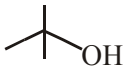
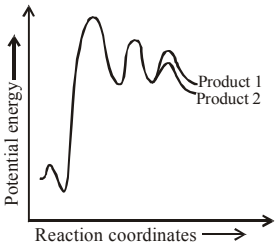
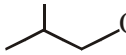
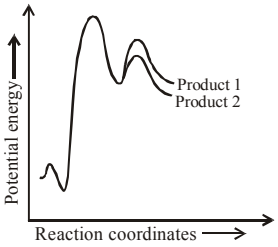
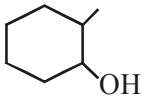
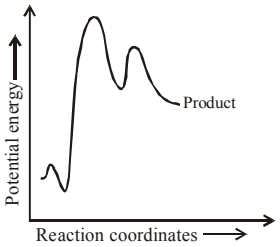
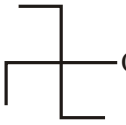
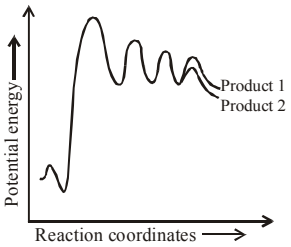
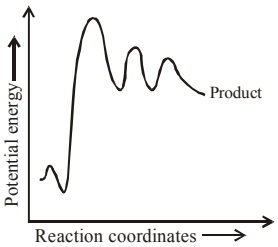
RACE # 19 | ORGANIC CHEMISTRY

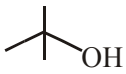
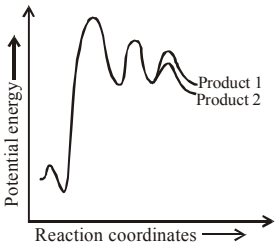
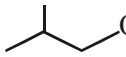
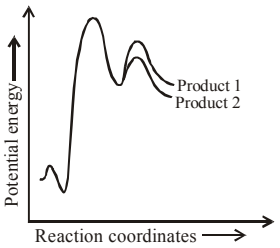
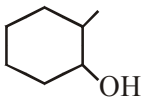
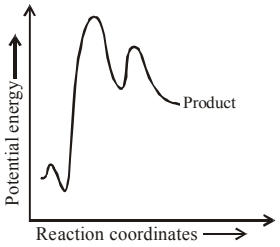
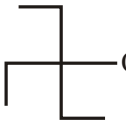
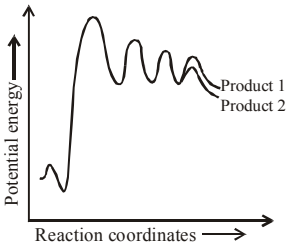
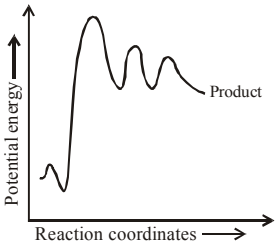
M.M. : 47 | TIME : 30 Min.

1. Match the following reaction with their corresponding pattern of graph :

[8, 0]

Column-I (Conversions)	**Column-II (Reagents)**
(A)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ Product(s)	(P) 
(B)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ Product(s)	(Q) 
(C)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ Product(s)	(R) 
(D)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ Product(s)	(S) 
	(T) 

1. निम्न अभिक्रिया को उनके आरेख के सम्बन्धित प्रकार के साथ सुमेलित कीजिये- **[8, 0]**

स्तम्भ-I (रूपान्तरण)	**स्तम्भ-II (अभिकर्मक)**
(A)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ उत्पाद	(P) 
(B)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ उत्पाद	(Q) 
(C)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ उत्पाद	(R) 
(D)  $\xrightarrow[\Delta]{conc.H_2SO_4}$ उत्पाद	(S) 
	(T) 

1. Ans. (A)→R ; (B)→T ; (C)→P ; (D)→R

2. **Statement 1 :** 1,1,1-trideutero-2-propanol reacts with conc. H_2SO_4 at high temperature to give only one alkene, 3,3,3-trideutero propene. **[3, –1]**

Statement 2 : C–D bond is stronger than C–H bond.

(A) Statement-1 is true, statement-2 is true and statement-2 is correct explanation for statement-1.

(B) Statement-1 is true, statement-2 is true and statement-2 is NOT the correct explanation for statement-1.

(C) Statement-1 is true, statement-2 is false.

(D) Statement-1 is false, statement-2 is true.

2. **कथन - 1 :** उच्च ताप पर सान्द्र H_2SO_4 के साथ 1,1,1-ट्राइड्यूटीरो-2-प्रोपेनॉल अभिक्रिया करके केवल एक एल्किन, 3,3,3-ट्राइड्यूटीरो प्रोपीन देता है। **[3, –1]**

कथन - 2 : C–H बन्ध की तुलना में C–D बन्ध प्रबल होते हैं।

(A) कथन-1 सत्य है, कथन-2 सत्य है तथा कथन-2, कथन-1 का सही स्पष्टीकरण है।

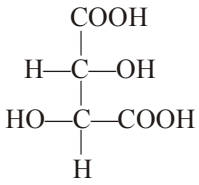
(B) कथन-1 सत्य है, कथन-2 सत्य है लेकिन कथन-2, कथन-1 का सही स्पष्टीकरण नहीं है।

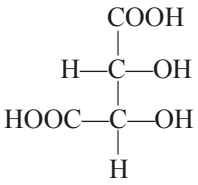
(C) कथन-1 सत्य है, कथन-2 असत्य है।

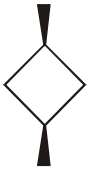
(D) कथन-1 असत्य है, कथन-2 सत्य है।

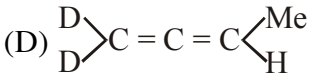
2. **Ans. (D)**

3. Identify optically active compound among following : **[3, –1]**

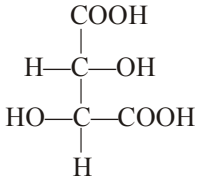
(A) 

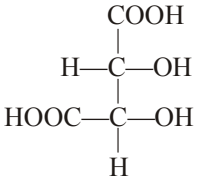
(B) 

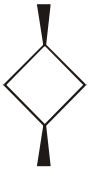
(C) 

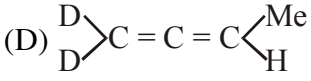
(D) 

3. निम्न में से प्रकाशिक सक्रिय यौगिक बताइये– **[3, –1]**

(A) 

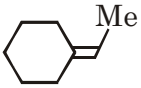
(B) 

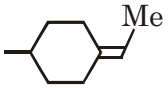
(C) 

(D) 

3. **Ans (B)**

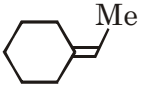
4. Which of the following compound can show geometrical isomerism as well as optical isomerism? **[3, –1]**

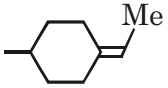
(A)  (B) 

(C) Me 

(D) 

4. निम्न मे से कौनसा यौगिक ज्यामितिय समावयवता के साथ-साथ प्रकाशिक समावयवता प्रदर्शित कर सकता है?

(A)  (B) 

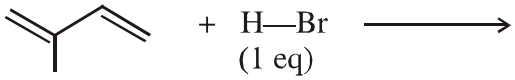
(C) Me 

(D) 

[3, –1]

4. Ans.(D)

5. Correct statement regarding product of reaction : **[3, –1]**



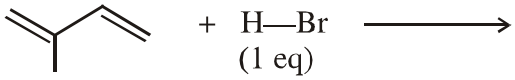
(A) Kinetic controlled product is a secondary bromide whereas thermodynamically controlled product is a tertiary bromide

(B) Kinetic controlled product is a tertiary bromide whereas thermodynamically controlled product is a primary bromide

(C) Both kinetic & thermodynamic controlled product is secondary bromide

(D) Both kinetic & thermodynamic controlled product is a tertiary bromide

5. अभिक्रिया के उत्पाद के लिए सही कथन है **[3, –1]**



(A) गतिकी नियंत्रित उत्पाद एक द्वितीयक ब्रोमाइड है जबकि उष्मागतिकी नियंत्रित उत्पाद एक तृतीयक ब्रोमाइड है

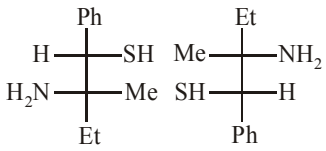
(B) गतिकी नियंत्रित उत्पाद एक तृतीयक ब्रोमाइड है जबकि उष्मागतिकी नियंत्रित उत्पाद एक प्राथमिक ब्रोमाइड है

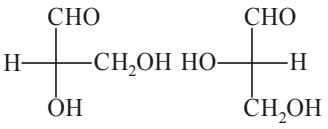
(C) दोनों, गतिकी नियंत्रित और उष्मागतिकी नियंत्रित उत्पाद द्वितीयक ब्रोमाइड है

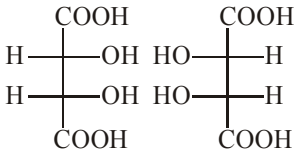
(D) दोनों, गतिकी नियंत्रित और उष्मागतिकी नियंत्रित उत्पाद एक तृतीयक ब्रोमाइड है

5. Ans. (B)

6. Which of the following is/are incorrect in the given isomeric pair : **[4, –1]**

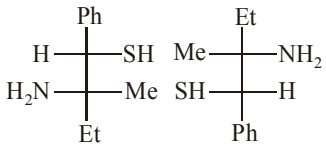
(A)  (Enantiomer)

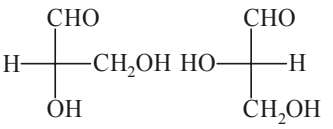
(B)  (Identical)

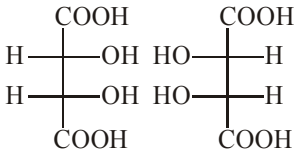
(C)  (Enantiomer)

(D)  (Distereomer)

6. दिये गये समावयवी युग्म में कौनसा गलत है– **[4, –1]**

(A)  (प्रतिबिम्बरूप समावयवी

(B)  (समान)

(C)  (प्रतिबिम्बरूप समावयवी

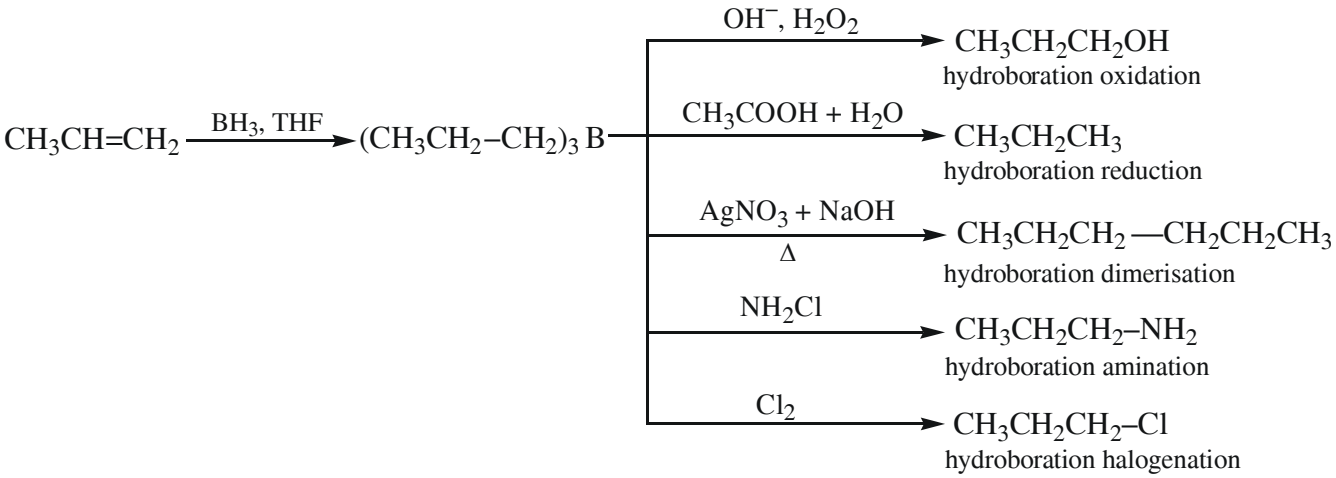
(D)  (विवरिमरूप समावयवी)

6. Ans. (A,C,D)

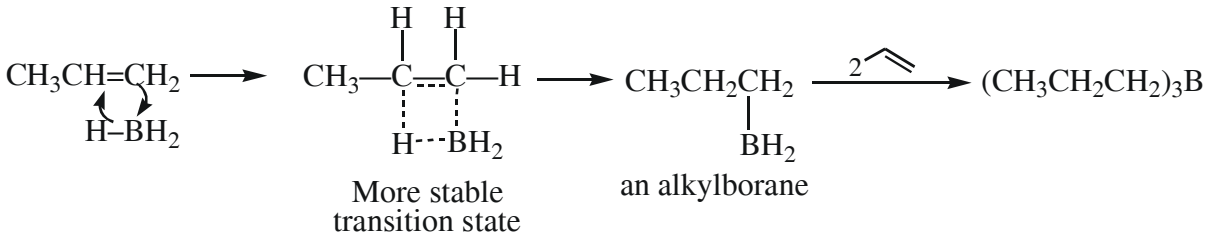
Read the following paragraph and answer the questiosn 7 to 9 given below :

HYDROBORATION-OXIDATION

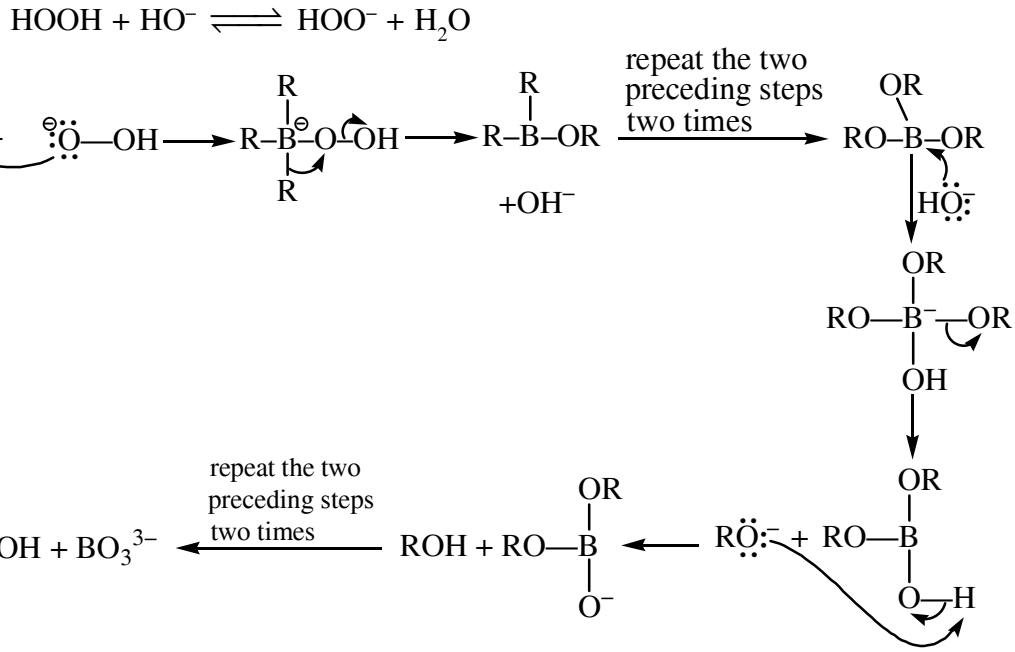
Hydroboration has been developed by brown as a reaction of tremendous synthetic utility because alkyl boranes are able to undergo a variety of transformation. Hydroboration is a one step, four centre, cis addition process in accordance with Markovnikov's rule but after oxidation it seems to be appear to violate Markovnikov's rule.



Mechanism of Hydroboration :

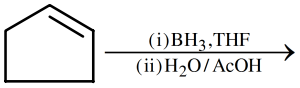


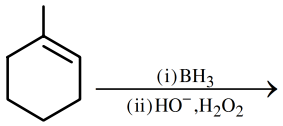
Mechanism of oxidation :

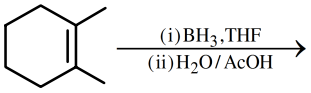


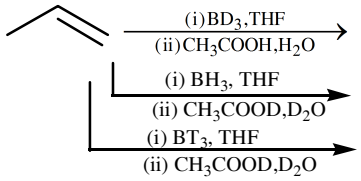
7. **[5, 0]**

I. $CH_2 = CH_2 \xrightarrow[(ii)HO^-, H_2O_2]{(i)BH_3}$

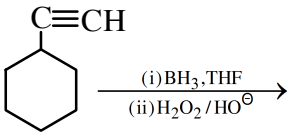
II. 

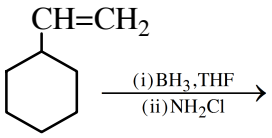
III. 

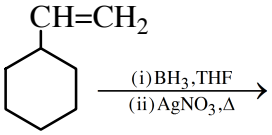
IV. 

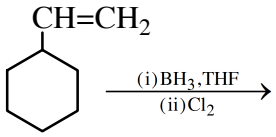
V. 

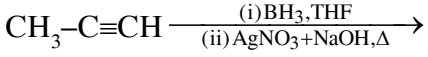
8. **[5, 0]**

I. 

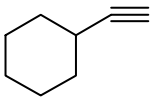
II. 

III. 

IV. 

V. 

9. Which of the following will not produce same product when treated with dil. H_2SO_4 / $HgSO_4$ or when undergo hydroboration oxidation ? **[4, –1]**

(A)  (B) $CH_3–C\equiv CH$ (C) $Ph–C\equiv CH$ (D) $CH_3–C\equiv C–CH_3$

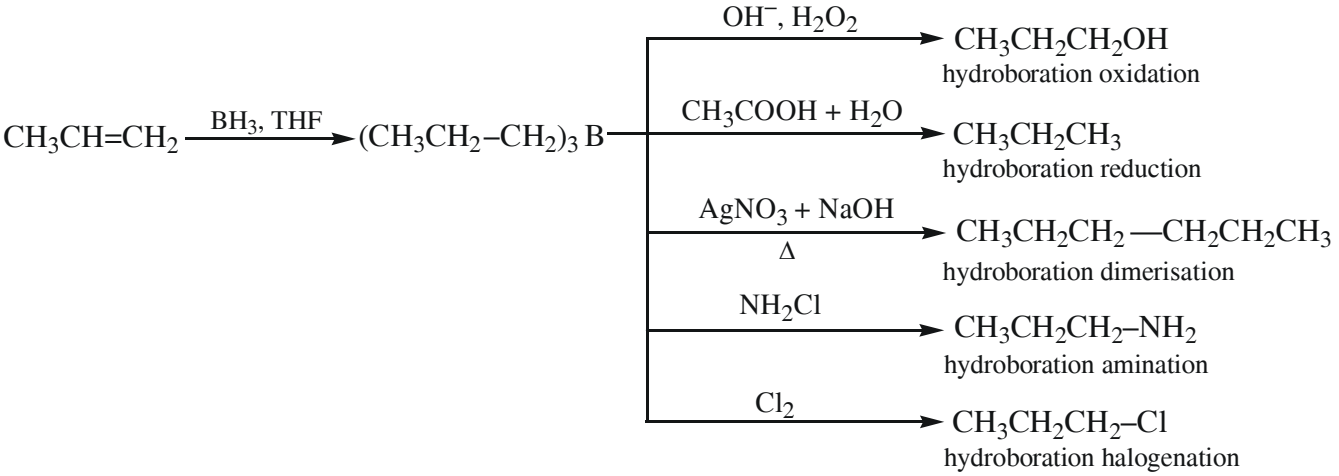
9. **Ans. (A,B,C)**

निम्न गद्यांशों को पढिये तथा नीचे दिये गये प्रश्नों (7 to 9) का उत्तर दीजिये।

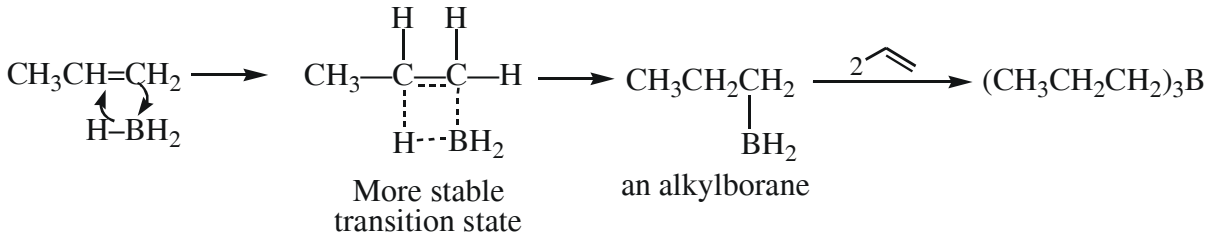
हाइड्रोबोरीकरण–ऑक्सीकरण (Hydroboration-oxidation)

ब्राउन द्वारा हाइड्रोबोरीकरण को एक अत्यधिक संश्लेषिक (synthetic) उपयोगिता की अभिक्रिया के रूप में विकसित किया

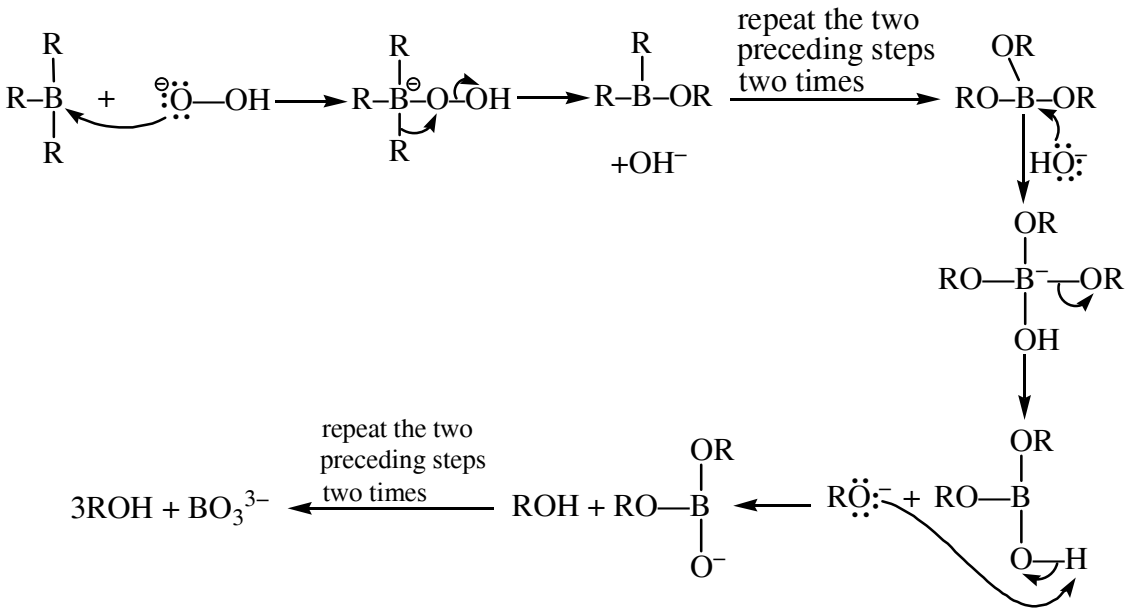
गया था क्योंकि एल्किल बोरेन से विभिन्न प्रकार के रूपान्तरण किये जा सकते है। हाइड्रोबोरीकरण एक पदीय, चार केन्द्रीय, समपक्ष योगात्मक प्रक्रम है जो कि मार्कोनिकॉफ नियम के अनुसार होती है परन्तु ऑक्सीकरण के बाद यह मार्कोनिकॉफ के नियम का उल्लघंन करती हुई दिखाई देती है।



हाइड्रोबोरीकरण की क्रियाविधि :



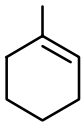
ऑक्सीकरण की क्रियाविधि :

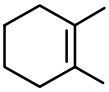


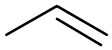
7. **[5, 0]**

I. $CH_2= CH_2 \xrightarrow[(ii)HO^-,H_2O_2]{(i)BH_3}$

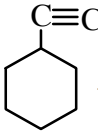
II.  $\xrightarrow[(ii)H_2O/AcOH]{(i)BH_3,THF}$

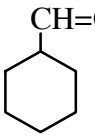
III.  $\xrightarrow[(ii)HO^-,H_2O_2]{(i)BH_3}$

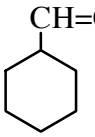
IV.  $\xrightarrow[(ii)H_2O/AcOH]{(i)BH_3,THF}$

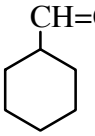
V. 
$\xrightarrow[(ii)CH_3COOH,H_2O]{(i)BD_3,THF}$
$\xrightarrow[(ii)\ CH_3COOD,D_2O]{(i)\ BH_3,\ THF}$
$\xrightarrow[(ii)\ CH_3COOD,D_2O]{(i)\ BT_3,\ THF}$

8. **[5, 0]**

I.  $\xrightarrow[(ii)H_2O_2/HO^{\ominus}]{(i)BH_3,THF}$

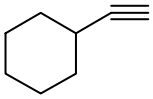
II.  $\xrightarrow[(ii)NH_2Cl]{(i)BH_3,THF}$

III.  $\xrightarrow[(ii)AgNO_3,\Delta]{(i)BH_3,THF}$

IV.  $\xrightarrow[(ii)Cl_2]{(i)BH_3,THF}$

V. $CH_3–C\equiv CH \xrightarrow[(ii)AgNO_3+NaOH,\Delta]{(i)BH_3,THF}$

9. निम्न में से कौनसे यौगिक तुन H_2SO_4 / $HgSO_4$ के साथ उपचारित करने या हाइड्रोबोरिकरण ऑक्सीकरण पर समान उत्पाद नहीं बनायेंगे– **[4, –1]**

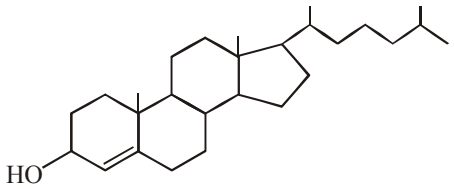
(A)  (B) $CH_3–C\equiv CH$ (C) $Ph–C\equiv CH$ (D) $CH_3–C\equiv C–CH_3$

9. Ans. (A,B,C)

10(a). How many diastereomeric pair are possible with $CH_3–CH=CH–\underset{\underset{Br}{|}}{CH}–CH=CH–CH_3$. **[4, 0]**

10(a). Ans. (5)

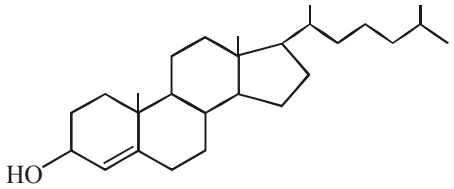
10(b). Calculate total number of chiral centre present in following compound : **[4, 0]**



10(b). Ans. (8)

10(a). $CH_3–CH=CH–\underset{\underset{Br}{|}}{CH}–CH=CH–CH_3$ के कितने विवरिम समावयवी युग्म सम्भावित है- **[4, 0]**

10(b). निम्न यौगिक में किरैल केन्द्र की कुल संख्या ज्ञात कीजिये- **[4, 0]**



FILL THE ANSWER HERE

1. A (P) (Q) (R) (S) (T)
B (P) (Q) (R) (S) (T)
C (P) (Q) (R) (S) (T)
D (P) (Q) (R) (S) (T)

2. (A) (B) (C) (D)

3. (A) (B) (C) (D)

4. (A) (B) (C) (D)

5. (A) (B) (C) (D)

6. (A) (B) (C) (D)

7. **(I)** **(II)** **(III)** **(IV)**
(V)

8. **(I)** **(II)** **(III)** **(IV)**
(V)

9. (A) (B) (C) (D)

10(a). (0) (1) (2) (3) (4) (5) (6) (7) (8) (9)

10(b). (0) (1) (2) (3) (4) (5) (6) (7) (8) (9)