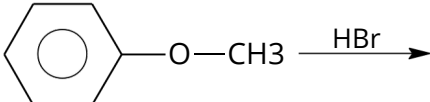
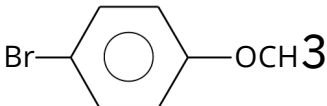
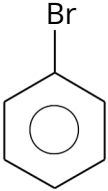
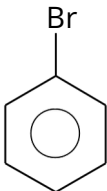
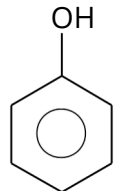
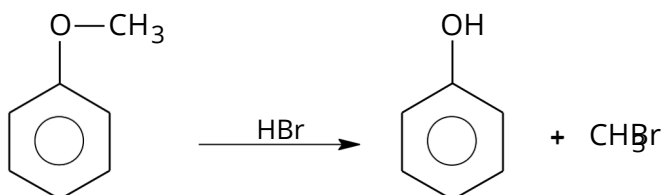


HALOALKANES AND HALOARENES

1.  the products are

- (a)  and HBr (b)  and CH₃Br
- (c)  and CH₃OH (d)  and CH₃Br

Answer: (d)

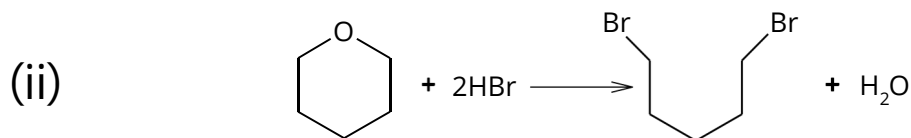
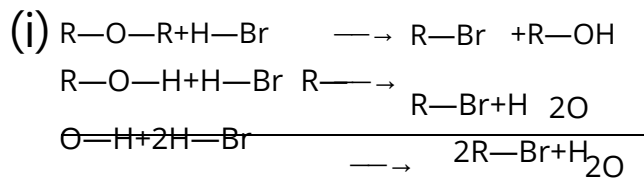


2. Heating a particular ether with HBr yielded a single organic product. Which of the following conclusions may be reached?

- (a) The reactant was a methyl ether
(b) The reactant was a symmetrical ether
(c) The reactant was a cyclic ether
(d) Both (b) and (c) may be correct

Answer: (d)

An unknown ether reacts with excess of HBr to yield a single product. This implies that the ether must be either symmetrical or cyclic.



3. For an SN2 reaction of $\text{CH}_3-\overset{\text{Me}}{\underset{|}{\text{C}}}-\text{CH}_2-\text{X}$ the most effective nucleophile will be

(a) MeO^-



(c) Me_2CHO^-

(d) MeCHO^-

Answer: (A)

As nucleophile becomes bulkier its backside approach to the displacement site is retarded.

4. Alkyl halide react with an alcoholic solution of ammonia to give a mixture of:

(a) 1° and 2° amine

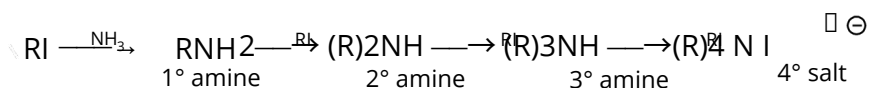
(b) 1° , 2° , 3° & quaternary

(c) 1° , 2° & 3° amines

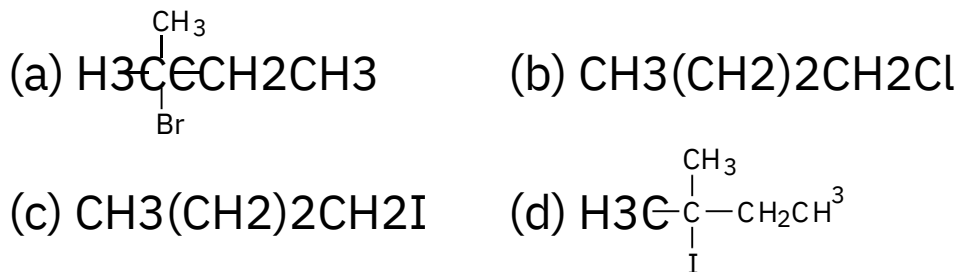
(d) 1° & 3° amine

Answer: (b)

Alcoholic solution of ammonia is heated in a sealed tube at 100°C



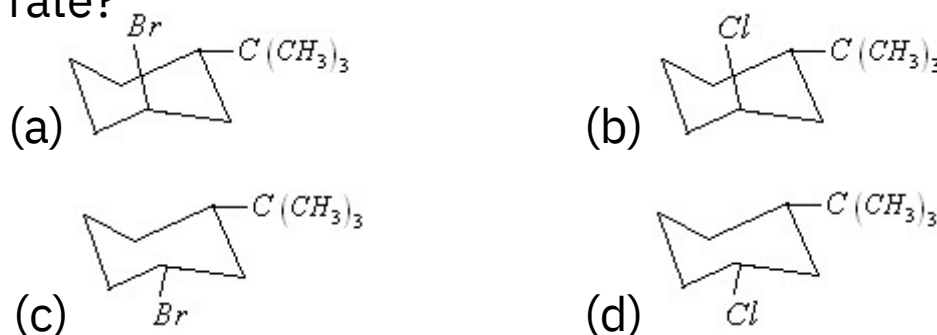
5. Which of the following compounds undergo E2 reactions with maximum rate.



Answer: (d)

C – I bond is broken easily. More over, the ease of reaction is t-alkyl halide > s-alkyl halide > p-alkyl halide.

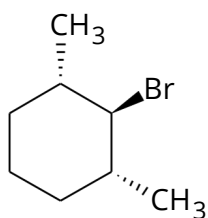
6. Which alkyl halide undergoes E2 elimination at the fastest rate?



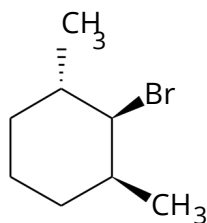
Answer: (a)

Will undergo E2 elimination at a faster rate because Br - is a better leaving group than Cl-

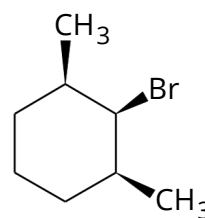
7. Arrange the following in decreasing order of reaction:



(X)



(Y)



(Z)

(a) X > Y > Z

(b) X > Z > Y

(c) Y > Z > X

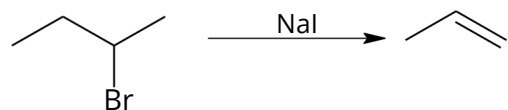
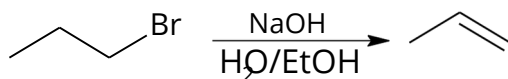
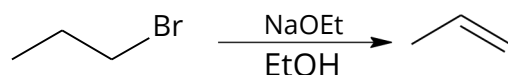
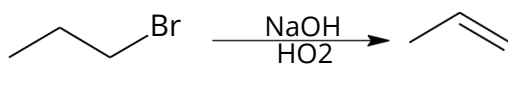
(d) Z > Y > X

Answer: (d)

E_2 is an example of anti-periplanar elimination. H must be anti to leaving group.

8. Which of the following is not reasonable for an elimination reaction?

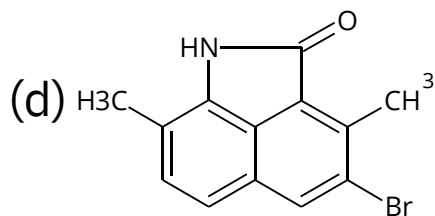
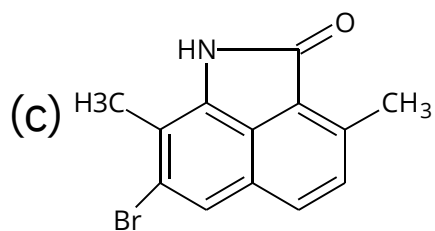
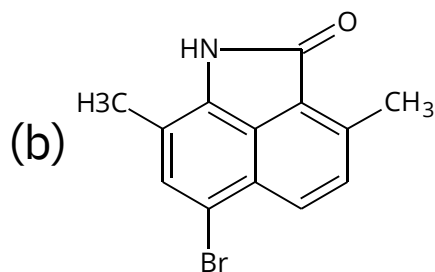
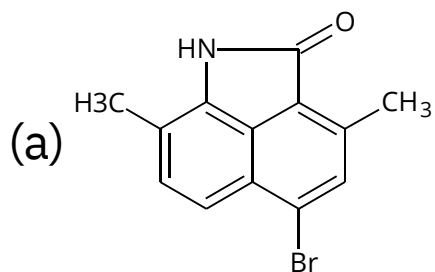
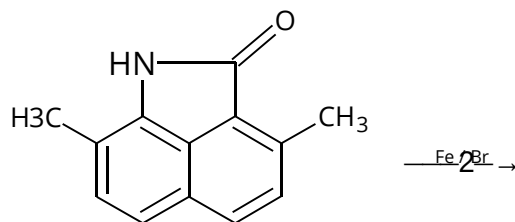
(a)
(b)
(c)
(d)



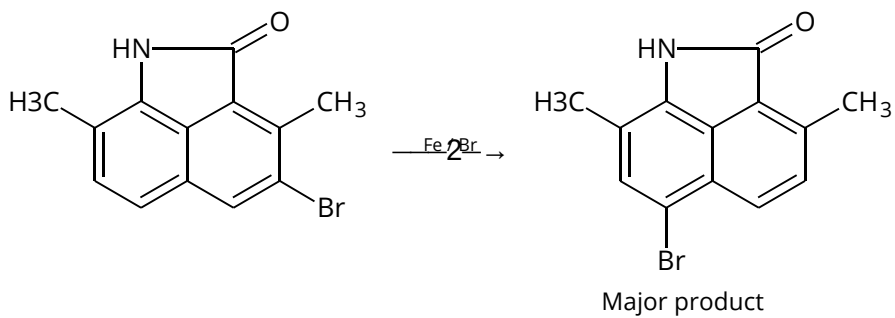
Answer: (d)

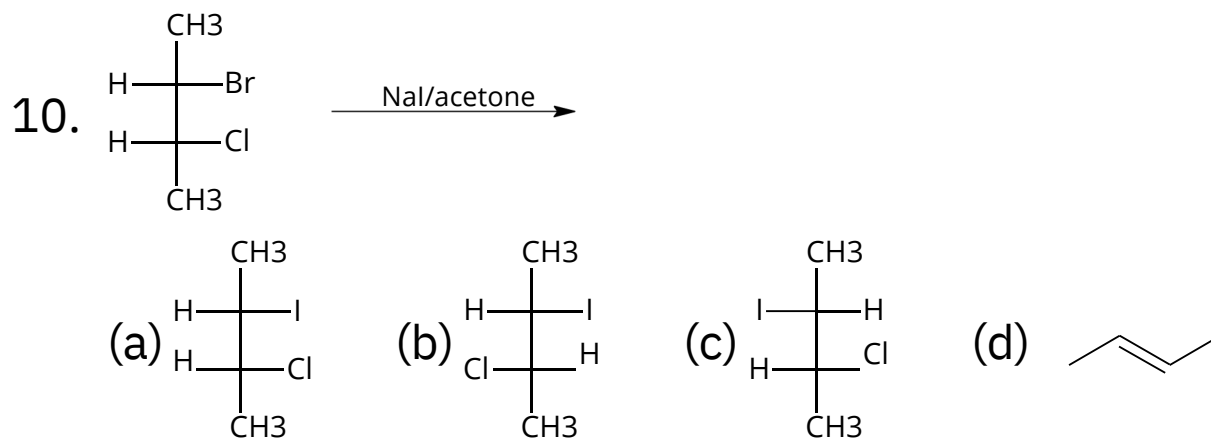
NaI favours substitution in alkyl halide.

9. Product on monobromination of this compound is

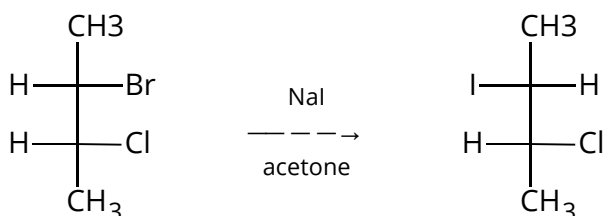


Answer: (b)





Answer: (c)

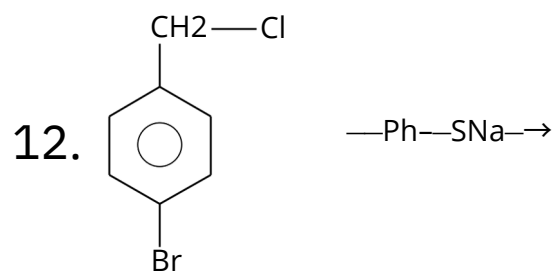


11. Which statement is true with respect to an S₂N reaction?

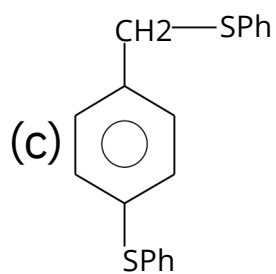
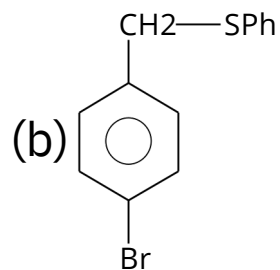
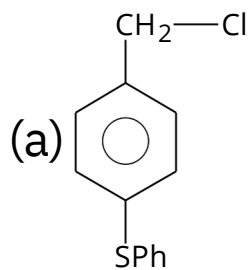
- (a) A good leaving group is a strong base
- (b) A good leaving group is a weak base
- (c) A leaving group must be negatively charged
- (d) A leaving group must be a halide

Answer: (b)

A good leaving group is a weak base.

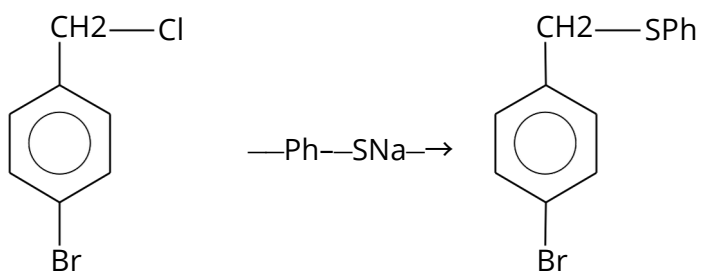


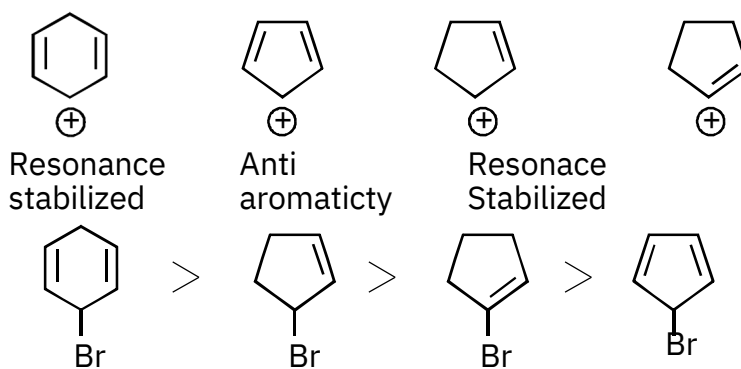
Structure of product (A) is



(d) None

Answer: (b)





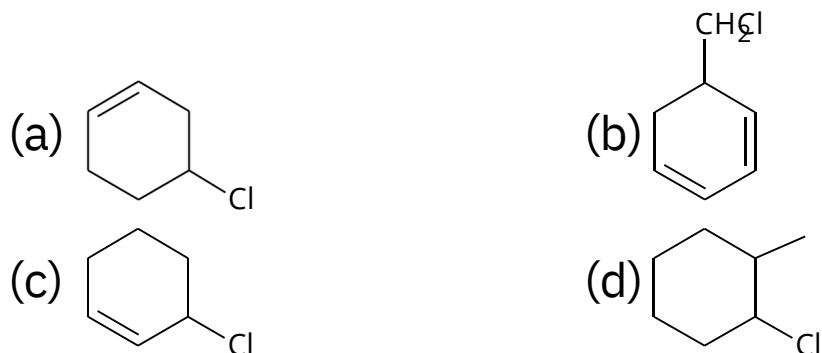
15. Towards nucleophilic substitution reaction with KNH_2 in liquid NH_3 , the more reactive substrate is

- (a) $\text{C}_6\text{H}_5\text{-CH}_2\text{-Cl}$ (b) $\text{C}_6\text{H}_5\text{-Cl}$
 (c) $t\text{-Bu-Cl}$ (d) $\text{C}_6\text{H}_5\text{-CH}=\text{CH-Cl}$

Answer: (a)

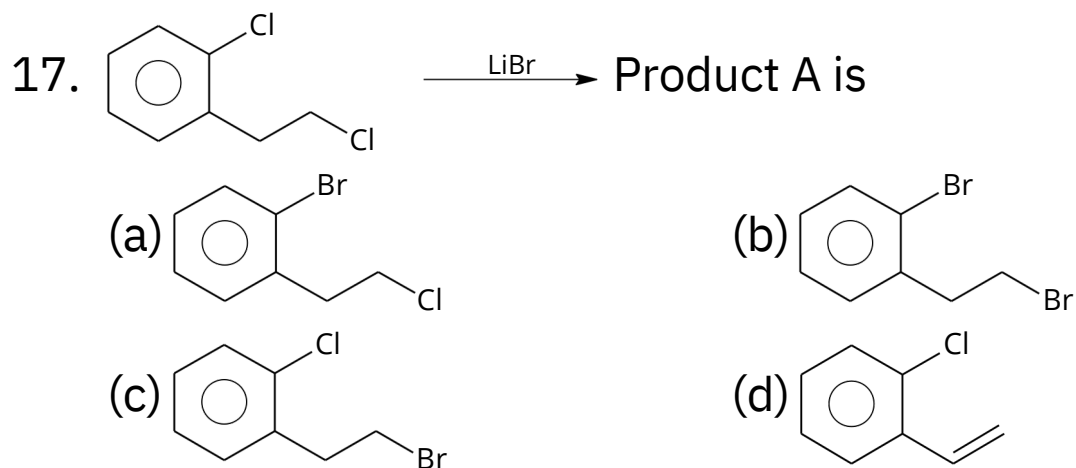
Benzyl & allyl substrates are more reactive toward $\text{S}_\text{N}2$ reactions. $t\text{-Bu-Cl}$ with KNH_2 gives elimination.

16. Which of the following compound give same $\text{S}_\text{N}1$ and $\text{S}_\text{N}2$ product?

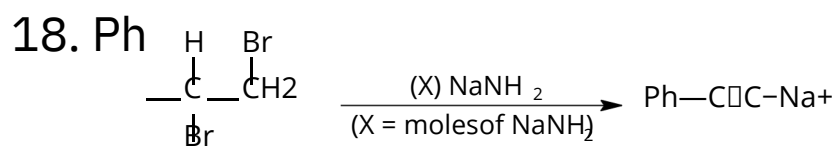
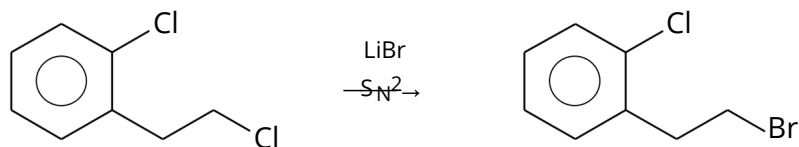


Answer: (c)

If carbocation can't undergo rearrangement then S_N1 and S_N2 product is same.



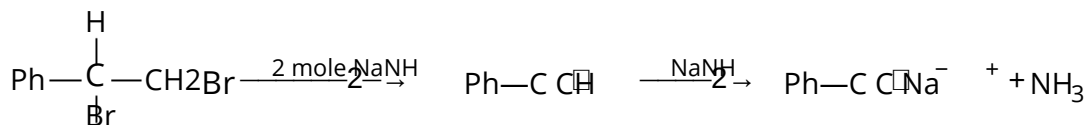
Answer: (c)



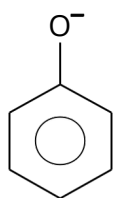
The value of X is

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

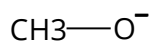
Answer: (c)



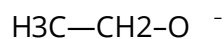
19. Arrange the following in their order of nucleophilicity in aprotic solvent



(I)



(II)



(III)

(a) I > II > III

(b) III > II > I

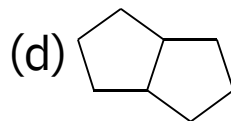
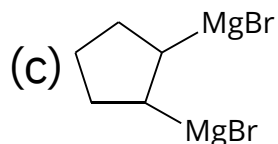
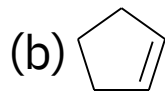
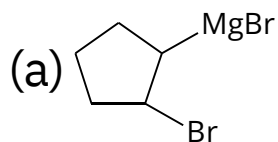
(c) II > I > III

(d) I

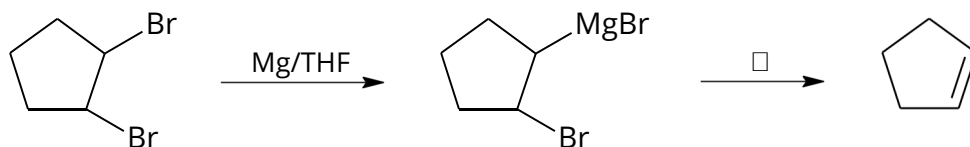
Answer: (c)

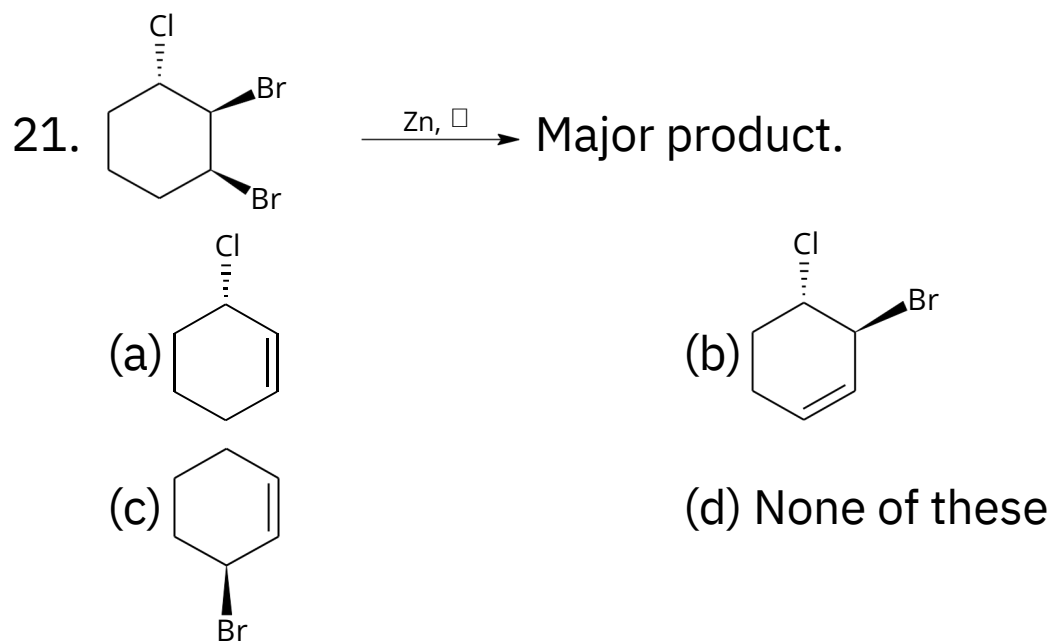
Nucleophilicity parallels basicity in polar aprotic solvent.

20. $\xrightarrow{\text{Mg/THF}}$ Identify structure of final product



Answer: (b)

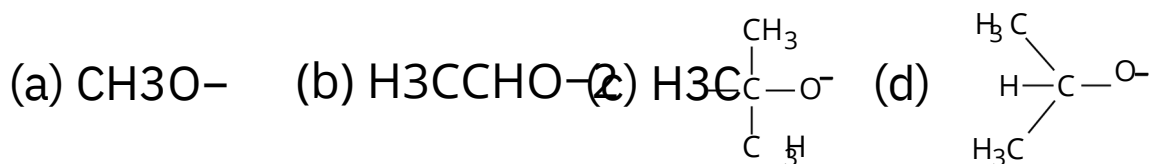




Answer: (c)

Dehalogenation is also anti-periplanar elimination.

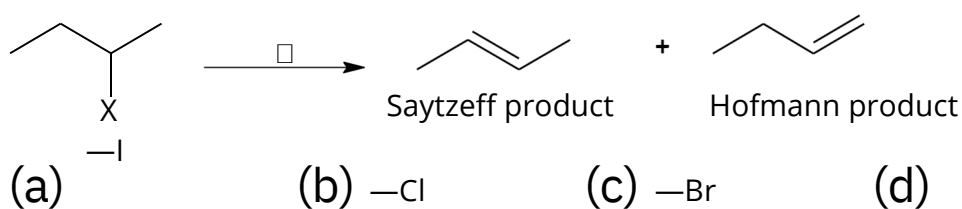
22. Hoffmann product is major when base is



Answer: (c)

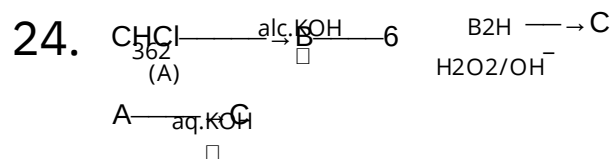
Bulky base favours Hofmann elimination.

23. Saytzeff product will be obtained maximum, when X is

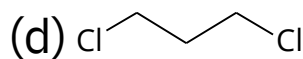
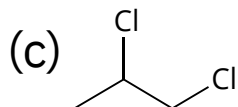
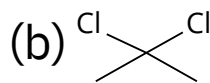
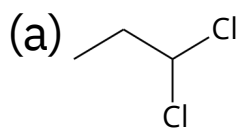


Answer: (a)

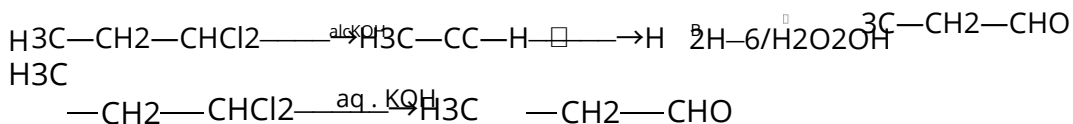
Better the leaving group, maximum is the percentage of Saytzeff product.



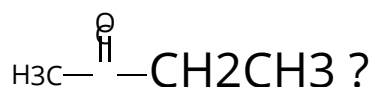
A is



Answer: (a)



25. Which of these reagents will form n-propionic acid from



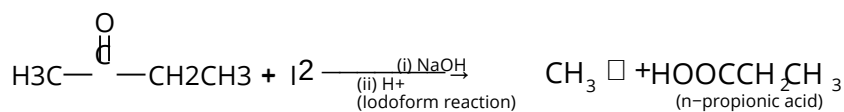
(a) $\text{NaOH} + \text{I}_2, \text{H}^+$

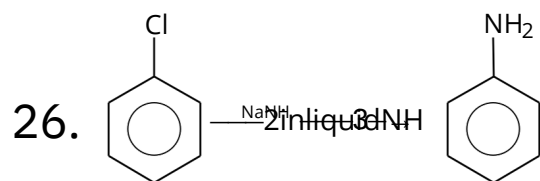
(b) Fehling's solution

(c) $\text{NaOHNaI}, \text{H}^+$

(d) Tollen's reagent

Answer: (a)

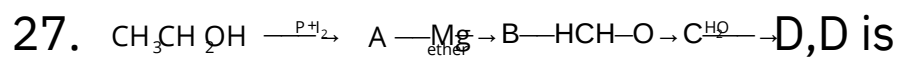
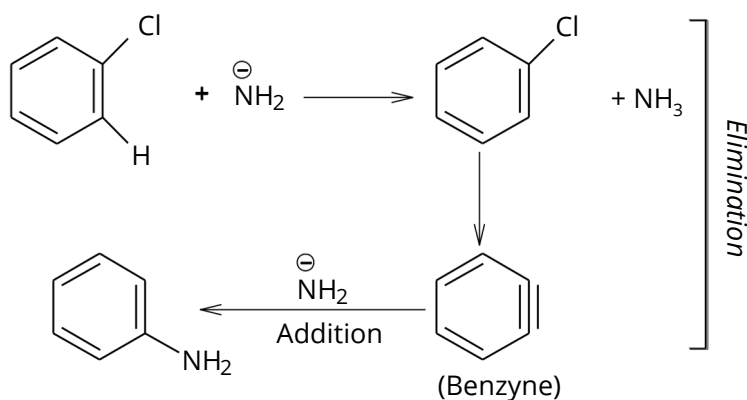




This reaction will follow

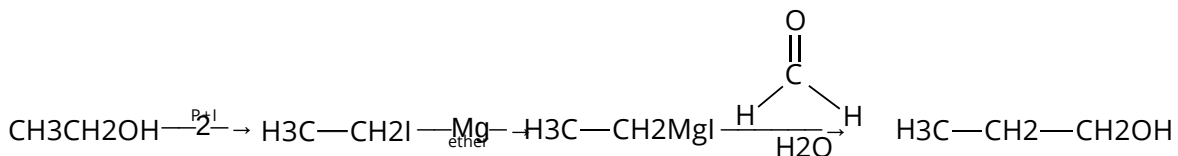
- (a) addition-elimination mechanism
- (b) elimination-addition mechanism
- (c) benzyne mechanism
- (d) Only (b) and (c)

Answer: (d)

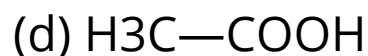
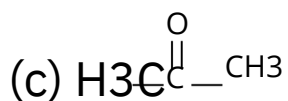
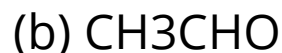


- (a) Butanal
- (b) n-Butyl alcohol
- (c) n-Propylalcohol
- (d) Propanal

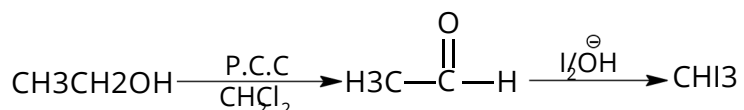
Answer: (c)



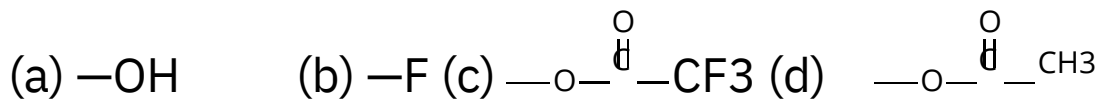
28. An organic compound X on treatment with Pyridinium Chlorochromate(PCC) in CH_2Cl_2 gives compound Y. Compound Y reacts with I_2/NaOH to form iodoform. The compound X is



Answer: (a)



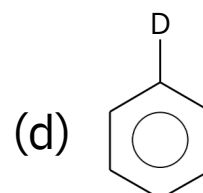
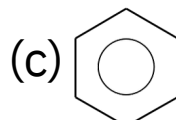
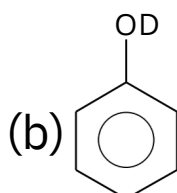
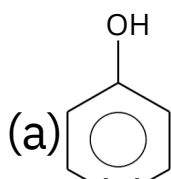
29. $\text{H}_3\text{C}-\text{S}-\text{Na}^+ + \text{CH}_3\text{CH}_2\text{X} \longrightarrow \text{H}_3\text{C}-\text{S}-\text{CH}_2\text{CH}_3 + \text{X}^-$ The reaction is fastest when X is



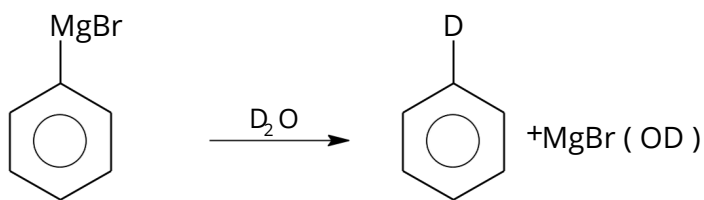
Answer: (c)

CF_3COO^- is the best leaving group amongst four options given.

30. $\text{PhMgBr} + \text{D}_2\text{O} \longrightarrow (\text{X})$; (X) will be



Answer: (d)



31. SN2 reaction at an asymmetric carbon of a compound always gives

- (a) an enantiomer of the substrate.
- (b) a product with opposite optical rotation.
- (c) a mixture of diastereomers.
- (d) a single stereoisomer.

Answer: (d)

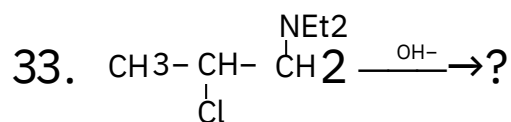
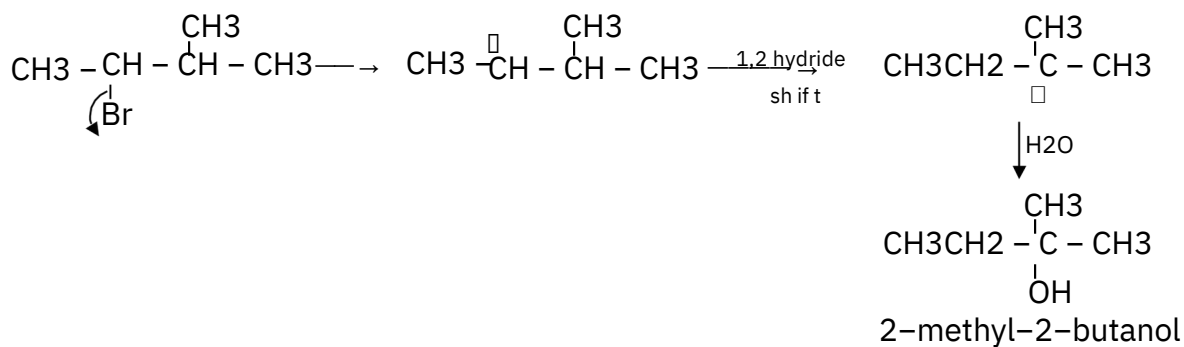
SN2 reaction proceeds with inversion of configuration. Since the attacking nucleophile is not same as that of leaving group, the product cannot be enantiomer of the substrate so the product will not necessarily have opposite optical rotation. Moreover only one product is obtained, so we cannot obtain diastereomers.

32. The hydrolysis of 2-bromo-3-methylbutane yields

- (a) 3-methyl-2-butanol (b) 2-methyl-2-butanol
- (c) 3-methylbutanol (d) 1-methylbutanol

Answer: (b)

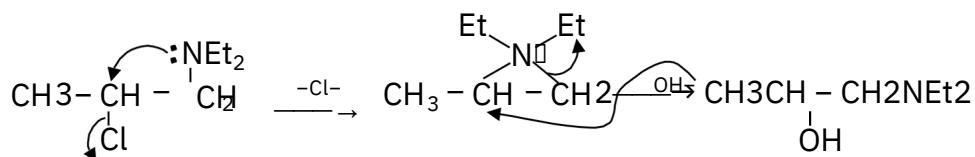
The intermediate is a 2° carbocation which rearranges to a more stable 3° carbocation by the shift of hydride.



The product of the above reaction is

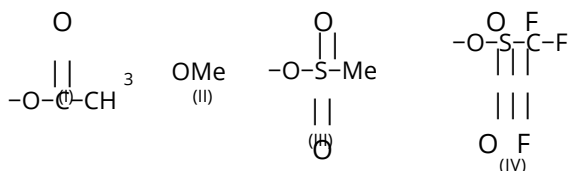
- (a) $\text{CH}_3\underset{\text{OH}}{\text{CH}}\text{CH}_2\text{NEt}_2$ (b) $\text{CH}_3\underset{\text{NEt}_2}{\text{CH}}\text{CH}_2\text{OH}$
 (c) $\text{CH}_3\underset{\text{Cl}}{\text{CH}}\overset{\ominus}{\text{C}}\text{HNEt}_2$ (d) $\text{CH}_3\underset{\text{OH}}{\text{CH}}\text{CH}_2 - \underset{\text{Et}}{\text{N}} - \text{OH}$

Answer: (a)



This is an example of neighbouring group participation.

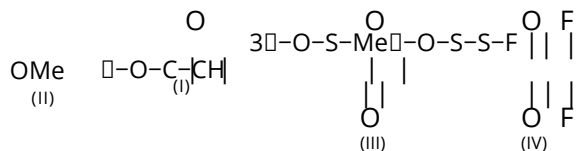
34. Arrange the following compounds in the order of leaving group ability:



- (a) I II III IV (b) IV III I II
 (c) III II I IV (d) II III IV I

Answer: (b)

Weaker the base, better is the leaving group. Hence, basicities decrease in the order



Therefore, the order of leaving group ability decreases in the reverse order (IV) > (III) > (I) > (II).

Hence, (b) is the correct answer.

35. An SN2 reaction at asymmetric carbon of a compound always gives

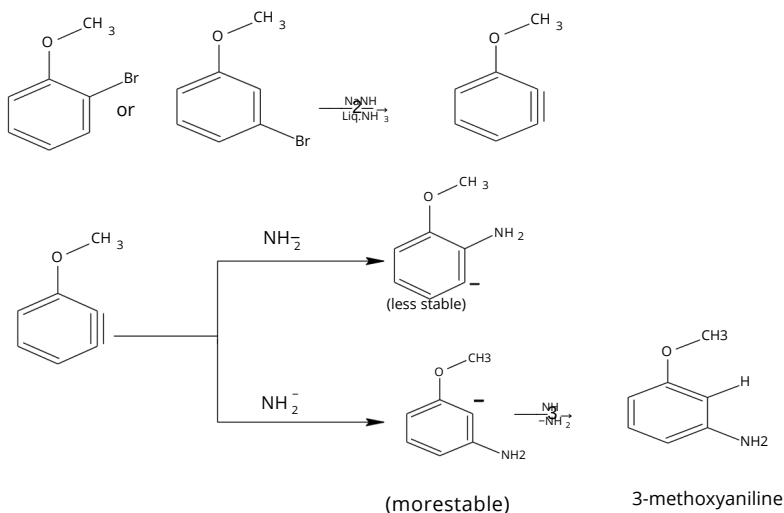
- (a) an enantiomer of the substance
- (b) a product with opposite optical rotation
- (c) a mixture of diastereomers
- (d) a single stereoisomer

Answer: (d)

In SN2 reaction, inversion of configuration occurs. Since the reactant and the product are not enantiomers, the sign of optical rotation may or may not change, hence single stereoisomer is obtained.

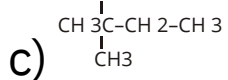
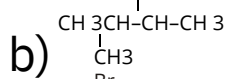
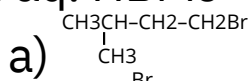
Hence, (d) is the correct answer.

36. A solution of (+)-2-chloro-2-phenylmethane in toluene racemizes slowly in the presence of small amount of SbCl5 due to formation of



Hence, (d) is the correct answer.

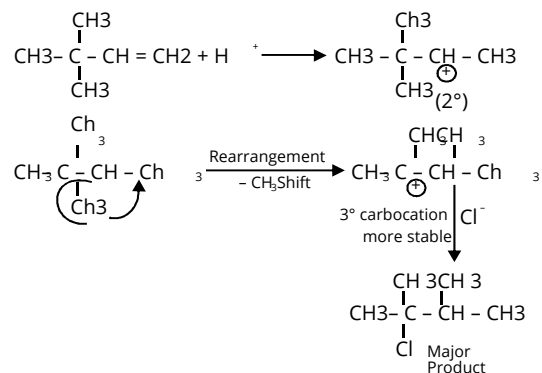
40. Major product obtained on reaction of 3-Methyl but-1-ene with aq. HBr is



d) Both (2) & (3) are formed in equal amounts

Answer: (c)

Explanation:



41. In $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Br}$, C - Br bond is formed by the overlapping of

- (a) $2\text{sp}^3 - 2\text{p}$ (b) $2\text{sp}^3 - 3\text{p}$
 (c) $2\text{sp}^3 - 2\text{p}$ (d) $2\text{sp}^3 - 4\text{p}$

Answer: (d)

In the compound $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Br}$

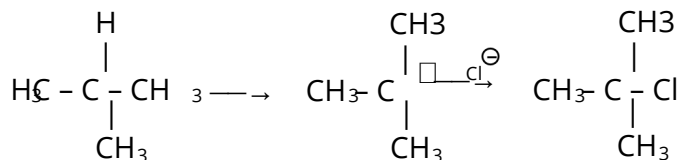
As we know Br lies 4th period so Bromine has 4 p_z orbital.

This 4 p_z orbital overlap with sp³ hybrid orbital of C adjacent to it.

42. In the chlorination of isobutane, which product will be formed in excess:

- (a) $(\text{CH}_3)_2\text{CHCH}_2\text{Cl}$ (b) $(\text{CH}_3)_3\text{CCl}$
 (c) Both of above (d) None of the above

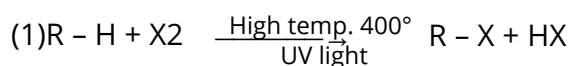
Answer: (b)



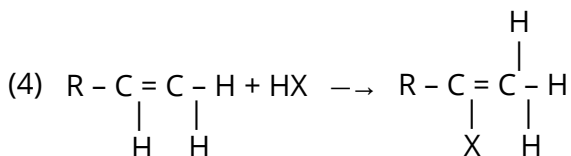
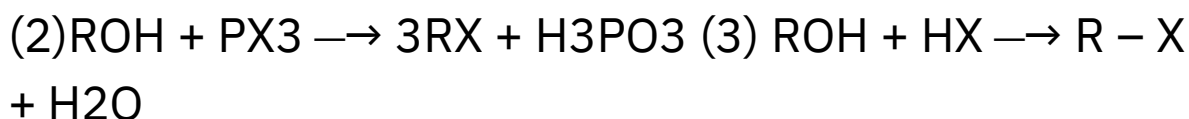
43. The following method cannot be considered suitable for the preparation of alkyl halide:

- (a) Halogenation of alkane (b) ROH and PX_3
 (c) ROH and HX (d) Alkene and HX

Answer: (a)



This is most drastic method as it required High temperature or catalyst CuCl_2 , FeCl_3 , FeBr_3 etc.

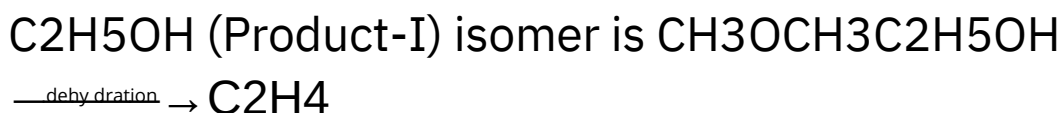
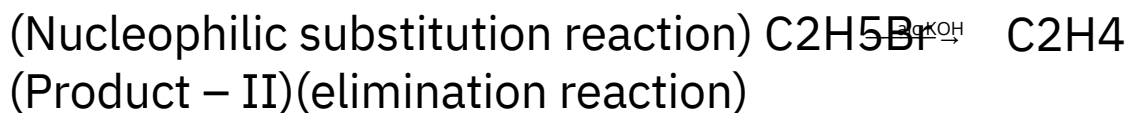
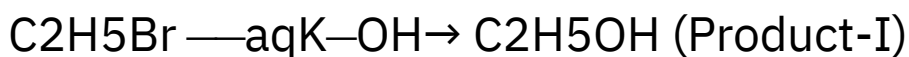


(2), (3) & (4) are very feasible process.

44. Product - I $\xrightarrow{\text{aqKOH}}$ $\text{C}_2\text{H}_5\text{Br}$ $\xrightarrow{\text{alcKOH}}$ Product - II

- (a) Product - I is obtained by the elimination reaction.
- (b) Product - II is obtained by the substitution reaction.
- (c) The molecular formula of Product - I is C_2H_4 , while the molecular formula of Product - II is $\text{C}_2\text{H}_6\text{O}$.
- (d) Product - I is the isomer of dimethyl ether, while Product-II is the dehydrated compound of Product - I.

Answer: (d)



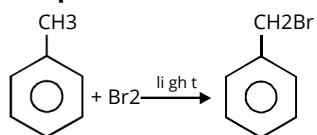
45. Toluene on treatment with one equivalent of Br_2 in presence of light gives (as major product)

- a) o-Bromotoluene

- b) p-Bromotoluene
- c) Benzylbromide
- d) Mixture of (1) & (2)

Answer: (c)

Explanation:



(Benzyl Bromide free radical substitution)