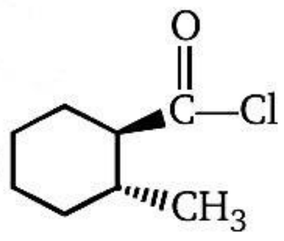
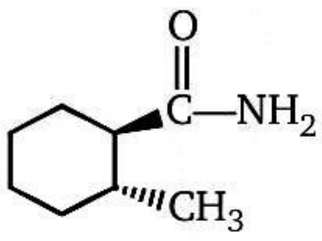
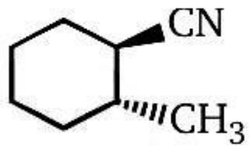
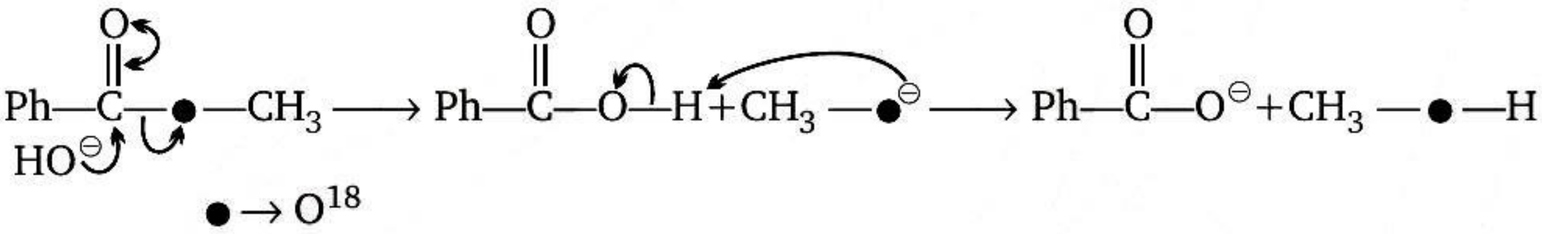
9 Carboxylic Acid and Their Derivatives

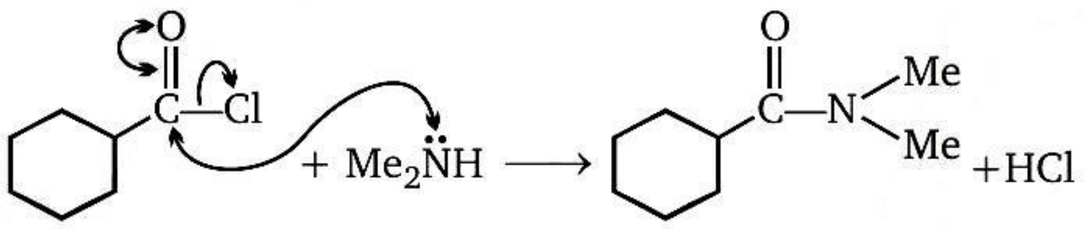
Level - 1

1. (b) (*A*) 

(*B*) 

(*C*) 

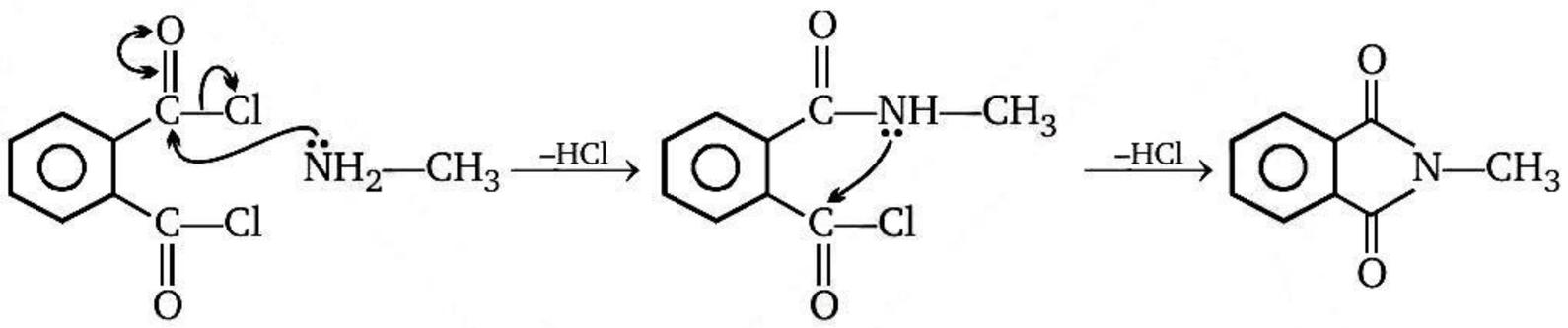
2. (b) 

3. (a) 

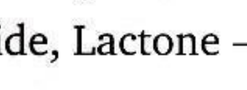
4. (c) Rate determing step is formation of carbanion, more the stable carbanion more is the rate of reaction.

$$c > d > b > a$$

b has more rate of reaction because of *d*-orbital resonance of chlorine.

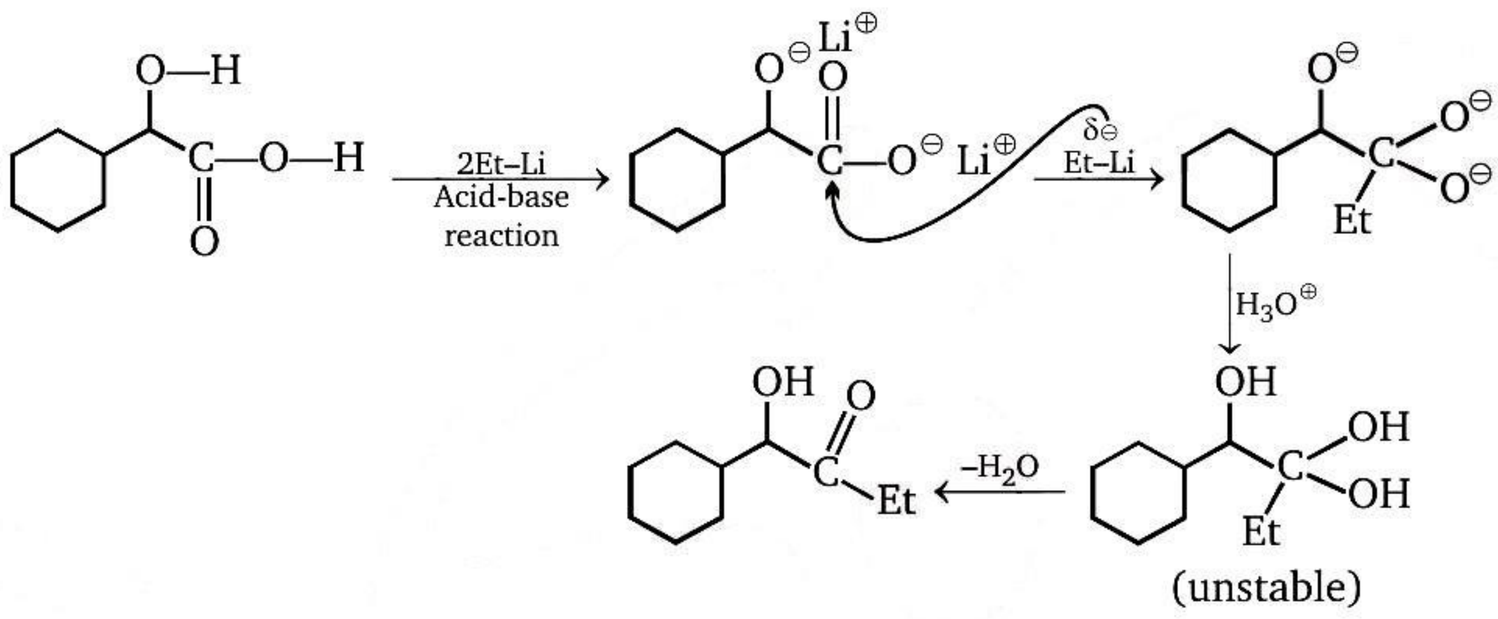
5. (a) 

6. (b) It violates bredt's rule.



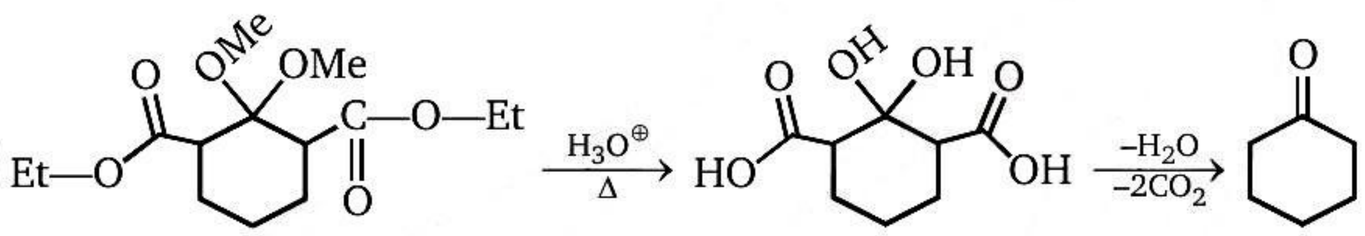
7. (d) Lactam ⟶ cyclic amide, Lactone ⟶ cyclic ester

8. (b)



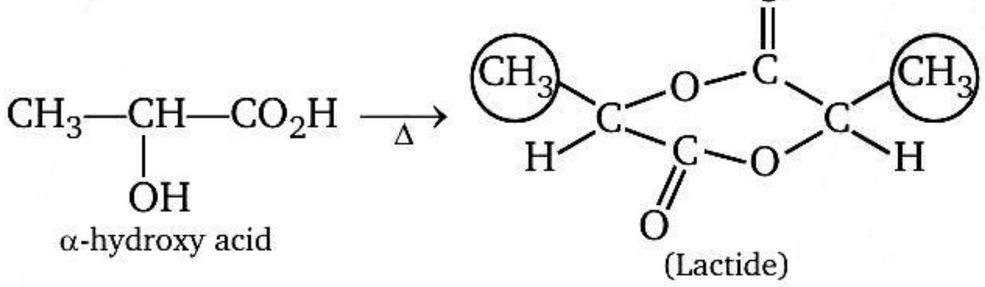
9. (b) Esterification reaction.

10. (b)

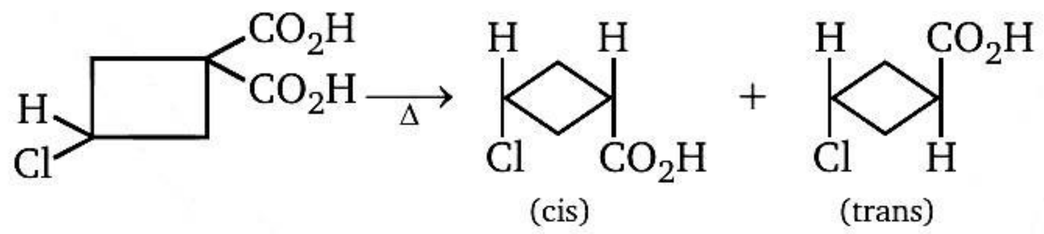


(β-keto acid formed will easily undergo De-carboxylation).

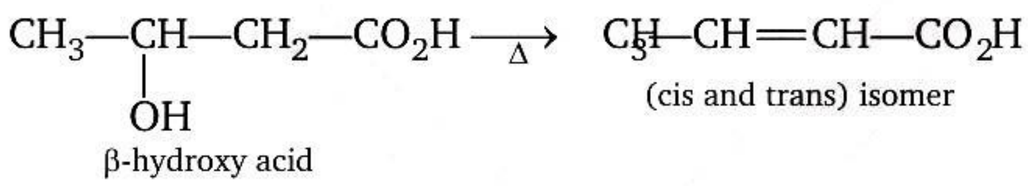
11. (d) (a)



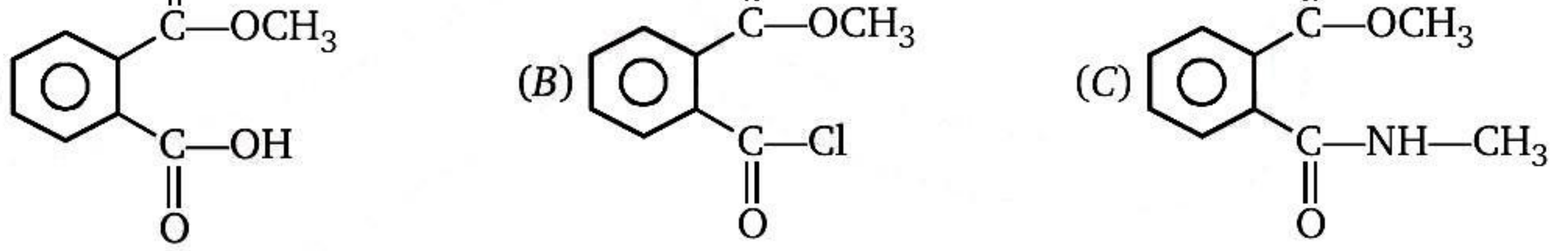
(b)

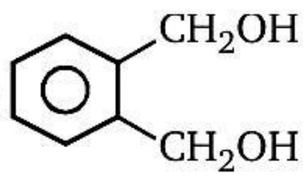
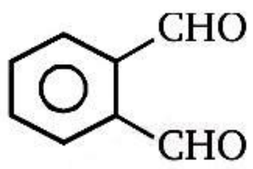
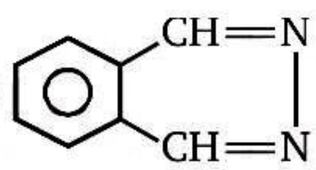


(c)

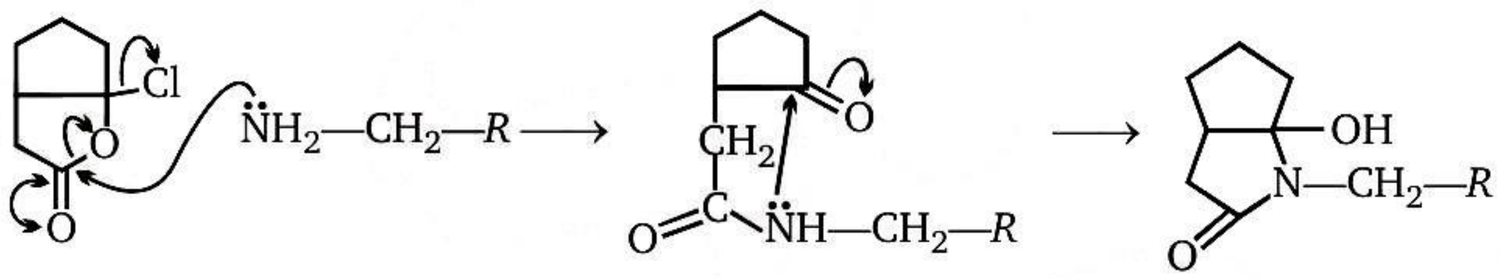


12. (b)



13. (b) (*A*)  (*B*)  (*C*) 

14. (a) (*A*) $CH_3 - CH = CH - Cl$ (*B*) $CH_3 - CH_2 - \underset{\displaystyle Cl}{\underset{|}{CH}} - Cl$ (*C*) $CH_3 - CH_2 - CHO$

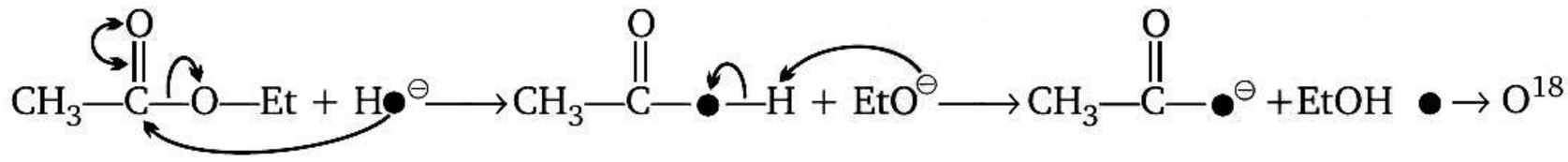
15. (b) 

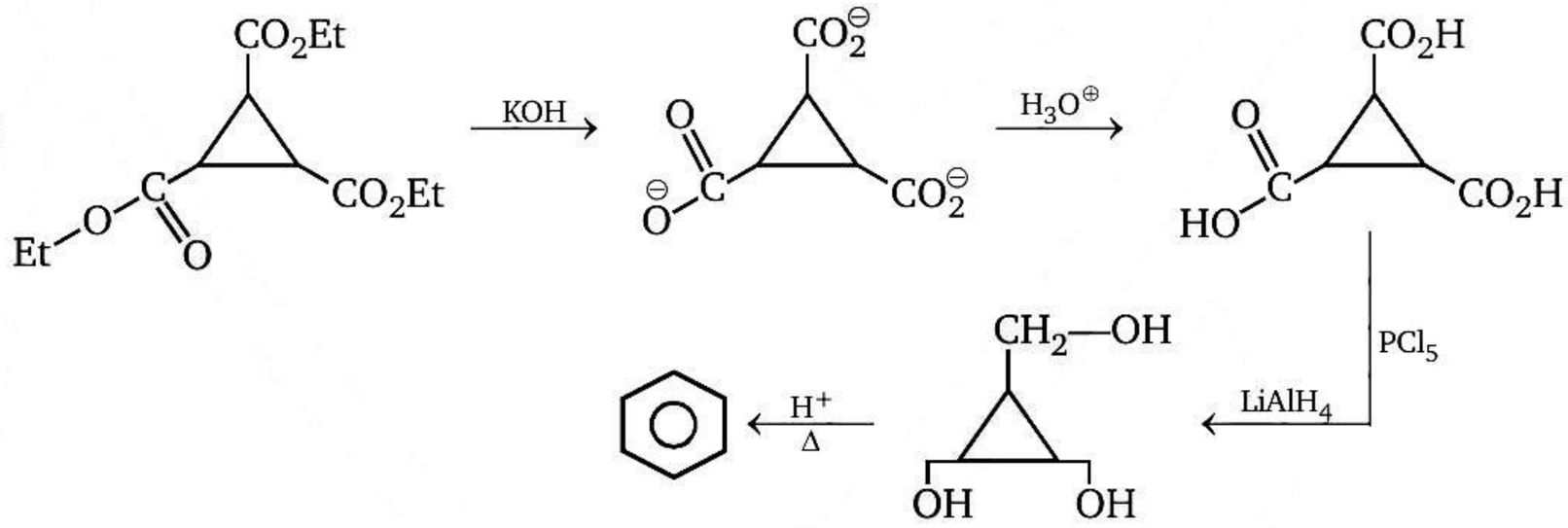
16. (c)

$$CH_3-\underset{\displaystyle CH_2-OH}{\underset{|}{CH}}-CO_2H \xrightarrow{LAH} CH_3-\underset{\displaystyle CH_2-OH}{\underset{|}{CH}}-CH_2-OH$$

(*X*)

$$\xrightarrow{NaHCO_3} CH_3-\underset{\displaystyle CH_2-OH}{\underset{|}{CH}}-CO_2^{\ominus} + CO_2$$

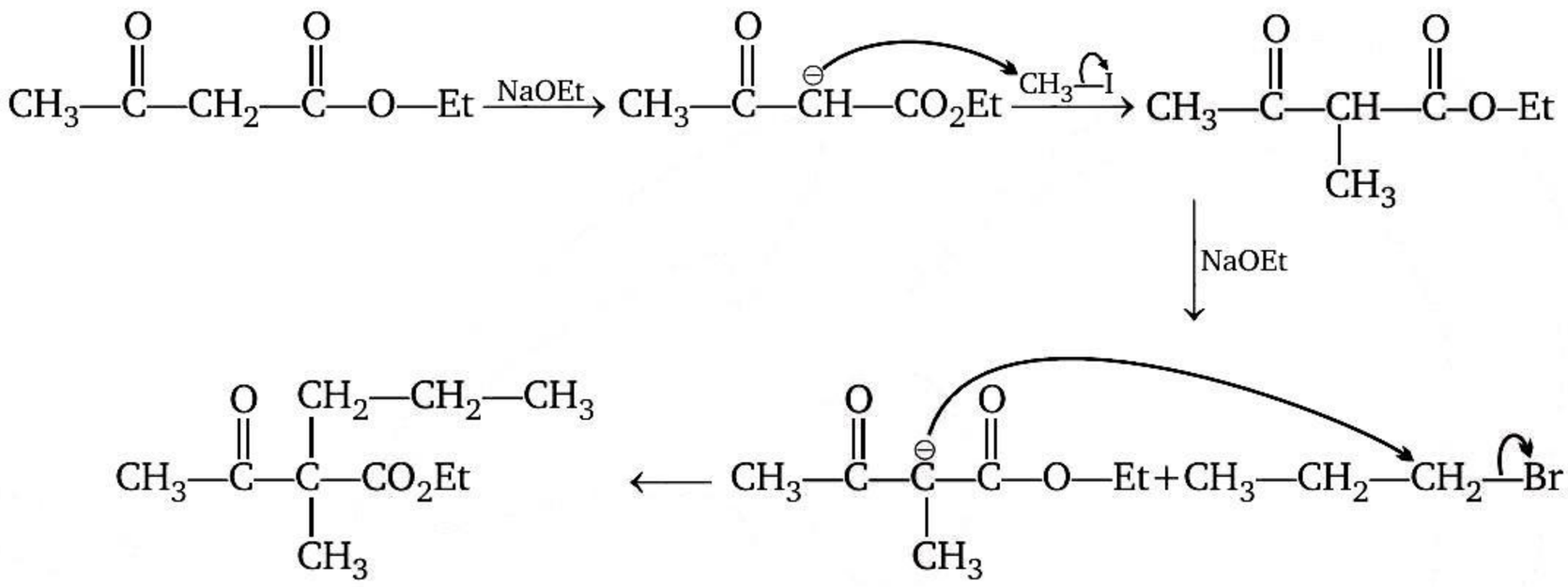
17. (c) 

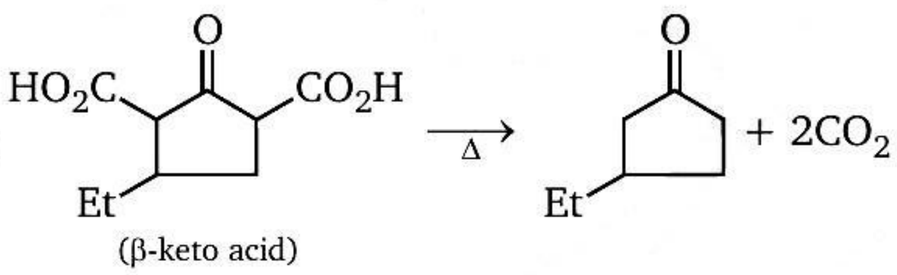
18. (b) 

19. (a)

$$CH_3-\underset{\displaystyle OH}{\underset{|}{CH}}-CO_2H \xrightarrow{\Delta} CH_3-CH\underset{\displaystyle C}{\overset{\displaystyle O-C}{\underset{\displaystyle O}{\overset{\displaystyle \|}{\underset{\displaystyle \|}{}}}}}-C-CH_3$$

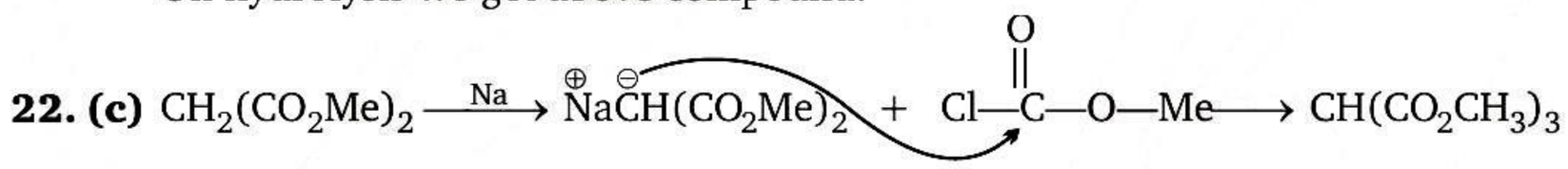
α-hydroxy acid

20. (a) 

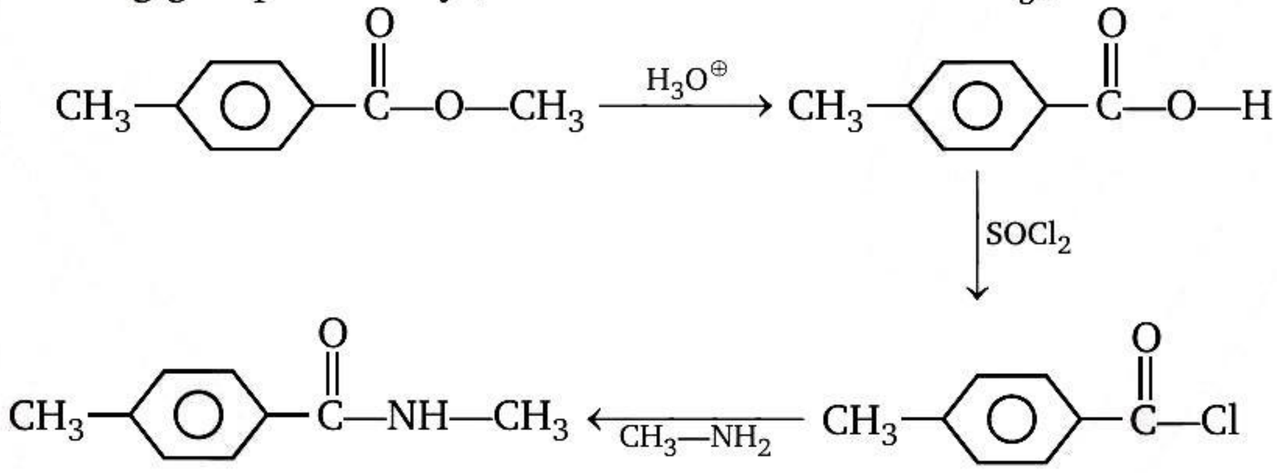
21. (b) 

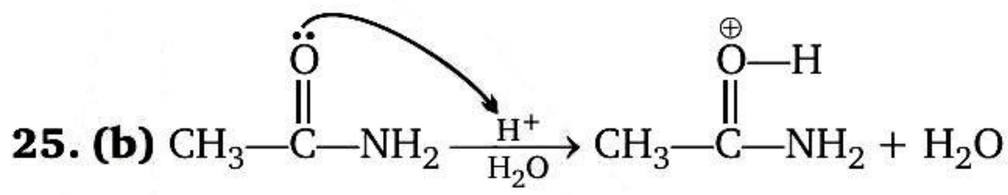
(β-keto acid)

On hydrolysis we get above compound.

22. (c) 

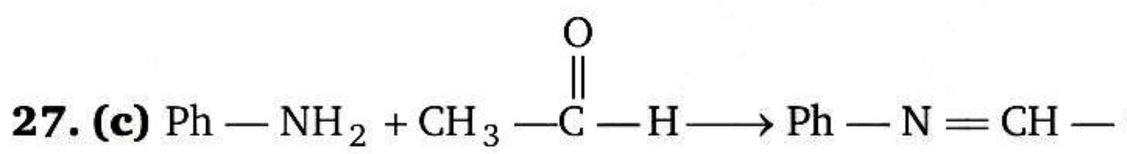
23. (b) Leaving group tendency (—Cl > —OEt > —NH — CH_3)

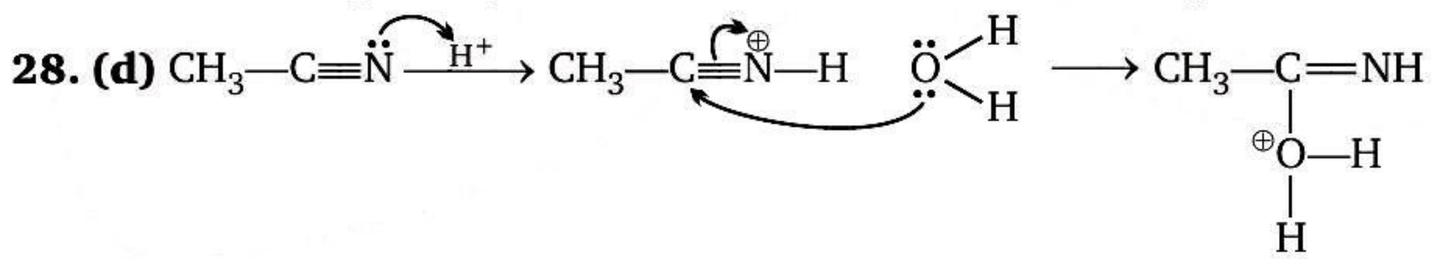
24. (a) 

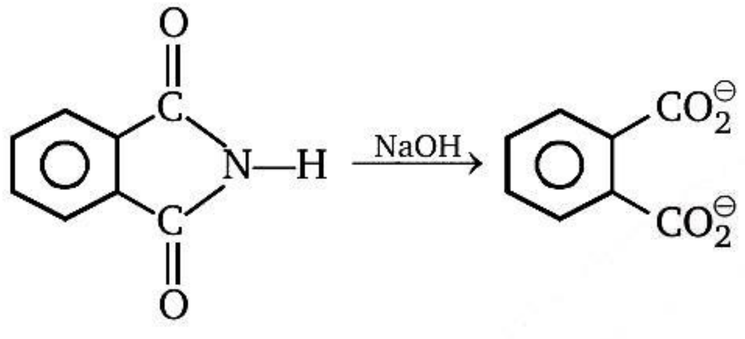
25. (b) 

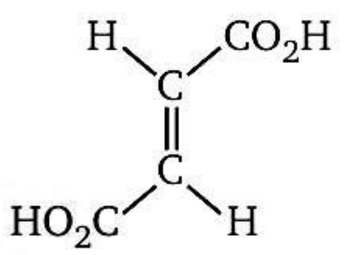
26. (d) Weak base cannot replace strong base.

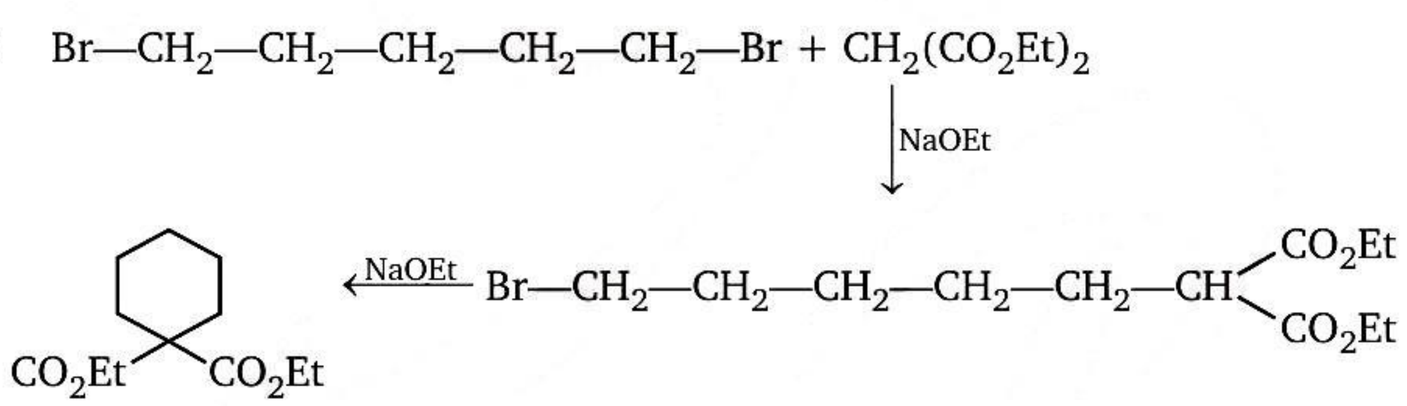
($Cl^{\ominus} < CH_3COO^{\ominus} < C_2H_5O^{\ominus} < NH_2^{\ominus} \Rightarrow$ Basicity order)

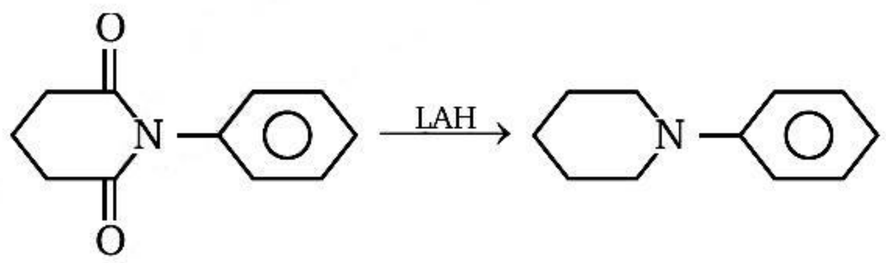
27. (c) 

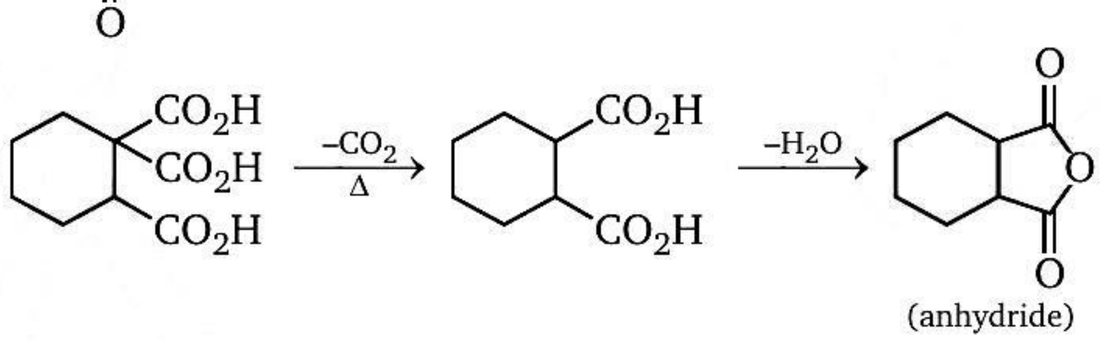
28. (d) 

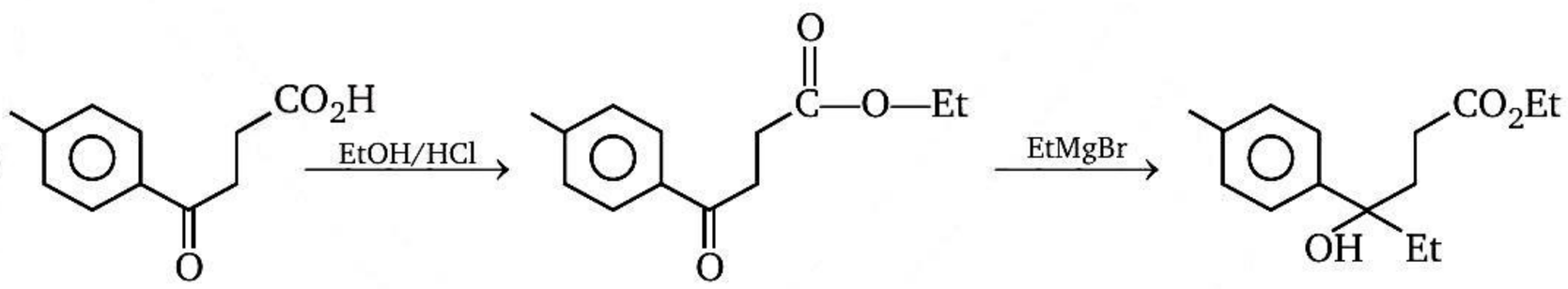
29. (c) 
(Hydrolysis in basic medium)

30. (c) 
(Fumaric acid)

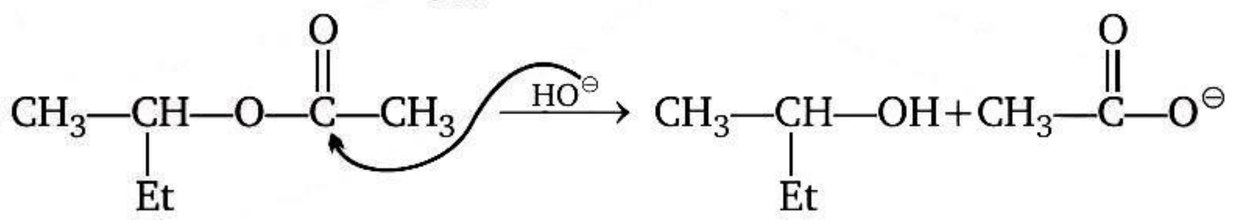
31. (b) 

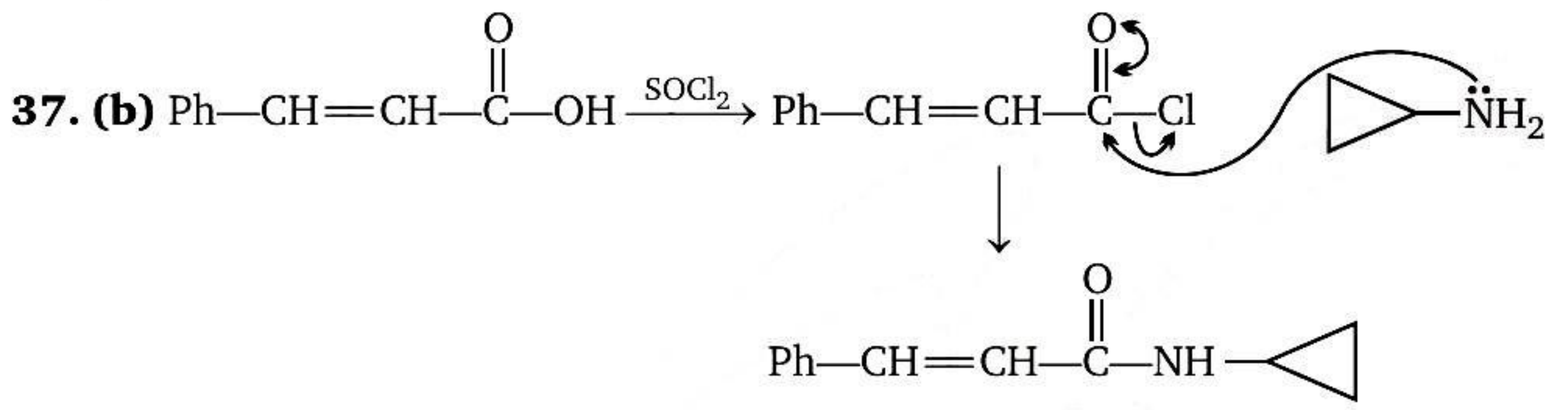
32. (c) 

33. (a) 
(anhydride)

34. (a) 
Ketone is more reactive than ester toward nucleophilic attack.

35. (b) Saponification reaction

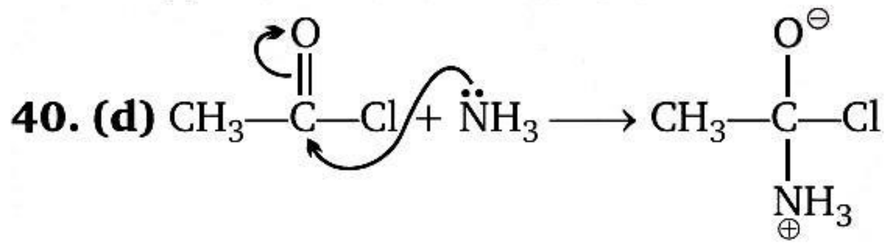
36. (a) 
(Saponification reaction) (d)

37. (b) 

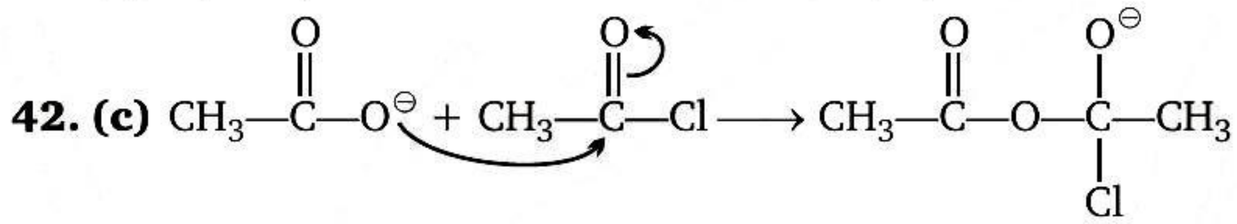
38. (b) Nitrogen is more nucleophilic than oxygen atom.

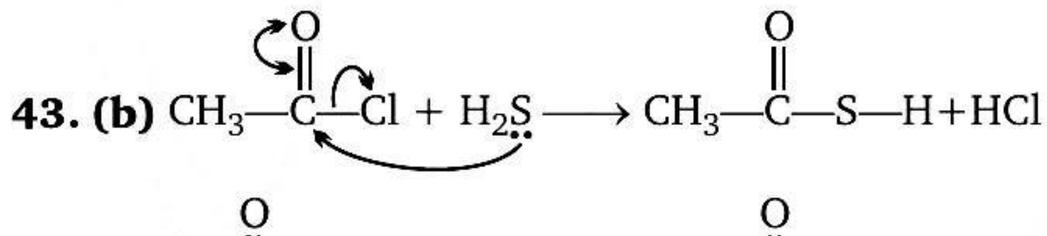
39. (d) Ester convert into another ester

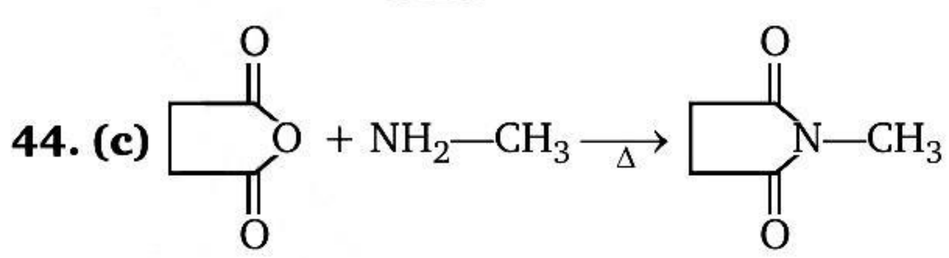
$\therefore$ it is trans esterification.

40. (d) 

41. (c) Hydrolysis of ester in basic medium. (saponification reaction)

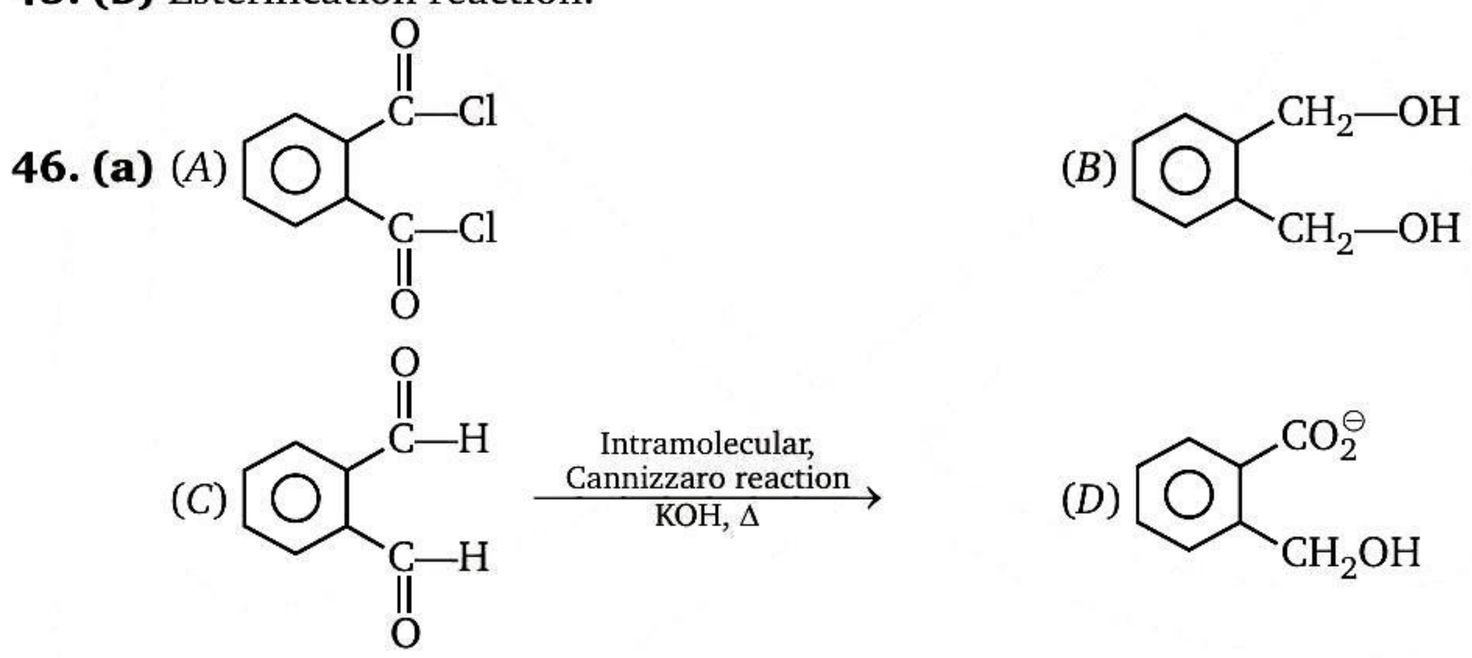
42. (c) 

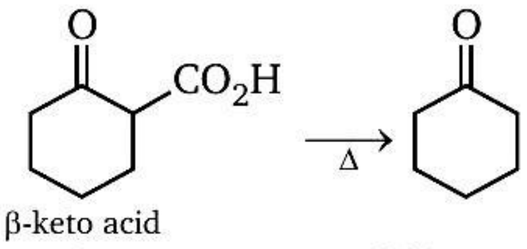
43. (b) 

44. (c) 

On heating water will removed.

45. (b) Esterification reaction.

46. (a) 

47. (c) 
β-keto acid

On heating CO_2 will liberate to acid

48. (b) In acidic medium formation of strong base, is not favourable.

49. (b) Esterification reaction.

50. (c) (*A*) $(CH_3)_2CH—CH_2—CO_2H$ (*B*) $(CH_3)_2CH—CH_2—CH_2—OH$

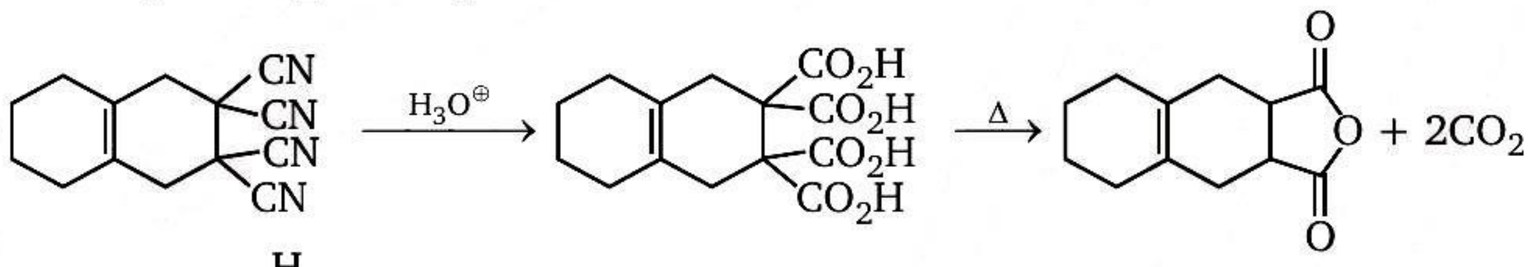
(*C*) $(CH_3)_2CH—CH_2—\overset{\overset{O}{\|}}{C}—H$

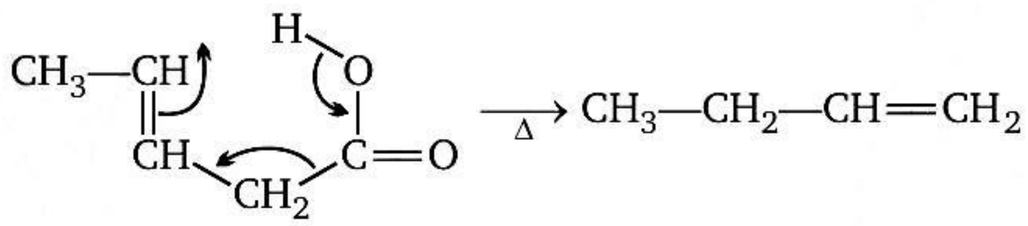
51. (d) (*A*) $Ph—CH_2—Br \xrightarrow{KCN} Ph—CH_2—C\equiv N \xrightarrow{H_3O^{\oplus}} Ph—CH_2—CO_2H\,(B)$

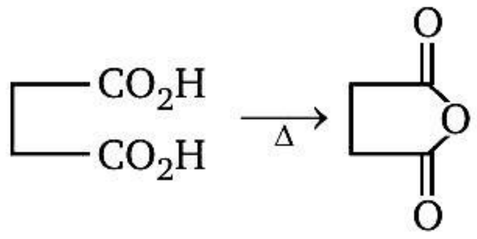
52. (d) β-keto acid will easily undergo de-carboxylation on heating.

53. (d) $X = CH_3—CH_2—CH_2—C\equiv N$ $Y = CH_3—CH_2—CH_2—CO_2H$

$Z = CH_3—CH_2—CH_2—\overset{\overset{O}{\|}}{C}—O—Et$ $Y \rightarrow Z$ is esterification reaction.

54. (a) 

55. (c) 
(Pericyclic mechanism)

56. (c) ($n = 2$) 

Succinic acid on heating form anhydride.

57. (c) At($n = 4$) Adipic acid will form.

58. (c) Hydrolysis of ester take place.

59. (b) Conjugated dienes on oxidation give oxalic acid.

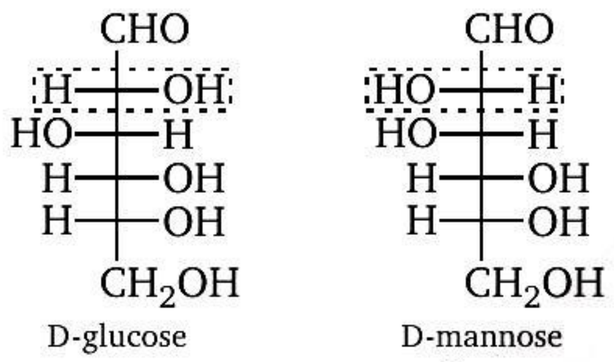
60. (b) Only one product will obtained.

61. (c) Geminal dicarboxylic group on heating gives two diastereomer.

62. (c) Cis on heating give diastereomer while trans on heating give one product.

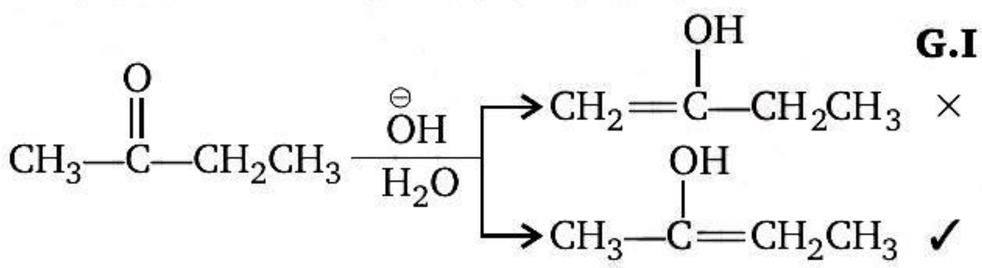
63. (b) Its Gabriel phthalimide reaction.

64. (b)

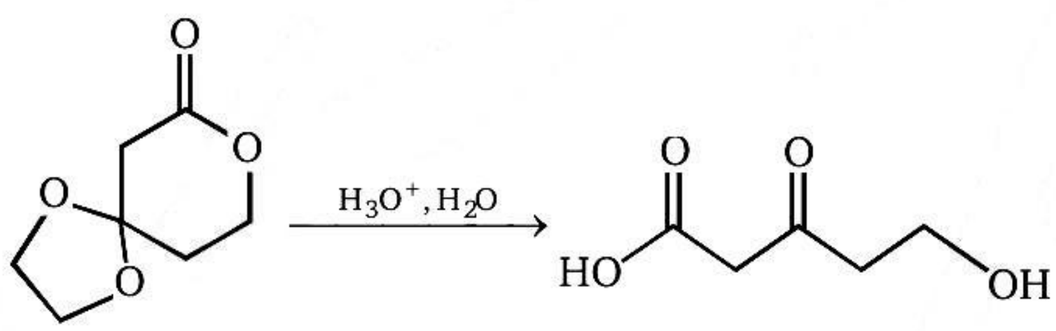


65. (b) $CH_3MgBr + CH_3CH_2{-}\overset{\overset{O}{\|}}{C}{-}Cl \longrightarrow \underset{\text{2-Butanone}}{CH_3{-}\overset{\overset{O}{\|}}{C}{-}CH_2CH_3} + Mg\begin{matrix}Br\\Cl\end{matrix}$

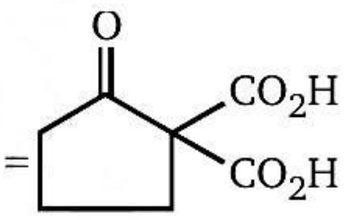
2-Butanone will show tautomerism.



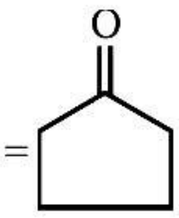
66. (c)



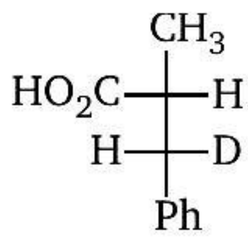
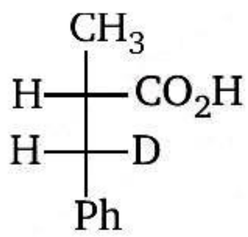
67. (c) $X =$

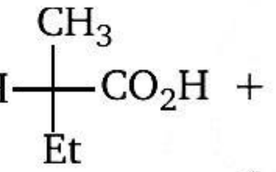
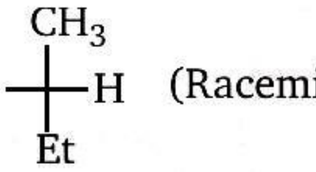


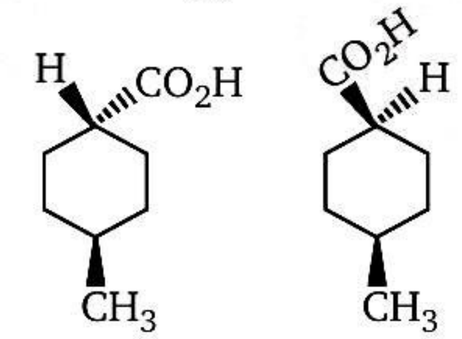
, $Y =$



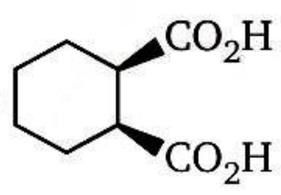
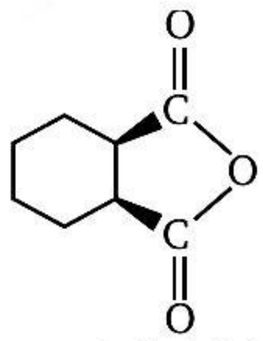
Level - 2

1. (a) $\xrightarrow[\Delta]{}$  +  + CO_2 (Diastereomers).

(b) $\xrightarrow[\Delta]{}$  +  (Racemic) + ζ

(c)  + CO_2

Diastereomers

(d)  $\xrightarrow[\Delta]{}$  (meso)

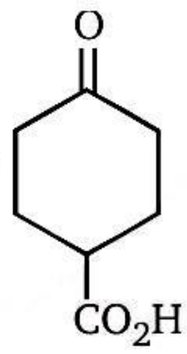
(anhydride)

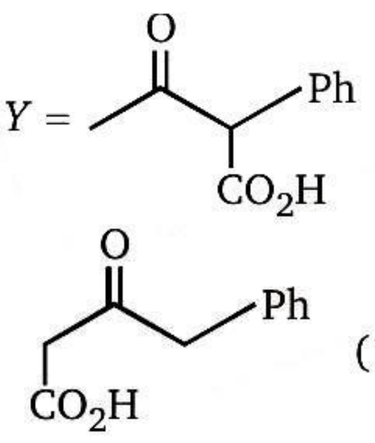
a – p,s ; b – q,s ; c – p,s ; d – r

Subjective Problems

1. (8) $X = 5$, $Y = 3$

$X + Y = 8$

Final product in reaction (1) is = 

$Y =$  (2)

(1)