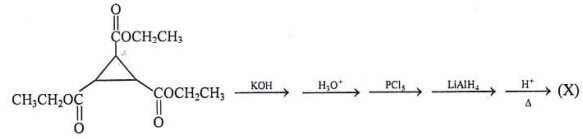
Chapter

24 Carboxylic Acid & Its Derivatives

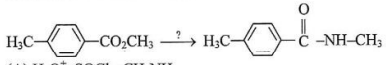
Single Correct Option Type Questions

Q.1 

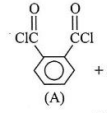
Product (X) is -

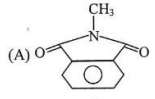
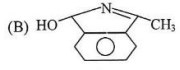
(A)  (B)  (C)  (D) 

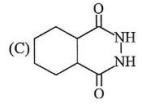
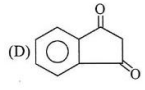
Q.2 Choose the best sequence of reactions for transformation given. Semicolons indicate separate reaction steps to be used in the order shown.

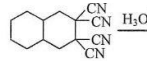


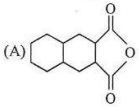
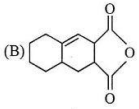
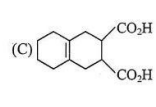
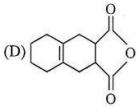
(A) H_3O^+; $SOCl_2$; CH_3NH_2
(B) HO^-/H_2O;PBr_3 ; Mg; CO_2; H_3O^- ; $SOCl_2$; CH_3NH_2
(C) $LiAlH_4$; H_2O; HBr; Mg; CO_2; H_3O^+; $SOCl_2$; CH_3NH_2
(D) None of these would yield the desired product

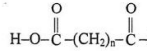
Q.3  (A) + $CH_3–NH_2$ → Product of the reaction is -

(A)  (B) 

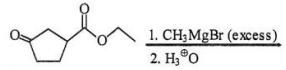
(C)  (D) 

Q.4  (A); Product (A) of the reaction is -

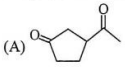
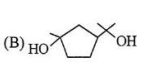
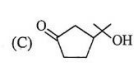
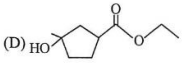
(A)  (B)  (C)  (D) 

Q.5  Product, At what value of (n) above compound will not evolve CO_2 gas ?

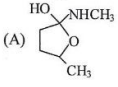
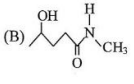
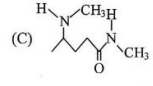
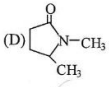
(A) n = 5 (B) n = 4 (C) n = 2 (D) n = 1

Q.6 

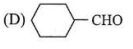
The product of reaction is -

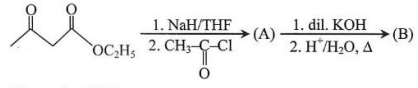
(A)  (B)  (C)  (D) 

Q.7  + CH_3NH_2 → (P); product P is -

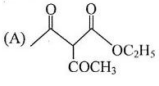
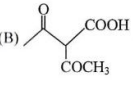
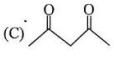
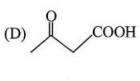
(A)  (B)  (C)  (D) 

Q.8 Product (P) in following reaction is $(CH_3COO)_2Ca \xrightarrow[\Delta]{\text{Drydistillation}}$ (P)

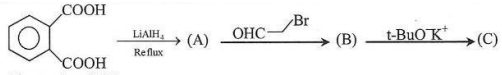
(A) CH_3–CHO (B) HCHO (C) CH_3 . CO . CH_3 (D) 

Q.9 

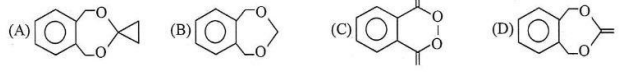
The product (B) is:

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

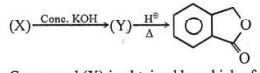
Q.10



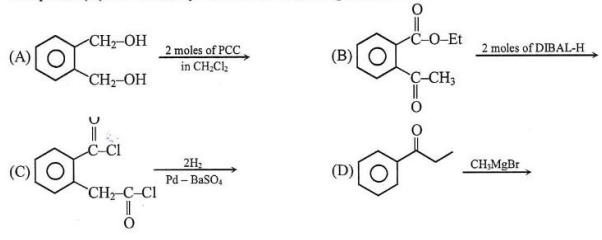
The product (C) is:



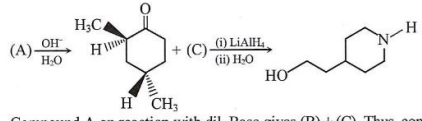
Q.11



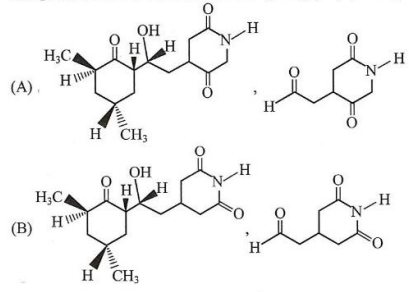
Compound (X) is obtained by which of the following reaction :

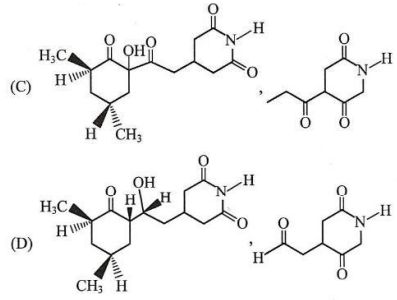


Q.12

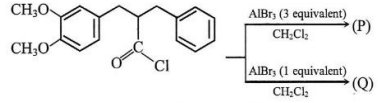


Compound A on reaction with dil. Base gives (B) + (C). Thus, compounds A, C are respectively:



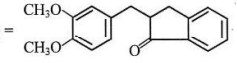


Q.13

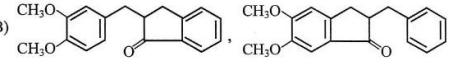


Major products (P) and (Q) are respectively :

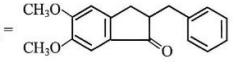
(A) P = Q =



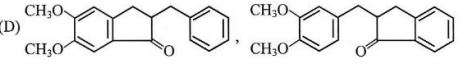
(B)



(C) P = Q =



(D)

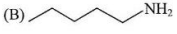


Q.14

B can be

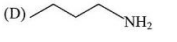
(A)

(B)

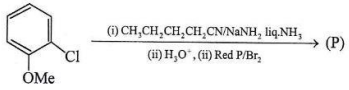


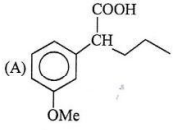
(C)

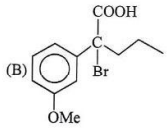
(D)

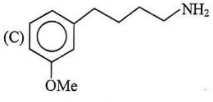


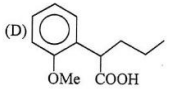
Q.15 The major product obtained in the following reaction will be -

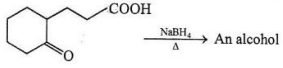


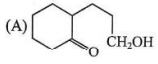
(A) 

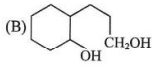
(B) 

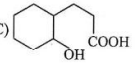
(C) 

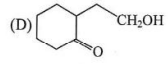
(D) 

Q.16 

(A) 

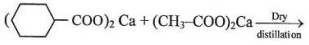
(B) 

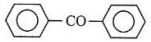
(C) 

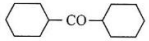
(D) 

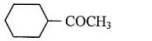
Multiple Correct Option Type Questions

Q.17 Possible products in the following reaction is ?

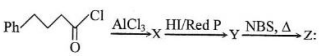


(A) 

(B) 

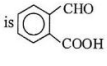
(C) 

(D) $CH_3–CO–CH_3$

Q.18 

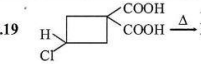
Which of the following are correct product -

(A) X is 

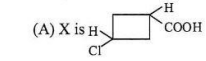
(B) Y is 

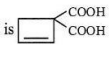
(C) Y is 

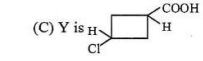
(D) Z is 

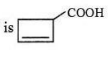
Q.19 

Which of the following are correct product -

(A) X is 

(B) X is 

(C) Y is 

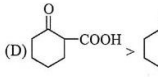
(D) Y is 

Q.20 Choose the correct rate of decarboxyation in the mentioned conditions :

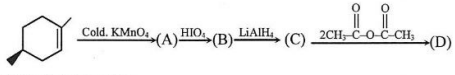
(A) $H_3C-CH_2-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-OH$ (decarboxylation on heating) > $H_3C-CH_2-CH=CH-\overset{O}{\overset{\|}{C}}-OH$

(B) $F_3C-COOH > H_3C-\overset{O}{\overset{\|}{C}}-OH$ (decarboxylation on heating with sodalime)

(C) $NO_2.CH_2.COOH > ClCH_2.CH_2.COOH$ (decarboxylation on heating)

(D) 

(decarboxylation on heating)

Q.21 

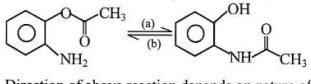
Correct statement is:

(A) D is optically active

(B) B is optically active

(C) Molecular weight of C to D increases by 84 unit

(D) Compound (A) exist as two stereo isomer

Q.22 

Direction of above reaction depends on nature of solution. Correct combination is :

(A) a = acidic solution (B) b = basic solution

(C) a = basic solution (D) b = acidic solution

Q.23 Benzoic acid (Ph – CO_2H) and Benzyl alcohol (Ph – CH_2OH) can be separated by

(A) Na (B) NaOH (C) $NaNH_2$ (D) $NaHCO_3$

Q.24 Choose the correct rate of decarboxyation in the mentioned conditions :

(A) $H_3C-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-OH >$ $H_3C-CH_2-CH=CH-\overset{O}{\overset{\|}{C}}-OH$

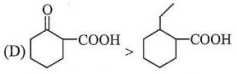
(decarboxylation on heating)

(B) $F_3C-COOH > H_3C-\overset{O}{\overset{\|}{C}}-OH$

(Rate of decarboxylation on heating)

(C) $NO_2.CH_2.COOH > ClCH_2.CH_2.COOH$

(decarboxylation on heating)

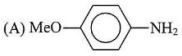
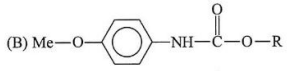
(D)  (decarboxylation on heating)

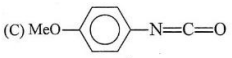
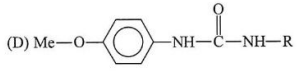
Q.25 Which of the following test can be used to differentiate phenol & Benzoic acid -

(A) $FeCl_3$ Test (B) $NaHCO_3$ Test

(C) Libermann nitroso Test (D) NaOH solubility Test

Q.26 p-Methoxy benzoyl chloride on reaction with sodium salt of hydrazoic acid in heating condition forms (A). (A) on further reaction with (i) H_2O (ii) ROH (iii) RNH_2 gives three products P, Q, R respectively. Then what are the structures of P, Q and R ?

(A)  (B) 

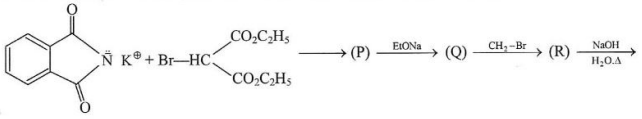
(C)  (D) 

Q.27 In which of the following reactions nitrene is likely to be an intermediate or transition state ?

(A) Schmidt rearrangement (B) Beckmann rearrangement

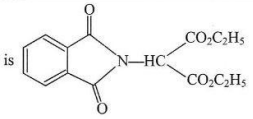
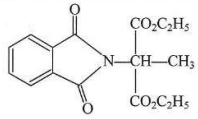
(C) Bayer-Villiger oxidation (D) Curtius reaction

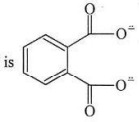
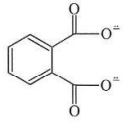
Q.28 In the following reaction sequence identify (P), (Q), (R), (S) and (T) as major products of the reaction ?



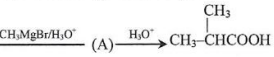
(S) + (T) $\xrightarrow{H_2O^+,\Delta}$ [Alanine – H]$^+$ (from S)

Which of the following is/are correct ?

(A) P is  (B) R is 

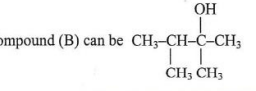
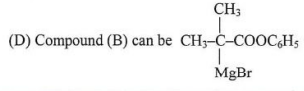
(C) T is  (D) S is 

Q.29 Consider the following reaction sequence



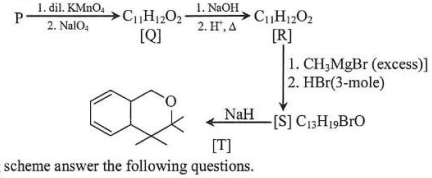
Which of the following statements are true ?

(A) Compound (A) can be  (B) Compound (A) can be 

(C) Compound (B) can be  (D) Compound (B) can be 

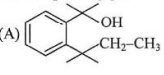
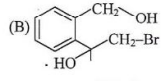
Passage Based Questions

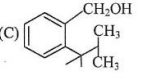
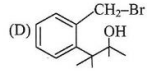
Passage # 1 (Ques. 30 - 33)



n the following scheme answer the following questions.

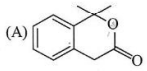
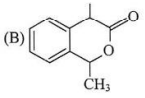
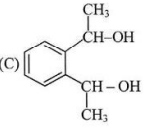
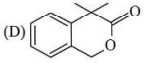
Q.30 The compound [S] is

(A)  (B) 

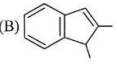
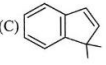
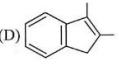
(C)  (D) 

Q.31 In the transformation of [Q] into [R] is (Reaction with NaOH only) the correct statement is
(A) Hydride transfer is rate determining
(B) Atack of ^{-}OH is rate determining
(C) Reaction is independent of ^{-}OH concentration
(D) Reaction is independent of reactant concentration

Q.32 Compound [R] is

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

Q.33 Compound (P) is

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

Passage # 2 (Ques. 34 - 36)

	pK_a
(a) $CH_3-\overset{O}{\overset{\|}{C}}-\underset{\uparrow}{C}H_2-\overset{O}{\overset{\|}{C}}-CH_3$	9
(b) $CH_3-\overset{O}{\overset{\|}{C}}-\underset{\uparrow}{C}H_2-\overset{O}{\overset{\|}{C}}-O-Et$	11
(c) $Et-O-\overset{O}{\overset{\|}{C}}-\underset{\uparrow}{C}H_2-\overset{O}{\overset{\|}{C}}-O-Et$	13
(d) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$	19

Consider the above data and give the answer of following questions.

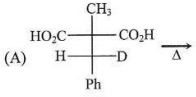
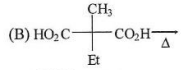
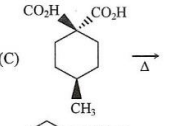
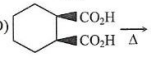
Q.34 Order of enol content –
(A) b > a > c > d (B) c > a > b > d (C) a > b > c > d (D) d > c > b > a

Q.35 When (b) reacts with (i) EtONa (ii) CH_3I (iii) $H_3O^{\oplus}/\Delta$, then product obtained will be -
(A) $CH_3-\overset{O}{\overset{\|}{C}}-CH_3$ (B) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-H$
(C) $CH_3-\overset{O}{\overset{\|}{C}}-CH_2-CH_3$ (D) $CH_3-CH_2-CH_2-\overset{O}{\overset{\|}{C}}-H$

Q.36 Which of the compound give 1° alcohol when treated with $LiAlH_4$ -
(A) a (B) b (C) c (D) both (B) & (C)

Column Matching Type Questions

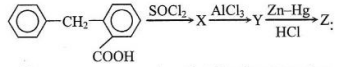
Q.37 Match the column :

Column -I	Column-II
(A) 	(P) Diastereomers
(B) 	(Q) Racemic mixture
(C) 	(R) Meso compound
(D) 	(S) CO_2 gas will evolve
	(T) NH_3 gas will evolve

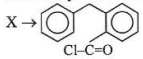
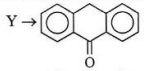
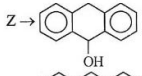
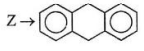
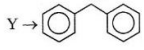
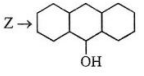
Q.38 Match the column:

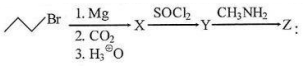
Column -I	Column-II
(A) $C_2H_5-COOH \xrightarrow{C_2H_5\bar{O}}$	(P) Hydrolysis
(B) $C_2H_5-COOH \xrightarrow{C_2H_5OH/H^{\oplus}}$	(Q) Esterification
(C) $C_2H_5-COOC_2H_5 \xrightarrow{H_2O/H^{\oplus}}$	(R) Saponification
(D) $C_2H_5-COOC_2H_5 \xrightarrow{OH^{\ominus}}$	(S) Acid base reaction
	(T) Friedal craft alkylation

Numeric Response Type Questions

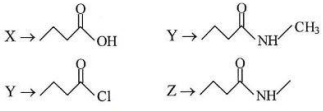
Q.39 

How many are correct product for above reaction -

X → 
Y → 
Z → 
Z → 
Y → 
Z → 

Q.40 

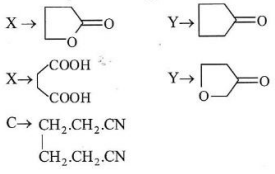
How many are correct product for above reaction-



Q.41 $C_4H_6O_4$ (x) $\xrightarrow{LiAlH_4}$ X $\xrightarrow{HBr}$ B $\xrightarrow{NaCN}$ C

$\xrightarrow[(ii)Ca(OH)_2,\Delta]{(i)\ H_3\overset{\oplus}{O}}$ Y $\xleftarrow[\Delta]{Drydistillation}$ $[\overline{O}OC.(CH_2)_4.\ CO\overline{O}]Ca$:

How many are correct product for above reaction-

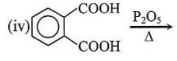


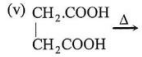
Q.42 How many reactions given acid anhydride as product:

(i) $C_6H_5COOH + CH_3COCl \xrightarrow{Pyridine}$

(ii) $C_6H_5COO^{\ominus}Na^{\oplus} + C_6H_5COCl \longrightarrow$

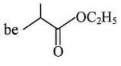
(iii) $C_6H_5CONH_2 + CH_3COO^{\ominus}\ Na^{\oplus} \longrightarrow$

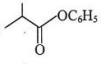
(iv) 

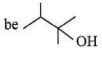
(v) 

Q.43 How many are correct product for following reactions -

(B) $\xleftarrow[H^{\oplus}/H_2O]{2CH_3MgBr}$ (A) $\xrightarrow{H^{\oplus}/H_2O}$ 

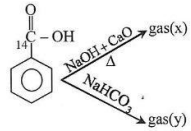
(i) Compound A can be 

(ii) Compound A can be 

(iii) Compound B can be 

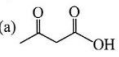
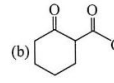
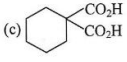
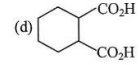
(iv) Compound B can be 

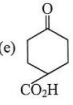
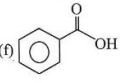
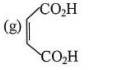
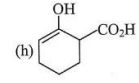
Q.44 How many carbon atom present in one molecule of caproic acid.

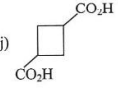
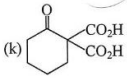
Q.45 

Difference between the molar mass of (x – y gas)

Q.46 Calculate the total number of compound evolve CO_2 gas on heating ?

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

(e) 
(f) 
(g) 
(h) 

(i) 
(j) 
(k) 

Q.47 (i)

(ii) Ph – OH + $NaNH_2$ → B(gas)

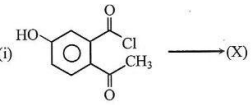
(iii) Ph – OH + NaH → C(gas)

(iv) Ph – OH + Na → D(gas)

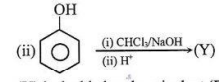
(Sum of molecular weight of A + B + C + D = ?)

Q.48 $C_{10}H_{14} \xrightarrow[(having\ 1-benzene\ ring)]{KMnO_4,H^+}$ Dicarboxylic acid

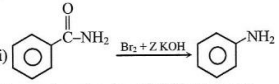
How many isomers (excluding stereoisomer) of $C_{10}H_{14}$ gives dicarboxylic acid when reacts with hot acidic $KMnO_4$.

Q.49 (i)  → (X)

(X) is moles of grignard reagent consumed.

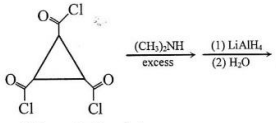
(ii) 

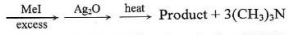
(Y) is double bond equivalent (DBE) of product

(iii) 

(Z) is number of moles of KOH consumed

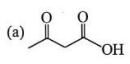
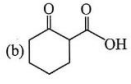
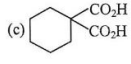
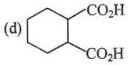
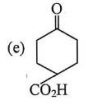
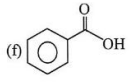
So, the value of (X + Y + Z) – 7 will be.

Q.50 



Calculate the double bond equivalent (DBE) value of the final product ?

Q.51 Calculate the total number of compound evolve CO_2 gas on heating ?

(a) 
(b) 
(c) 
(d) 
(e) 
(f) 
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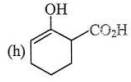
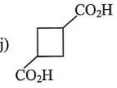
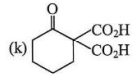
(h) 
(i) 
(j) 
(k) 

ANSWER KEY

Single Correct Option type Questions

1. (B)	**2.** (A)	**3.** (A)	**4.** (A)	**5.** (C)	**6.** (B)	**7.** (B)
8. (C)	**9.** (C)	**10.** (D)	**11.** (A)	**12.** (B)	**13.** (C)	**17.** (C)
15. (B)	**16.** (C)					

Multiple Correct Option type Questions

17. (B,C,D)	**18.** (A,C,D)	**19.** (A,C)	**20.** (B,C,D)	**21.** (A,B,C,D)	**22.** (C,D)	**23.** (B,D)
24. (B,C,D)	**25.** (A,B,C)	**26.** (A,B,D)	**27.** (A,D)	**28.** (A,B,C)	**29.** (A,B,C)	

Passage Based Questions

30. (D)	**31.** (A)	**32.** (D)	**33.** (C)	**34.** (C)	**35.** (C)	**36.** (D)

Column Matching Type Questions

37. [**A** → P,S; **B** → Q,S; **C** → P,S; **D** → R]

38. [**A** → S; **B** → Q; **C** → P; **D** → P,R]

Numeric Response Type Questions

39. (3)	**40.** (3)	**41.** (3)	**42.** (4)	**43.** (2)	**44.** (6)	**45.** (2)
46. (5)	**47.** (65)	**48.** (9)	**49.** (6)	**50.** (4)	**51.** (5)	