Self Practice Paper (SPP)

1. Aqueous solution of the following compound on electrolysis gives ethane
(1) Acetic acid (2) Acetamide (3) Potassium acetate (4) Ethyl acetate

2. Which of the following does not decolourise bromine solution in carbon disulphide
(1) Acetylene (2) Propene (3) Ethane (4) Propyne

3. Which one gives only one monosubstitution product on chlorination
(1) n-pentane (2) Neopentane (3) Isopentane (4) n-butane

4. By Wurtz reaction, a mixture of methyliodide and ethyliodide gives
(1) Butane (2) Ethane
(3) Propane (4) A mixture of the above three

5. Electrolysis of cold concentrated aqueous solution of potassium succinate yields
(1) Ethane (2) Ethyne (3) Ethene (4) Ethane-1, 2-diol

6. Formation of 2-butene from 2-bromobutane is according to
(1) Markowikoff's (2) Bayer (3) Saytzeff (4) Wurtz

7. Acetylenic hydrogens are acidic because
(1) Sigma electron density of C–H bond in acetylene is nearer to carbon, which has 50% s-character
(2) Acetylene has only one hydrogen on each carbon
(3) Acetylene contains least number of hydrogens among the possible hydrocarbons having two carbons
(4) Acetylene belongs to the class of alkynes with molecular formula C_nH_{2n-2}

8. The shapes of methane, ethene and ethyne molecules are, respectively
(1) Tetrahedral, planar and linear (2) Tetrahedral, linear and planar
(3) Pyramidal, planar and linear (4) Tetrahedral, pyramidal and planar

9. Carbide, which react with water to give propyne is
(1) CaC_2 (2) SiC (3) Mg_2C_3 (4) Al_4C_3

10. $CaC_2 + H_2O \rightarrow A \xrightarrow{H_2SO_4/HgSO_4} B$. Identify A and B in the given reaction
(1) C_2H_2 and CH_3CHO (2) CH_4 and HCOOH
(3) C_2H_4 and CH_3COOH (4) C_2H_2 and CH_3COOH

11. The number of π-bonds in the product formed by passing acetylene through dilute sulphuric acid containing mercuric sulphate is
(1) Zero (2) One (3) Two (4) Three

12. $(CH_3)_2C = \underset{\underset{CH_3}{|}}{CH} \xrightarrow[H_2]{\text{Catalyst}}$ Optical isomers
(1) 2 (2) 4 (3) Zero (4) 3

13. The order of increasing reactivity towards HCl of the following compounds will be
(1) $CH_2 = CH_2$ (2) $(CH_3)_2C = CH_2$ (3) $CH_3CH = CHCH_3$
(1) 1 < 2 < 3 (2) 1 < 3 < 2 (3) 3 < 2 < 1 (4) 2 < 1 < 3

14. Which one of the following reactions would be the best for the formation of 2-bromobutane
(1) $CH_3CH = CHCH_2CH_3 \xrightarrow{HBr}$ (2) $CH_3CH_2CH = CH_2 \xrightarrow{HBr}$
(3) $CH_3CH = CHCH_3 \xrightarrow{Br_2}$ (4) $CH_3CH_2CH = CH_2 \xrightarrow[\text{Peroxide}]{HBr}$
(1) 1 (2) 2 (3) 3 (4) 4

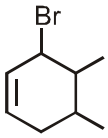
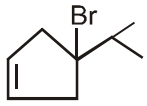
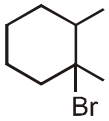
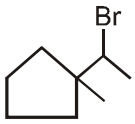
15. On halogenation, an alkane gives only one monohalogented product. The alkane may be :
(1) 2 - methyl butane (2) 2, 2 dimethyl propane
(3) cyclopentane (4) both (2) and (3)

16. Which of the following compounds can be best prepared by Wurtz- reaction ?
(1) Iso- butane (2) n- butane (3) n - pentane (4) Iso - pentane

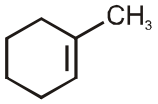
17. Calcium carbide + heavy water $\longrightarrow$?
(1) C_2H_2 (2) CaD_2 (3) $Ca(OD)_2$ (4) CD_4

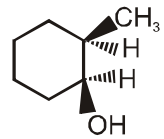
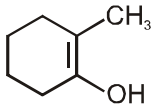
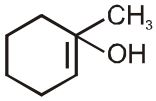
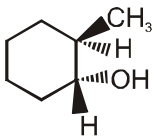
18. On catalytic reduction (H_2/Pt) how many alkenes will give n-butane ?
(1) 1 (2) 2 (3) 3 (4) 4

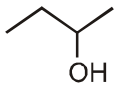
19.  $\xrightarrow[CCl_4]{HBr}$ A (Major) ; Product (1) is :

(1) 
(2) 
(3) 
(4) 

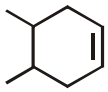
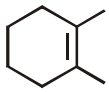
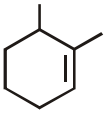
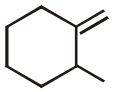
20. In the reaction of hydrogen bromide with an alkene (in the absence of peroxides), the first step of the reaction is the .... to the alkene.
(1) fast addition of an electrophilic (2) slow addition of an electrophile
(3) fast addition of a nucleophilic (4) slow addition of a nucleophile

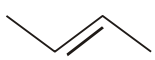
21.  $\xrightarrow[2.\ H_2O_2/OH^-]{1.\ BH_3/THF}$ A ; Product A is :

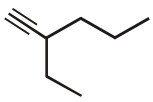
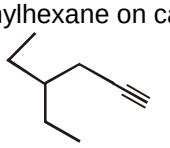
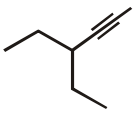
(1) 
(2) 
(3) 
(4) 

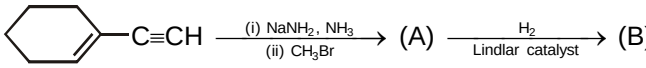
22.  $\xrightarrow[\Delta]{H^+}$ Possible products (x) (y) products. The number of possible products for x and y is
(1) 2, 4 (2) 3, 5 (3) 3, 6 (4) 3, 4

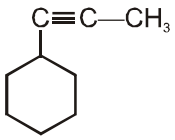
23. Decreasing order of heat evolved upon catalytic hydrogenation of given product with a H_2(Pd/C) is :

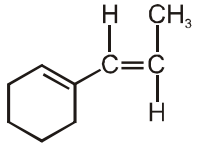
(a) 
(b) 
(c) 
(d) 
(1) b > c > a > d (2) d > a > c > b (3) d > c > a > b (4) c > b > c > d

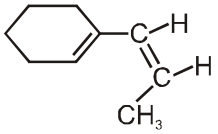
24.  $\xrightarrow[CCl_4]{Br_2}$ $\xrightarrow[(ii)\ NaNH_2,\Delta]{(i)\ alc.KOH,\Delta}$ (A) major ; Product (A) is :
(1) $H_2C=CH-CH=CH_2$ (2) $CH_3-C\equiv C-CH_3$
(3) $CH_3-CH_2-C\equiv CH$ (4) $CH_3-CH=C=CH_2$

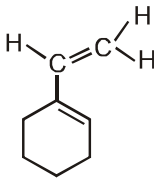
25. Which alkyne will give 3-ethylhexane on catalytic hydrogenation ?
(1) 
(2) 
(3) 
(4) All of these

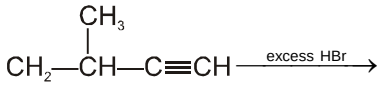
26. 

(1) 

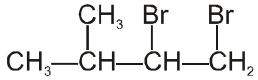
(2) 

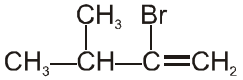
(3) 

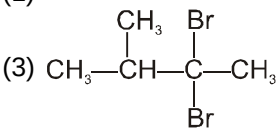
(4) 

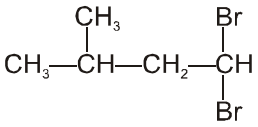
27. 

the product of the above reaction is

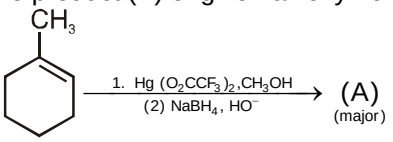
(1) 

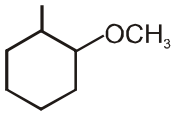
(2) 

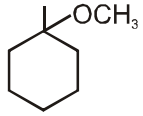
(3) 

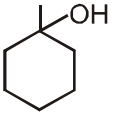
(4) 

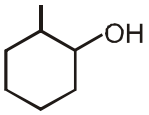
28. The product (A) of given alkoxymercuration de-mercuration is :



(1) 

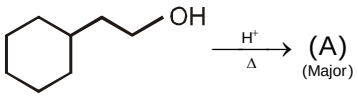
(2) 

(3) 

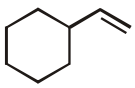
(4) 

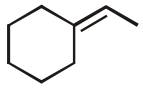
29. Which one will product rearranged alcohol as a product.
(1) Hydration of alkene (2) Hydroboration -oxidation of alkene
(3) Exymercuration-demercuration of alkene (4) None of these

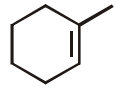
30. Pure methane can be prepared by :
(1) Wurtz reaction (2) Kolbe electrolysis method
(3) soda-lime de-carboxylation (4) reduction with H_2

31. 

Major-product (A) is :

(1) 

(2) 

(3) 

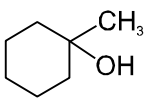
(4) 

32. The correct order of reactivity of following alkenes towards acidic hydration is :
(1) Ethene (2) Propenoic acid (3) Butenedioic acid
(1) 3 > 2 > 1 (2) 2 > 1 > 3 (3) 1 > 2 > 3 (4) 1 > 3 > 2

33. Decreasing order of decarboxycation amongst the following.

(A) $CH_3–CH_2–CH_2–COOH$ (B) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOH$ (C) $CH_3-\overset{\displaystyle O}{\overset{\|}{C}}-CH_2-COOH$

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

34. Which of the following alkene will give (P) on oxymercuration reduction reaction, (P) = 

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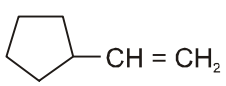
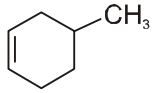
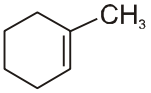
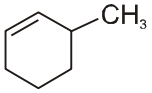
(1) 

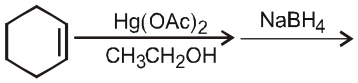
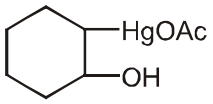
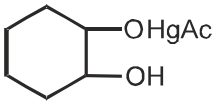
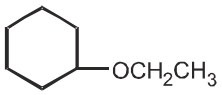
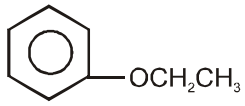
(2) 

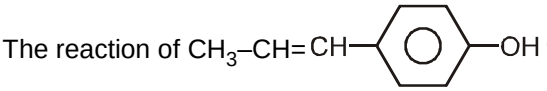
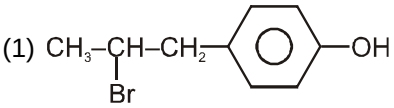
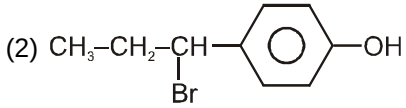
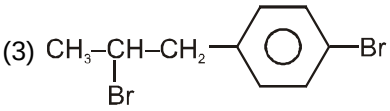
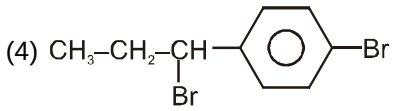
(3) 

(4) 

35. Which is wrong statement
(1) Addition of halogen to double bond is stereo selective and stereospecific
(2) Elimination of X_2 from dihalide is stereo selective and stereospecific
(3) Addition of X_2 to > C=C < is of anti addition
(4) Elimination of X_2 from dihalide is of syn elimination

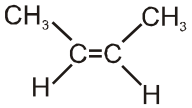
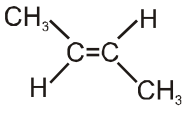
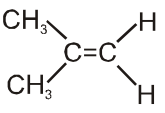
36. cis-but-2-ene $\xrightarrow[\text{Peroxide}]{\text{HBr}}$ product, product of the reaction is :
(1) Racemic (2) Diasteriomers (3) Meso (4) E & Z isomers

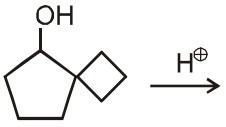
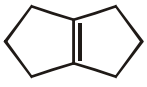
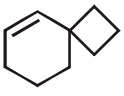
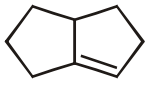
37.  A. The product A in the above sequence of reaction is :
(1)  (2)  (3)  (4) 

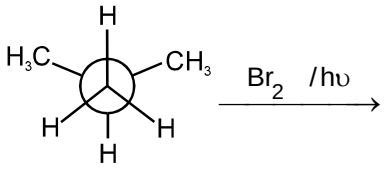
38. The reaction of  with HBr gives.
(1)  (2) 
(3)  (4) 

39. Which of the following statements is correct ?
(1) Alkynes are more reactive than alkenes towards halogen addition.
(2) Alkenes are more reactive than alkynes towards halogen addition
(3) Both alkynes and alkenes are equally reactive towards halogen addition
(4) Primary vinylic cation $RCH=\overset{\oplus}{C}H$ is less reactive than secondary vinylic cation $R\overset{\oplus}{C}=CH_2$

40. $CH_3CH_2CH_2C \equiv CH \xrightarrow{BH_3,\ THF} \xrightarrow{H_2O_2\ /\ OH^-}$ 'X'
Identify the product 'X' :
(1) $CH_3CH_2CH_2CH_2CHO$ (2) $CH_3CH_2CH_2C(=O)CH_2$
(3) $CH_3CH_2CH_2CHO$ (4) $CH_3CH_2C(=O)CH_2CH_3$

41. The compound which reacts with HBr obeying Markownikoff's rule is :
(1) $CH_2=CH_2$ (2)  (3)  (4) 

42. The major product formed the reaction.

(1)  (2)  (3)  (4) None of these

43.  Product (major)

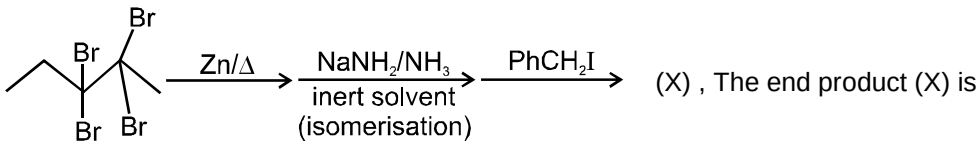
Identify the major product.

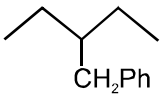
(1) $CH_3-\underset{\underset{H}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-Br$

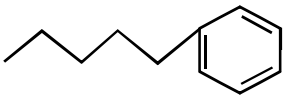
(2) $CH_3-\underset{\underset{Br}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_3$

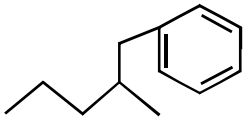
(3) $CH_3-CH_2-CH_2-Br$

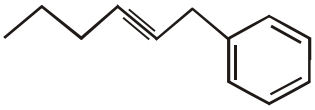
(4) $CH_3-\underset{\underset{Br}{|}}{CH}-CH_3$

44.  (X) , The end product (X) is

(1) 

(2) 

(3) 

(4) 

45. 1, 2-dibromoethane when heated with alcoholic potash gives

(1) Ethane (2) Acetylene (3) Ethylene (4) Methane

SPP Answers

1.	(2)	**2.**	(2)	**3.**	(1)	**4.**	(4)	**5.**	(3)	**6.**	(3)	**7.**	(1)
8.	(1)	**9.**	(3)	**10.**	(1)	**11.**	(2)	**12.**	(3)	**13.**	(3)	**14.**	(2)
15.	(4)	**16.**	(2)	**17.**	(3)	**18.**	(3)	**19.**	(3)	**20.**	(2)	**21.**	(4)
22.	(2)	**23.**	(2)	**24.**	(2)	**25.**	(4)	**26.**	(3)	**27.**	(3)	**28.**	(2)
29.	(1)	**30.**	(3)	**31.**	(2)	**32.**	(3)	**33.**	(4)	**34.**	(3)	**35.**	(4)
36.	(1)	**37.**	(3)	**38.**	(2)	**39.**	(2)	**40.**	(1)	**41.**	(4)	**42.**	(1)
43.	(2)	**44.**	(4)	**45.**	(2)								

SPP Solutions

1. Paraffins or alkanes are non-polar compounds. Hence soluble in benzene.

2. $CH_3–CH=CH_2 + HCl \xrightarrow{\text{Peroxide}} CH_3–\underset{\underset{Cl}{|}}{CH}–CH_3$

Peroxide rule is applicable only to HBr.

3. Peroxide rule is applicable only to HBr and not for HCl, HF and HI.

5. $\begin{matrix}CH_2COOK\\|\\CH_2COOK\end{matrix} + 2H_2O \xrightarrow{\text{Electrolysis}} \underset{\text{Anode}}{\begin{matrix}CH_2\\||\\CH_2\end{matrix}} + 2CO_2 + 2KOH + \underset{\text{Cathode}}{H_2}$

6. $CH_3 - \underset{\underset{Br}{|}}{CH} - CH_2 - CH_3 \rightarrow CH_3 - CH = CH - CH_3 + HBr$

2–Bromobutane

9. $Mg_2C_3 + 4H_2O \rightarrow CH_3C \equiv CH + 2Mg(OH)_2$

10. Wohler reaction :

$CaC_2 + 2H_2O \longrightarrow C_2H_2 + Ca(OH)_2$

$\underset{\text{Acetylene}}{C_2H_2} \xrightarrow[60^oC]{dil.H_2SO_4/HgSO_4} \underset{\text{Unstable}}{[CH_2 = CHOH]} \rightarrow \underset{\text{Acetaldehyde}}{CH_3CHO}$

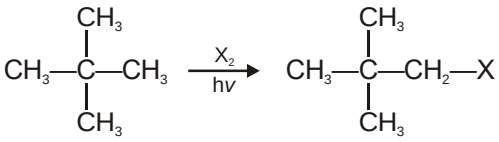
11. $CH \equiv CH + H_2O \xrightarrow[HgSO_4]{\text{dil.}H_2SO_4} CH_2 = C - OH \rightarrow CH_3 - \underset{\underset{O}{||}}{C} - H$

12. $(CH_3)_2 - C = \underset{\underset{CH_3}{|}}{CH} \xrightarrow[\text{hydrogenation}]{\text{Catalytic}} (CH_3)_2 - CH - \underset{\underset{CH_3}{|}}{CH_2}$

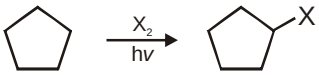
14. $CH_3-CH_2-CH=CH_2 \xrightarrow{HBr} CH_3-CH_2-\underset{\underset{Br}{|}}{CH}-CH_3$

2–Bromobutane

15.



Both compound gives only one monohalogenated product is possible.

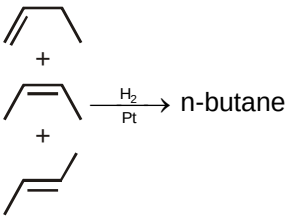


16. $2CH_3-CH_2-Cl \xrightarrow[\text{Dry ether}]{Na} CH_3-CH_2-CH_2-CH_3$

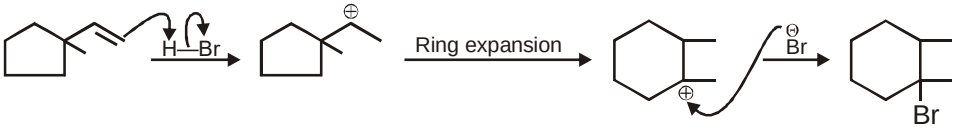
Open chain alkane product having even number of carbons and symmetrical can be achieved by Wurtz reaction.

17. $CaC_2 + D_2O \longrightarrow Ca(OD)_2 + D-C\equiv C-D$

18.



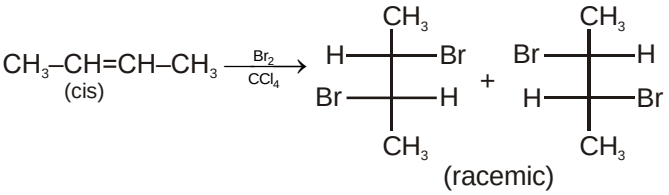
19.



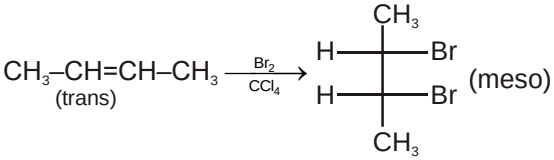
20. Formation of carbocation is the rate determining step.

21. Oxymercuration-Demercuration take place.
(Addition of –OH takes place according to Markovnikoff's rule)

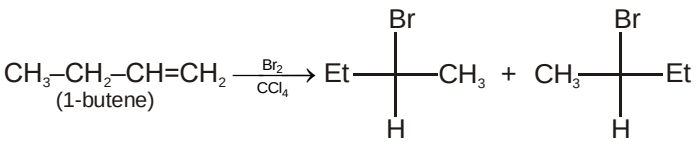
22. x = 3, (y 0 5)



(racemic)



(meso)



(racemic)

23. Most stable alkene less heat of hydrogenation.

a $\rightarrow 4\alpha H$

b $\rightarrow 10\alpha H$

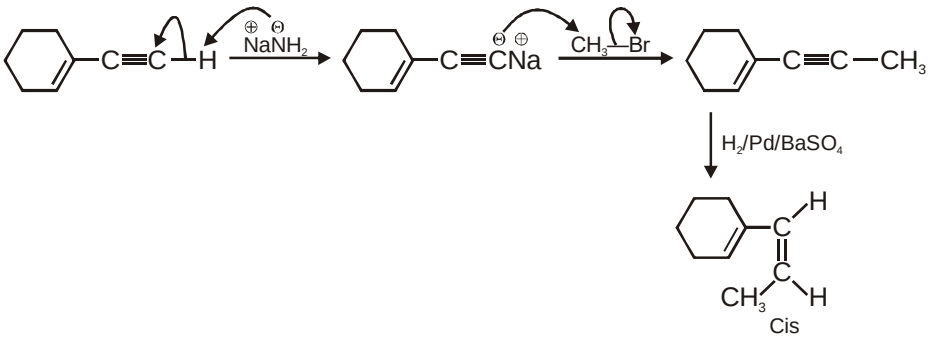
c $\rightarrow 6\alpha H$

d $\rightarrow 3\alpha H$

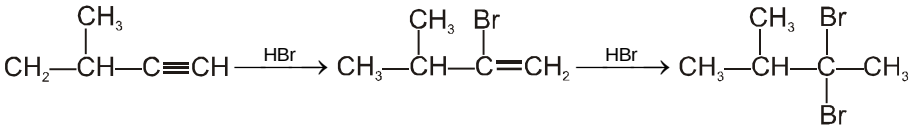
24. Formation of vicinal di-halide followed by two consecutive E_2 reaction. (elimination bimolecular)

25. All alkyne on catalytic hydrogenation give 3-ethylhexane.

26.

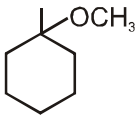


27.



28. Addition of CH_3OH, according to Markovnikoff's rule take place.

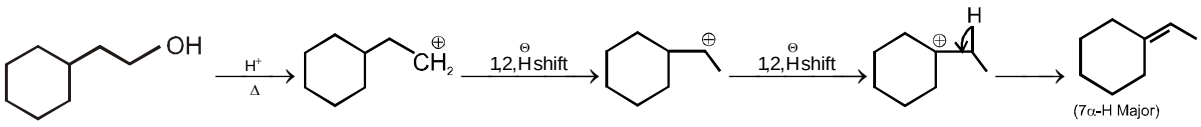
$\therefore$



29. It is electrophilic addition reaction & proceeds carbocation.

30. $CH_3 - CO_2H \xrightarrow[\Delta]{NaOH,\ CaO} CH_4 + CO_2$

31.



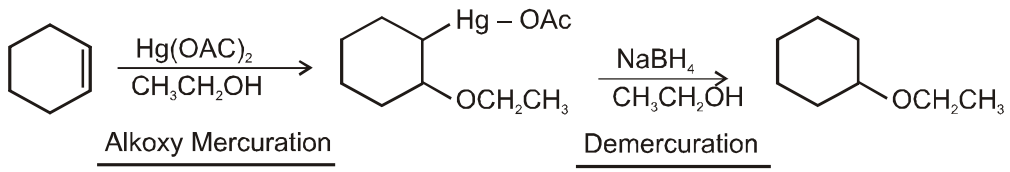
32. More stable carbocation gives faster reaction.

34. Addition of water by oxymercuration reduction without rearrangement.

35. Elimination of X_2 from dihalide is of anti manner not syn.

36. Product will have two chiral carbon, so total product will be $2^n = 2^2 = 4$.

37.



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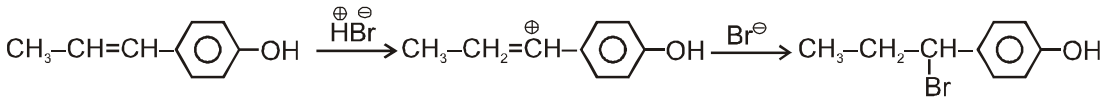

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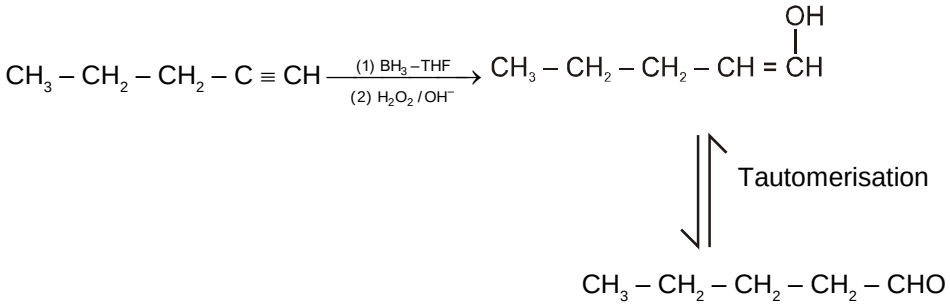
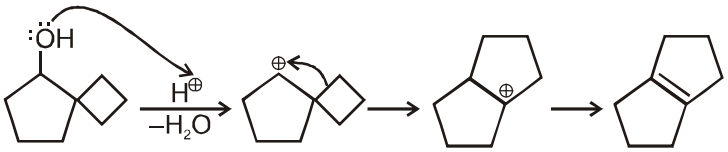


41. Non symmetrical alkene with a non symmetrical reagent will follow markownikoff's rule.

42.



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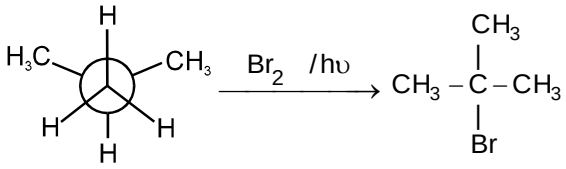

44.