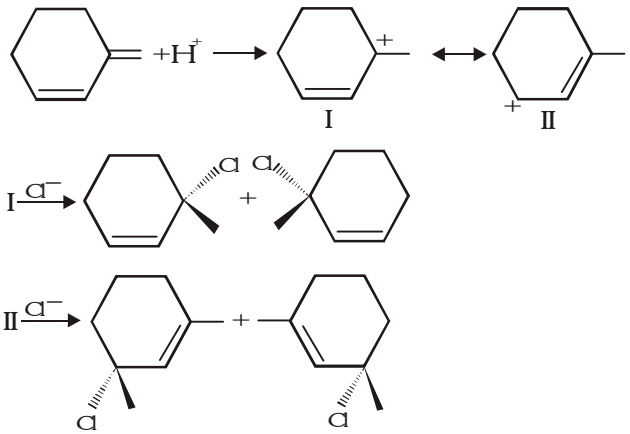
1. (X) :  (Y) : 

Cis

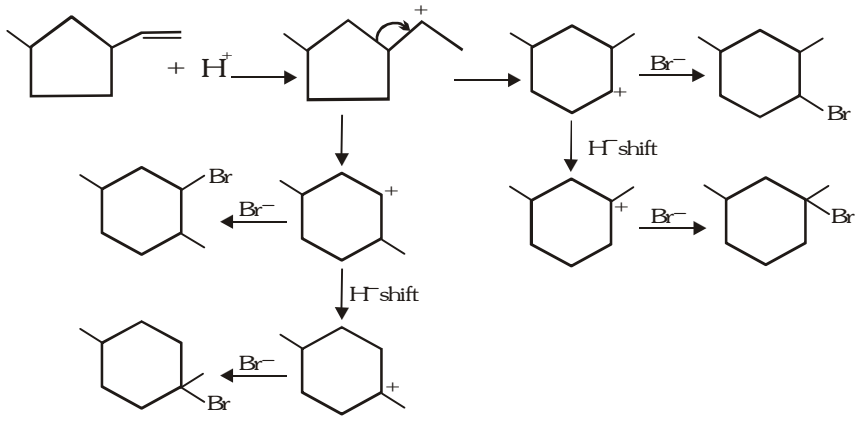
trans

2. (a) $H_2O/Hg^{2+}/H^+$, (b) $(Sia)_2$ BH/H_2O_2, $\ddot{O}H$, (c) 2HCl,
(d) Na, CH_3 – I, (e) Na, D–O–D

3. (a) II ; (b) I ; (c) II ; (d) I

4. 

6.



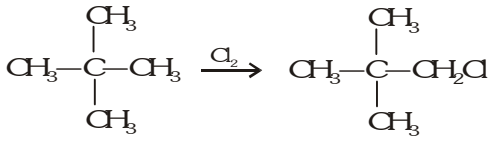
7. Mol.wt of alkane = Vapour density 2 = 36 2 = 72

Alkane is C_nH_{2n+2}

$\therefore$ 12n + 2n + 2 = 72

$\therefore$ n = 5 $\therefore$ Alkane is C_5H_{12}

Thus alkane C_5H_{12} showing only one mono substitution product is

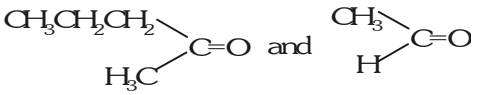


(A) (2,2-dimethylpropane)

8. (i) Olefin $\xrightarrow{O_3}$ ozonide $\xrightarrow{2H}$ $CH_3-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=O + CH_3CHO$ (ethanal)

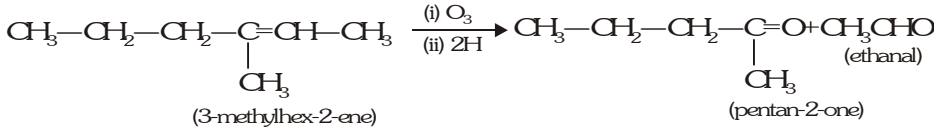
(pentan-2-one)

(ii) Thus olefin has 7 carbon atoms with two units round double bond as



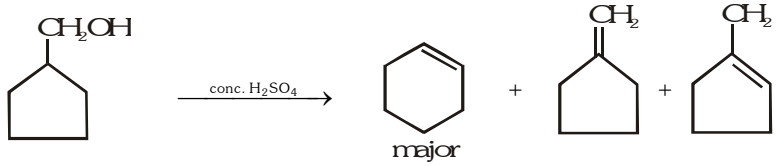
(iii) The olefin is therefore $CH_3-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}}=CH-CH_3$

(iv) The reaction is



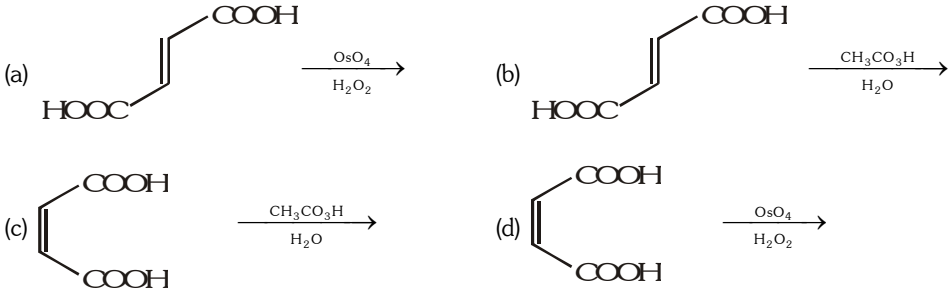
(3-methylhex-2-ene) (pentan-2-one)

9. n-Pentane has higher b.p. (36.2 C) than neopentane (9.5 C). It is due to vander waals forces. n-Pentane has a rod-like shape, while neopentane is sphere-like. Rods can touch along their entire length, while the spheres touch only at a point. The more the contanct between molecules, the greater the vander waals forces and hence higher the b.p.

1. 

Give mechanism of this reaction.

2. Identify the products in the following, giving their configurations. (if any)

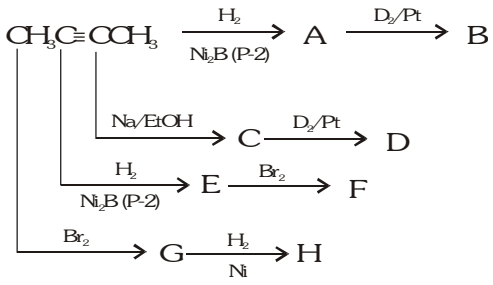


3. Write one reagent in each case to make distinction between

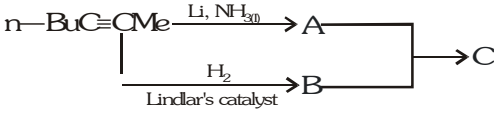
(a) 1-butyne and 2-butyne ..... (b) 1-butene and 1-butyne .....

(c) ethene and ethane .....

4. 2-Butyne undergoes following reactions in steps as indicated. Identify A to H.

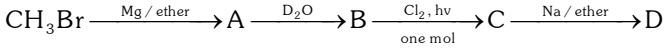


5. Identify A, B, C with proper explanation.



6. A hydrocarbon A($C_{10}H_{12}$) has no chiral carbon. A gives a white precipitate with ammonical solution of silver nitrate. A on traeatment with H_2/Pt gives B($C_{10}H_{20}$). A on ozonolysis gives C($C_8H_{12}O_4$) as one product which on heating with soda lime gives D(C_6H_{12}). D on monochlorination with Cl_2/hv gives $C_6H_{11}Cl$ as sole isomer. Identify A to D.

7. Identify A to D in the following scheme.



8. $\overset{\cdots\cdots\cdots}{C_4H_9Cl} \xrightarrow{Na/\text{ether}}$ 

Write structure of C_4H_9Cl.

9. Specify the reagents in which addition to alkene is syn or anti

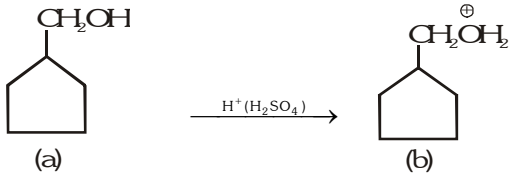
(i) Br_2 water (ii) H_2/pd

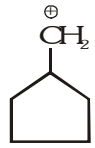
(iii) MnO_4^-/OH^- (iv) HCO_3H

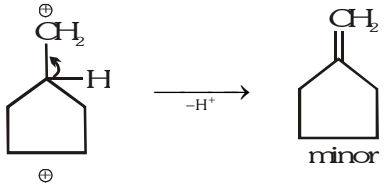
(v) MCPBA (vi) OsO_4 in ether, followed by $\overline{O}H/H_2O$

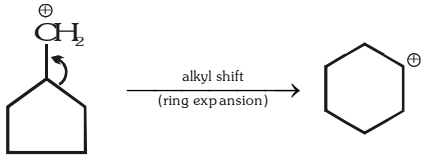
10. C_5H_{10} represents three isomeric alkenes A_1, A_2 and A_3. Each on hydrogenation gives 2-methylbutane. A_1 and A_2 on oxymercuration-demercuration give the same 3° alcohol. A_2 and A_3 on hydroboration oxidation give different 1° alcohol. Assign structures to A_1, A_2 and A_3 and explain the reactions.

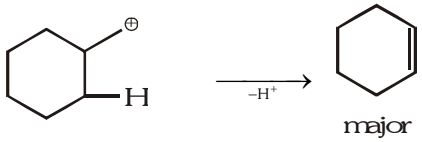
BRAIN STORMING SUBJECTIVE EXERCISE **ANSWER KEY** EXERCISE -4(B)

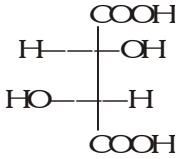
1. **Step (I) :** 

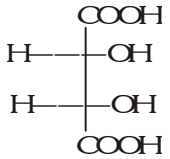
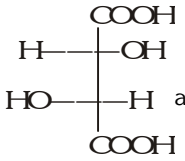
Step (II) : (b) $\xrightarrow{-H_2O}$ 

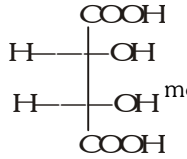
Step (III) : 

Step (IV) : 

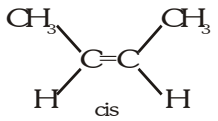
Step (V) : 

2. (a)  and its enantiomer-a case of syn addition. Mixture is optically inactive (racemic).

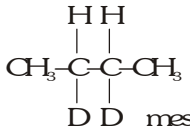
(b)  meso form by anti addition. (c)  and its enantiomer (racemic) by anti additon.

(d)  meso by syn addition.

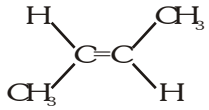
4. A is obtained by syn addition

A : 

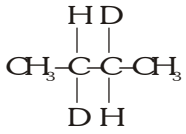
B is also obtained by syn addition

B : 

C is obtained by anti addition

C : 

D is mixture of d-and l-(recemic mixture)

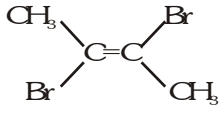
D : 

d- and ℓ- (racemic)

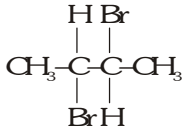
E is obtained by syn addition

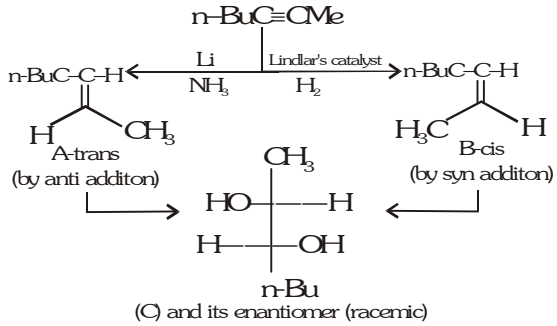
E : as A

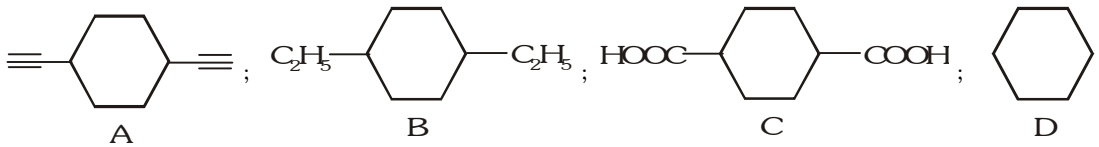
Addition of Br_2 is anti

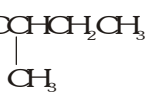
G : 

H : as F

F : 

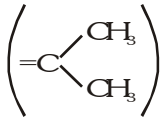
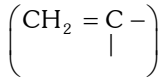
5. 

6. 

10. A_1, A_2 or A_3 $\xrightarrow{H_2}$ 

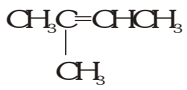
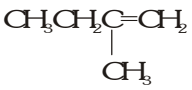
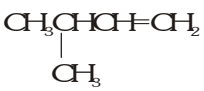
This shows that each of A_1, A_2 and A_3 have same C-chain; only position of (C=C) is to be decided.

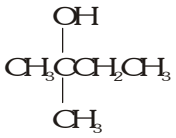
A_1, A_2 $\xrightarrow[\text{demercuration}]{\text{oxymercuration}}$ 3° alcohol

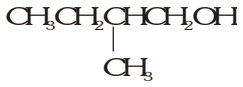
hence A_1 and A_2 have  or  groupings.

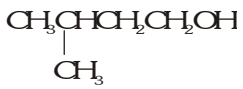
A_2 and A_3 $\xrightarrow{\text{hydroboration oxidation}}$ 1° alcohol

This indicates presence of (CH_2=) grouping at the terminal. Hence,

A_1 is  A_2 is  A_3 is 

A_1 or A_2 $\xrightarrow[\text{demercuration}]{\text{oxymercuration}}$  3 alcohol (X)

A_2 $\xrightarrow[\text{oxidation}]{\text{hydroboration}}$  1° alcohol (Y)

A_3 $\xrightarrow[\text{oxidation}]{\text{hydroboration}}$  1° alcohol (Z)

Y and Z are different 1° alcohols.

EXERCISE - 05 [A] JEE-[MAINS] : PREVIOUS YEAR QUESTIONS

1. Which of these will not react with acetylene - [AIEEE-2002]
(A) NaOH (B) ammonical $AgNO_3$ (C) Na (D) HCl

2. What is the product formed when acetylene reacts with hypochlorous acid - [AIEEE-2002]
(A) CH_3COCl (B) $ClCH_2CHO$ (C) Cl_2CHCHO (D) $ClCH_2COOH$

3. 1–Butene may be converted to butane by reaction with - [AIEEE-2003]
(A) Pd/H_2 (B) Zn - HCl (C) Sn - HCl (D) Zn - Hg/HCl

4. On mixing a certain alkane with chlorine and irradiating it with ultraviolet light, it forms only one monochloroalkane. This alkane could be - [AIEEE-2003]
(A) neopentane (B) propane (C) pentane (D) isopentane

5. Which one of the following is reduced with Zn-Hg/HCl to give the corresponding hydrocarbon
(A) Butan-2-one (B) Acetic acid [AIEEE-2004]
(C) Acetamide (D) Ethyl acetate

6. Which one of the following has the minimum boiling point : [AIEEE-2004]
(A) isobutane (B) 1–butyne (C) 1–butene (D) n–butane

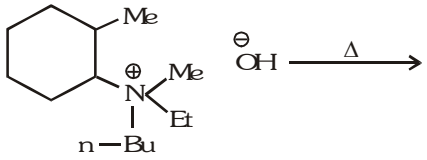
7. 2-Methylbutane on reacting with bromine in the presence of sunlight gives mainly [AIEEE-2005]
(A) 2–bromo-2–methylbutane (B) 1–bromo-2–methylbutane
(C) 1–bromo-3–methylbutane (D) 2–bromo-3–methylbutane

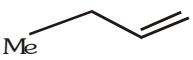
8. Alkyl halides react with dialkyl copper reagent to give [AIEEE-2005]
(A) alkyl copper halides (B) alkenes
(C) alkenyl halides (D) alkanes

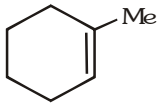
9. Reaction of one molecule of HBr with one molecule of 1,3–butadiene at 40 C gives predominantly
(A) 1–bromo–2–butene under thermodynamically controlled conditions [AIEEE-2005]
(B) 3–bromobutene under kinetically controlled conditions
(C) 1–bromo–2–butene under kinetically controlled conditions
(D) 3–bromobutene under thermodynamically controlled conditions

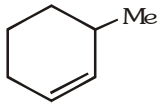
10. Acid catalyzed hydration of alkenes except ethene leads to the formation of [AIEEE-2005]
(A) secondary or tertiary alcohol
(B) primary alcohol
(C) mixture of secondary and tertiary alcohols
(D) mixture of primary and secondary alcohols

11. Elimination of bromine from 2–bromobutane results in the formation of [AIEEE-2005]
(A) predominantly 2–butene (B) equimolar mixture of 1 and 2–butene
(C) predominantly 2–butyne (D) predominantly 1–butene

12. 

The alkene formed as a major product in the above elimination reaction is- [AIEEE-2006]
(A) 

(B) $CH_2=CH_2$ (C) 

(D) 

13. Reaction of trans-2-phenyl-1-bromocyclo pentane on reaction with alcoholic KOH produces-
(A) 4-phenyl cyclopentene(B) 2-phenyl cyclopentene [AIEEE-2006]
(C) 1-phenyl cyclopentene(D) 3-phenyl cyclopentene

14. Phenyl magnesium bromide reacts with methanol to give- [AIEEE-2006]
(A) A mixture of anisole and Mg(OH)Br (B) A mixture of benzene and Mg(OMe)Br
(C) A mixture of toluene and Mg(OH)Br (D) A mixture of phenol and Mg(Me)Br

15. Which of the following reactions will yield, 2, 2-dibromopropane **[AIEEE-2007]**

(A) $CH_3-C\equiv CH + 2HBr \longrightarrow$ (B) $CH_3CH=CHBr + HBr \longrightarrow$

(C) $CH\equiv CH + 2HBr \longrightarrow$ (D) $CH_3 - CH = CH_2 + HBr \longrightarrow$

16. In the following sequence of reactions, the alkene affords the compound 'B' :- **[AIEEE-2008]**

$CH_3CH=CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B.$

The compound B is

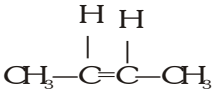
(A) CH_3CH_2CHO (B) CH_3COCH_3 (C) $CH_3CH_2COCH_3$ (D) CH_3CHO

17. The hydrocarbon which can react with sodium in liquid ammonia is **[AIEEE-2008]**

(A) $CH_3CH_2CH_2C\equiv CCH_2CH_2CH_3$ (B) $CH_3CH_2C\equiv CH$

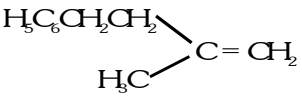
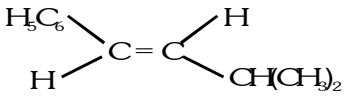
(C) $CH_3CH=CHCH_3$ (D) $CH_3CH_2C\equiv CCH_2CH_3$

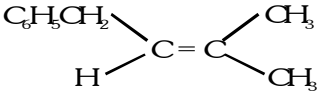
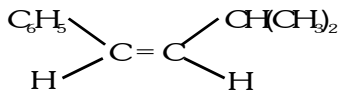
18. The treatment of CH_3MgX with $CH_3C\equiv C-H$ produces **[AIEEE-2008]**

(A) $CH_3-CH=CH_2$ (B) $CH_3C\equiv C-CH_3$ (C)  (D) CH_4

19. The main product of the following reaction is **[AIEEE-2010]**

$C_6H_5CH_2CH(OH)CH(CH_3)_2 \xrightarrow{\text{Conc. } H_2SO_4} ?$

(A)  (B) 

(C)  (D) 

20. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is :- **[AIEEE-2010]**

(A) ethene (B) propene (C) 1-butene (D) 2-butene

21. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of :- **[AIEEE-2011]**

(A) an isopropyl group (B) an acetylenic triple bond

(C) two ethylenic double bonds (D) a vinyl group

22. Ozonolysis of an organic compound 'A' produces acetone and propionaldehyde in equimolar mixture. Identify 'A' from the following compounds :- **[AIEEE-2011]**

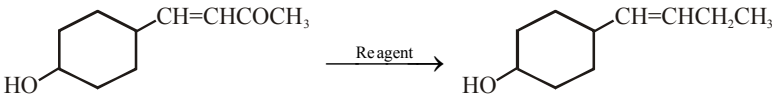
(A) 2 - Methyl - 1- pentene (B) 1 - Pentene

(C) 2 - Pentene (D) 2 - Methyl - 2 - pentene

23. 2–Hexyne gives trans –2–Hexene on treatment with :- **[AIEEE-2012]**

(A) Li AlH_4 (B) Pt/H_2 (C) Li/NH_3 (D) $Pd/BaSO_4$

24. In the given transformation, which of the following is the most appropriate reagent ? **[AIEEE-2012]**



(A) $NaBH_4$ (B) $NH_2\ NH_2, \overset{\ominus}{O}H$ (C) Zn – Hg / HCl (D) Na, Liq.NH_3

JEE-[MAIN] : PREVIOUS YEAR QUESTIONS	ANSWER KEY	EXERCISE -5[A]

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans	1	3	1	1	1	1	1	4	1	1	1	2	4	2	1
Que.	16	17	18	19	20	21	22	23	24						
Ans	4	2	4	2	4	4	4	3	2						

EXERCISE - 05 [B] JEE-[ADVANCED] : PREVIOUS YEAR QUESTIONS

1. Alcoholic solution of KOH is a specific reagent for - **[IIT-90]**

(A) Dehydration (B) Dehydrogenation (C) Dehydro halogenation (D) Dehalogenation

2. Of the following, unsaturated hydrocarbons are - **[IIT-90]**

(A) Ethyne (B) Cyclohexane (C) n-propane (D) Ethane

3. 1–chlorobutane on reaction with alcoholic potash gives **[IIT-91]**

(A) 1–butene (B) 1–butanol (C) 2–butene (D) 2–butanol

4. The hybridisation of carbon atoms in C–C single bond of $HC \equiv C - CH=CH_2$ **[IIT-93]**

(A) sp^3–sp^3 (B) sp^2–sp^3 (C) sp–sp^2 (D) sp^2–sp^2

5. The product (s) obtained via oxymercutation ($HgSO_4 + H_2SO_4$) of 1–butyne would be - **[IIT-92]**

(A) $CH_3 - CH_2 - \underset{\underset{O}{\|}}{C} - CH_3$ (B) CH_3–CH_2–CH_2–CHO

(C) CH_3–CH_2–CHO–HCHO (D) CH_3–CH_2–COOH+HCOOH

6. Which is the decreasing order of strength of bases : **[IIT-93]**

OH^-, NH_2^-, $HC \equiv C^-$ and $CH_3 - CH_2^-$

(A) $CH_3 - CH_2^- > NH_2^- > HC \equiv C^- > OH^-$ (B) $HC \equiv C^- > CH_3 - CH_2^- > NH_2^- > OH^-$

(C) $OH^- > NH_2^- > HC \equiv C^- > CH_3 - CH_2^-$ (D) $NH_2^- > HC \equiv C^- > OH^- > CH_3 - CH_2^-$

7. The chief reaction product of reaction between n-butane and bromine at 130° C is - **[IIT-95]**

(A) $CH_3CH_2CH_2CH_2Br$ (B) $CH_3CH_2\underset{\underset{CH_3}{|}}{CH}Br$

(C) $CH_3\underset{\underset{CH_3}{|}}{CH}CH_2Br$ (D) $CH_3\underset{\underset{CH_3}{|}}{C}Br_2$

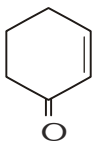
8. When cyclohexane is poured on water, it floats, because - **[IIT-97]**

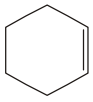
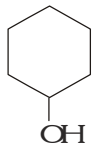
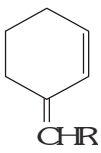
(A) Cyclohexane is in 'boat' form (B) Cyclohexane is in 'chair' form

(C) Cyclohexane is in 'crown' form (D) Cyclohexane is less dense than water

9. $(CH_3)_3$ CMgCl on reaction with D_2O produces **[IIT-97]**

(A) $(CH_3)_3CD$ (B) $(CH_3)_3OD$ (C) $(CD_3)_3CD$ (D) $(CD_3)_3OD$

10. When  reacts with $Ph_3\overset{\oplus}{P}-\overset{\ominus}{C}HR$, the product is - **[IIT-97]**

(A)  (B)  (C)  (D) 

11. The intermediate during the addition of HCl to propene in the presence of peroxide is : **[IIT-97]**

(A) $CH_3\dot{C}HCH_2Cl$ (B) $CH_3\overset{\oplus}{C}HCH_3$ (C) $CH_3CH_2\dot{C}H_2$ (D) $CH_3CH_2\overset{\oplus}{C}H_2$

12. Read the following statement and explanation and answer as per the option given below : **[IIT-98]**

Assertion : Addition of Br_2 to 1–butene gives two optical isomers.

Reason : The product contains one asymmetric carbon.

(A) If both assertion and reason are correct, and reason is the correct explanation of the assertion

(B) If both assertion and reason are correct, but reason is not correct explanation of the assertion

(C) If assertion is correct but reason is incorrect

(D) If assertion is incorrect but reason is correct

13. The reaction of $CH_3CH{=}CH$–C$_6$H$_4$–OH with HBr gives - **[IIT-98]**

(A) $CH_3CHBrCH_2$–C$_6$H$_4$–OH (B) CH_3CH_2CHBr–C$_6$H$_4$–OH

(C) $CH_3CHBrCH_2$–C$_6$H$_4$–Br (D) CH_3CH_2CHBr–C$_6$H$_4$–Br

14. In the compound $CH_2{=}CH{-}CH_2{-}C{\equiv}CH$, the $C_2{-}C_3$ bon is of the type **[IIT-99]**

(A) $sp{-}sp^2$ (B) $sp^2{-}sp^3$

(C) $sp{-}sp^3$ (D) $sp^3{-}sp^3$

15. The product obtained via oxymecuration ($HgSO_4 + H_2SO_4$) of 1–Butyne would give – **[IIT-99]**

(A) $CH_3CH_2-\overset{\overset{O}{\|}}{C}-CH_3$ (B) $CH_3CH_2CH_2{-}CHO$

(C) $CH_3CH_2CHO + HCHO$ (D) $CH_3CH_2COOH + HCOOH$

16. Read the following statement and explanation and answer as per the option given below : **[IIT-2000]**

Assertion : 1–Butene on reaction with HBr in the presence of a peroxide produces 1–bromobutane.

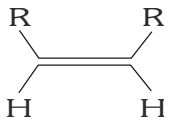
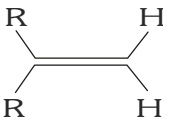
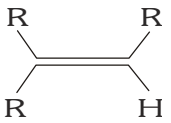
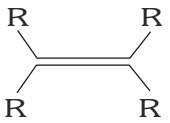
Reason : It involves the formation of a primary radical.

(A) If both assertion and reason are correct, and reason is the correct explanation of the assertion

(B) If both assertion and reason are correct, but reason is not correct explanation of the assertion

(C) If assertion is correct but reason is incorrect (D) If assertion is incorrect but reason is correct

17. Which one of the following alkenes will react fastest with H_2 under catalytic hydrogenation condition - **[IIT-2000]**

(A)  (B)  (C)  (D) 

18. Propyne and propene can be distinguished by - **[IIT-2000]**

(A) conc. H_2SO_4 (B) Br_2 in CCl_2 (C) dil.$KMnO_4$ (D) $AgNO_3$ in ammonia

19. Read the following statement and explanation and answer as per the option given below : **[IIT-2001]**

Assertion : Addition of bromine to trans–2–butene yields meso–2, 3–dibromobutane.

Reason : Bromine addition to an alkene is an electrophilic addition.

(A) If both assertion and reason are correct, and reason is the correct explanation of the assertion

(B) If both assertion and reason are correct, but reason is not correct explanation of the assertion

(C) If assertion is correct but reason is incorrect

(D) If assertion is incorrect but reason is correct

20. In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti-Markovnikov addition to alkene because - **[IIT-2001]**

(A) Both are highly ionic

(B) One is oxidising and the other is reducing

(C) One of the step is endothermic in both the cases

(D) All the steps are exothermic in both cases

21. The reaction of propene with HOCl proceeds via the addition of - **[IIT-2001]**

(A) H^+ in the first step (B) Cl^+ in first step

(C) OH^- in first step (D) Cl^+ and OH^- in single step

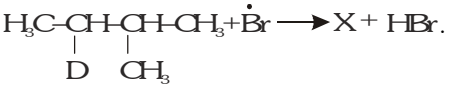
22. The nodal plane in the π-bond of ethene is located in - **[IIT-2001]**

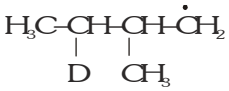
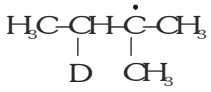
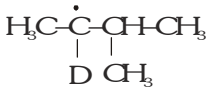
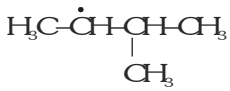
(A) the molecular plane

(B) a plane parallel to the molecular plane

(C) a plane perpendicular to the molecular plane which contains the carbon-carbon σ-bond at right angle

(D) a plane perpendicular to the molecular plane which contains the carbon-carbon σ-bond

23. Consider the following reaction  Identify the structure of major product X : **[IIT-2002]**

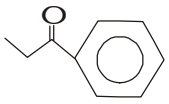
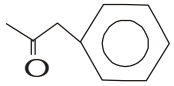
(A)  (B)  (C)  (D) 

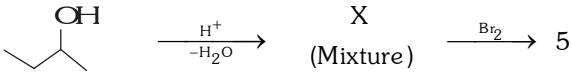
24. Identify a reagent from the following list which can easily distinguish between 1–butyne and 2–butyne :

(A) Bromine, CCl_4 (B) H_2, Lindlar catalyst

(C) dilute H_2SO_4, $HgSO_4$ (D) ammonical Cu_2Cl_2 solution **[IIT-2002]**

25. $C_6H_5-C\equiv C-CH_3 \xrightarrow[H_2SO_4]{HgSO_4} A$ **[IIT-2003]**

(A)  (B)  (C)  (D) 

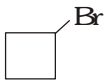
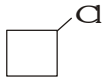
26.  compounds of molecular formula $C_4H_8Br_2$.No. of compounds X will be **[IIT-2003]**

(A) 2 (B) 3 (C) 4 (D) 5

27. 2–hexyne can be converted into trans –2–hexene by the reaction of - **[IIT-2004]**

(A) H_2–Pd–$BaSO_4$ (B) Li in Liquid NH_3 (C) H_2–PtO_2 (D) $NaBH_4$

28. 1–Bromo–3–chloro cyclobutane on reaction with 2–equivalent of sodium in ether gives - **[IIT-2005]**

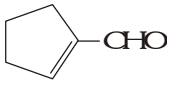
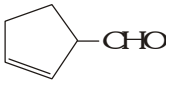
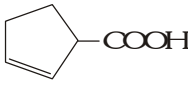
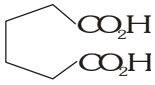
(A)  (B)  (C)  (D) 

29. $CH_3-CH=CH_2 \xrightarrow{NOCl}$ Product, product is : **[IIT-2006]**

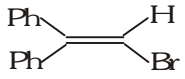
(A)  (B) 

(C) $CH_3-CH_2-CH_2-Cl$ (D)

30. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on further treatment with aqueous KOH yields compound F. Compound F is : **[IIT-2007]**

(A)  (B)  (C)  (D) 

31. Complete the following, giving the structures of the principal organic products. **[IIT 1997]**

(a)  + KNH_2 ⟶ A **(b)**  + $CHBr_3$ + t-BuOK ⟶ B

32. Match the following : **[IIT 2006]**

(A)	$Ph-CH_2-CH_2-Br$ & $Ph-CD_2-CH_2-Br$ reacts with the same rate.	(p)	E^1 reaction
(B)	$Ph-\underset{\displaystyle Br}{\underset{\vert}{C}}H-CH_3$ reacts faster than $Ph-\underset{\displaystyle Br}{\underset{\vert}{C}}H-CD_3$	(q)	E^2 reaction
(C)	$Ph-CH_2-CH_2-Br \xrightarrow{C_2H_5OD/C_2H_5O^-} Ph-CD=CH_2$	(r)	E_{cb}^1 reaction
(D)	$CH_3-\underset{\displaystyle Br}{\underset{\vert}{C}}H-CD_3 \xrightarrow{\text{alc. KOH}} CH_2=CH-CD_3$ (Major Product)	(s)	1^{st} order reaction

33. $(CH_3)_2\underset{\displaystyle Cl}{\underset{\vert}{C}}-CH_2CH_3 \xrightarrow{\text{alc. KOH}}$? **[IIT-1992]**

34. $C_6H_5CH_2\underset{\displaystyle Br}{\underset{\vert}{C}}HCH_3 \xrightarrow[\text{heat}]{\text{alc. KOH}}$? $\xrightarrow{HBr}$? **[IIT-1993]**

35. $C(C_6H_{12})$, an optically active hydrocarbon which on catalytic hydrogenation gives an optically inactive compound, C_6H_{14}. **[IIT-1993]**

36. Draw the stereochemical structure of the product in the following reactions. **[IIT-1994]**

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

37. Write down the structure of the stereoisomers formed when cis-2-butene is reacted with bromine. **[IIT-1995]**

38. An organic compound $E(C_5H_8)$ on hydrogenation gives compound $F(C_5H_{12})$. Compound E on ozonolysis gives formaldehyde and 2-ketopropanal. Deduce the structure of compound E. **[IIT-1995]**

39. Give the structures of the major organic products from 3-ethyl-2-pentene under each of the following reaction conditions. **[IIT-1996]**

(a) HBr in the presence of peroxide (b) Br_2/H_2O (c) Hg $(OAc)_2/H_2O$; $NaBH_4$

40. An alkyl halide, (X) of formula $C_6H_{13}Cl$ on treatment with potassium tertiary butoxide gives two isomeric alkenes (Y) and (Z) (C_6H_{12}). Both alkenes on hydrogenation give 2, 3-dimethylbutane. Predict the structures of (X), (Y) and (Z). **[IIT-1996]**

41. 3, 3-Dimethyl-butan-2-ol loses a molecule of water in the presence of concentrated sulphuric acid to give tetramethylethylene as a major product. Suggest a suitable mechanism. **[IIT-1996]**

42. One mole of the compound A (molecular formula C_8H_{12}), incapable of showing stereoisomerism, reacts with only one mole of H_2 on hydrogenation over Pd. A undergoes ozonolysis to give a symmetrical diketone B ($C_8H_{12}O_2$). What are the structure of A and B ? **[IIT-1997]**

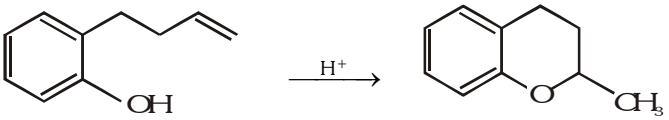
43. Compound (A) C_6H_{12} gives a positive test with bromine in carbon tetrachloride. Reaction of (A) with alkaline $KMnO_4$ yields only (B) which is the potassium salt of an acid. Write structure formulae and IUPAC name of (A) and (B). **[IIT-1997]**

44. The central carbon-carbon bond in 1, 3-butadiene is shorter than that of n-butane. Why ? **[IIT-1998]**

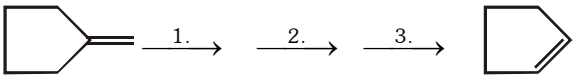
45. Write the intermediate steps for the following reaction. **[IIT-1998]**

$C_6H_5CH(OH)C{\equiv}CH \rightarrow C_6H_5CH{=}CHCHO$

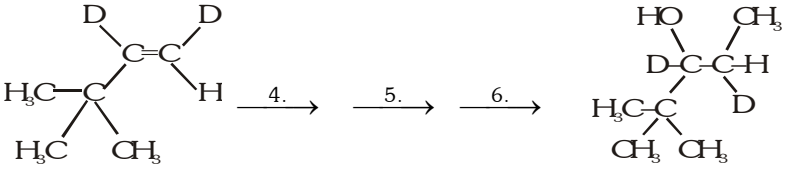
46. Write the intermediate steps for the following reaction. **[IIT-1998]**



47. Complete the following - **[IIT-1999]**



48. Complete the following- **[IIT-1999]**

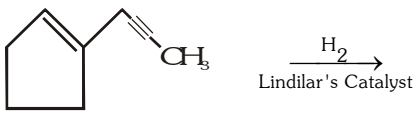


49. Carry out the following transformation in not more than three steps. **[IIT 1999]**

$CH_3{-}CH_2{-}C{\equiv}C{-}H \rightarrow CH_3{-}CH_2{-}CH_2{-}\overset{\overset{O}{\|}}{C}{-}CH_3$

50. $CH_2{=}CH^-$ is more basic than $HC{\equiv}C^-$. Why ? **[IIT 2000]**

51. What would be the major product in each of the following reaction ? **[IIT 2000]**



52. On reaction with 4N alcoholic KOH at 175°C 1-pentyne is slowly converted into equilibrium mixture of 1.3% 1-pentyne (A), 95.2% 2-pentyne (B) and 3.5% 1, 2-pentadiene (C). Give the suitable mechanism of formation of A, B and C with all intermediates. **[IIT-2001]**

53. Identify X, Y and Z in the following synthetic scheme and write their structure. Is the compound Z optically active ? Justify your answer. **[IIT-2002]**

$$CH_3CH_2C{\equiv}C{-}H \xrightarrow[(ii)CH_3CH_2Br]{(i)NaNH_2} X \xrightarrow{H_2/Pd-BaSO_4} Y \xrightarrow{\text{Alkaline } KMnO_4} Z$$

54. HCHO and $CH_3-\overset{O}{\overset{\|}{C}}-\overset{O}{\overset{\|}{C}}-H$ are the products obtained on ozonolysis of a monomer (A) of a polymer.

(a) Give the structure of (A) **[IIT-2005]**

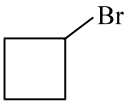
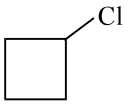
(b) Draw the all "cis" form of a polymer of a monomer (A)

Q.55 When Phenyl Magnesium Bromide reacts with tert. butanol, which of the following is formed?

(A) Tert. butyl methyl ether (B) Benzene

(C) Tert. butyl benzene (D) Phenol **[IIT '2005]**

Q.56 1–bromo–3–chlorocyclobutane when treated with two equivalents of Na, in the presence of ether which of the following will be formed? **[IIT '2005]**

(A)  (B)  (C)  (D) 

Q.57 CH_3–CH=CH_2 + NOCl $\rightarrow$ P **[IIT 2006]**

Identify the adduct.

(A) $CH_3-\underset{Cl}{CH}-\underset{NO}{CH_2}$ (B) $CH_3-\underset{NO}{CH}-\underset{Cl}{CH_2}$

(C) $CH_3-CH_2-\underset{Cl}{\overset{NO}{CH}}$ (D) $\underset{NO}{CH_2}-CH_2-\underset{Cl}{CH_2}$

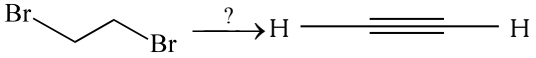
Q.58 The number of stereoisomers obtained by bromination of trans-2-butene is **[IIT 2007]**

(A) 1 (B) 2 (C) 3 (D) 4

Q.59 The number of structural isomers for C_6H_{14} is **[IIT 2007]**

(A) 3 (B) 4 (C) 5 (D) 6

Q.60 The reagent(s) for the following conversion, **[IIT 2007]**



is / are

(A) alcoholic KOH (B) alcoholic KOH followed by $NaNH_2$

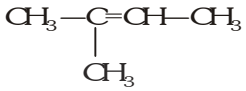
(C) aqueous KOH followed by $NaNH_2$ (D) Zn / CH_3OH

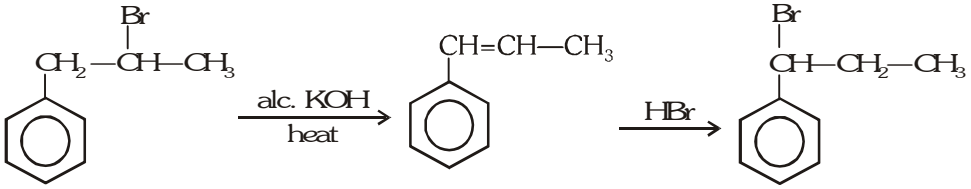
Q.61 The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alkyne. The bromoalkane and alkyne respectively are **[IIT-2010]**

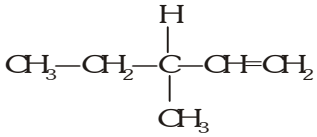
(A) $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3CH_2C{\equiv}CH$ (B) $BrCH_2CH_2CH_3$ and $CH_3CH_2CH_2C{\equiv}CH$

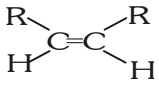
(C) $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3C{\equiv}CH$ (D) $BrCH_2CH_2CH_2CH_3$ and $CH_3CH_2C{\equiv}CH$

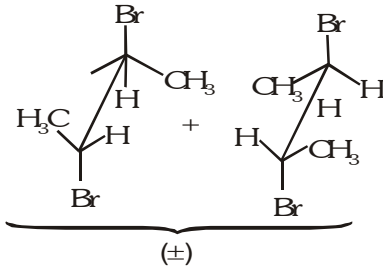
1. (C)	**2.** (A)	**3.** (A)	**4.**(C)	**5.** (A)	**6.** (A)	**7.**(B)	**8.** (D)
9. (A)	**10.** (C)	**11.** (B)	**12.** (A)	**13.** (B)	**14.** (B)	**15.** (A)	**16.** (C)
17. (A)	**18.** (D)	**19.** (B)	**20.** (C)	**21.** (B)	**22.** (C)	**23.** (B)	**24.** (D)
25. (A)	**26.** (B)	**27.** (B)	**28.** (C)	**29.** (A)	**30.** (B)		

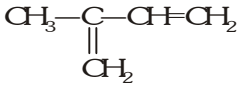
33. 

34. 

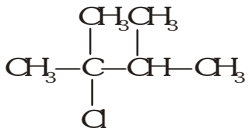
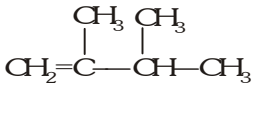
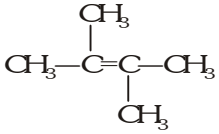
35. 
(C_6H_{12})

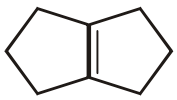
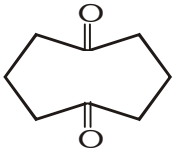
36. 

37. 

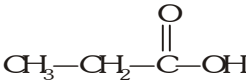
38. (E) 

39. (a)  (b)  (c) $(C_2H_5)_3$ C–OH

40. (x)  (Y)  (Z) 

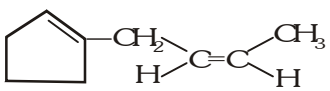
42. (a)  (b) 

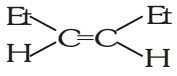
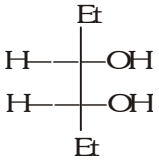
43. (A) $CH_3-CH_2-CH=CH-CH_2-CH_3$ (3-Hexene)

(B)  (propanoic acid)

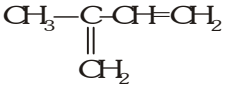
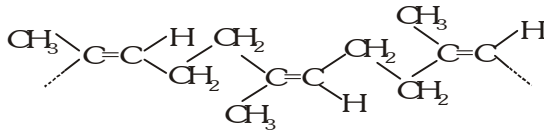
47. 1 → ozonolysis ; 2 → $LiAlH_4$; 3 → H_2SO_4

48. (4) → HO–Cl ; (5) → CH_3MgCl ; (6) → H_2O/H^+

51. 

53. (x) → Et–C≡C–Et (Y) →  (Z) 

(Z) is meso compound so optically inactive.

54. a. (A) →  b. 

55. (B) **56.** (D) **57.** (A) **58.**(A) **59.** (C)

60. (B) **61.** (D)