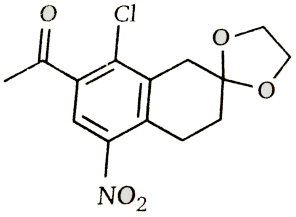
CHEMISTRY

BOOKS - MS CHOUHAN CHEMISTRY (HINGLISH)

ALDEHYDES AND KETONES

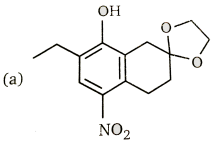
Exercise

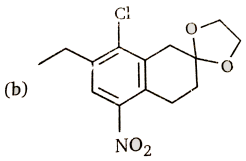
1. Match the following columns

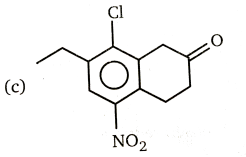


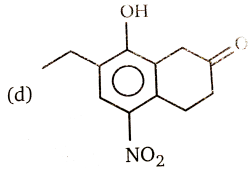
$\xrightarrow[\text{(Wolff-Kishner reduction)}]{N_2H_4/KOH/H_2O}$ (A) ; Product A is :
major

A. (a)



B. 

C. 

D. 

Answer: A

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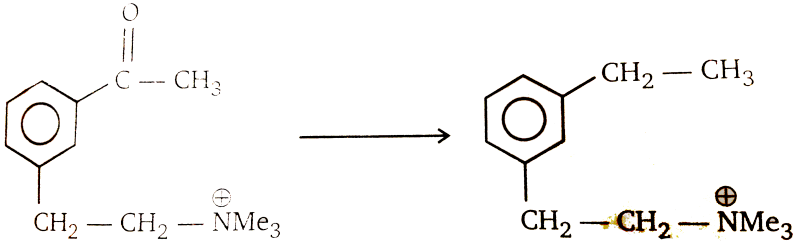
2. 

Above conversion can be achieved by :

A. Wolf-Kishner reduction

B. Clemmensen reduction

C. $LiAlH_4$

D. $NaBH_4$

Answer: B

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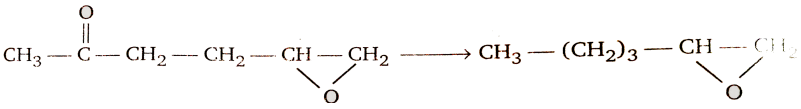
3. 

Above conversion can be achieved by :

A. Wolf-Kishner reduction

B. Clemmensen reduction

C. $HS-CH_2-CH_2-SH$, following by Raney Ni

D. None of these

Answer: D

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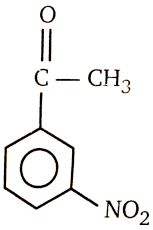
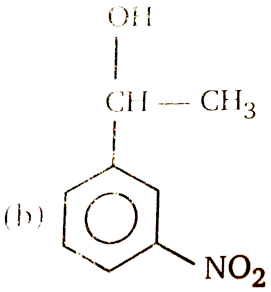
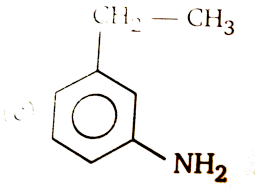
4.  $\xrightarrow[HCl]{Zn(Hg)}$; Product of the Clemmensen reduction is :

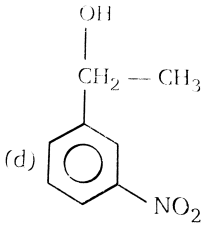
Product of the Clemmensen reduction is :

A. z

B. 

C. 

D.



Answer: C

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5.

$$CH_3 - \overset{O}{\overset{||}{C}}H - CH_2 - CH_2 - \overset{O}{\overset{||}{C}} - CH_3 \rightarrow CH_3 - \overset{OH}{\overset{|}{C}}H - (CH_2)_3 - CH_3$$

Above conversion can be achieved by :

A. Wolf-Kishner reduction

B. Clemmensen reduction

C. $LiAIH_4$

D. $NaBH_4$

Answer: A

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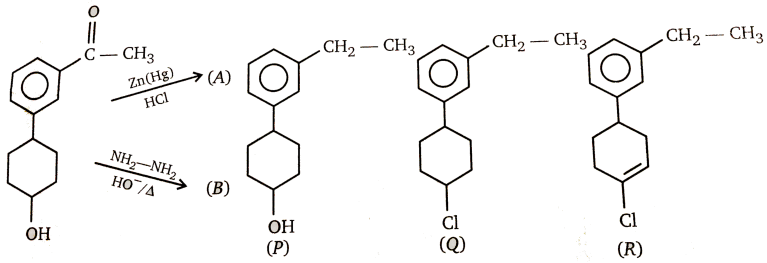
6.



Identify product (A) & (B) from the given product P , Q , R :

A. A=P , B=Q

B. A=Q , B=R

C. A= Q , B=P

D. A= R , B= P

Answer: C

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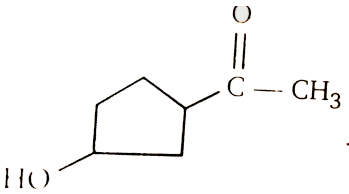
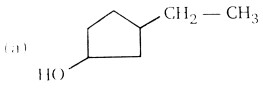
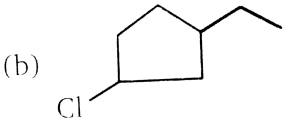
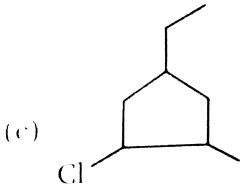


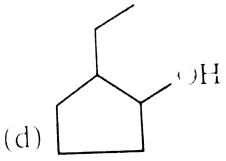
7.

(A) , Identify the A .

A. 

B. 

C. 

D. 

Answer: B

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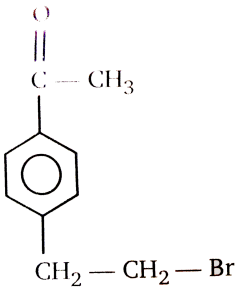
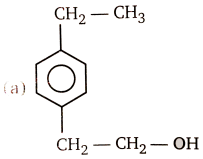
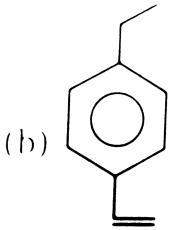
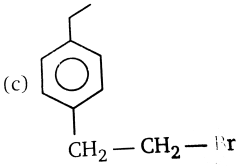
8. 

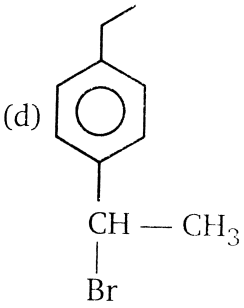
$\xrightarrow[\text{(Wolff-Kishner reduction)}]{N_2H_4 \atop HO^-, \Delta}$ (A) ; Product (A) is :

(A) , Product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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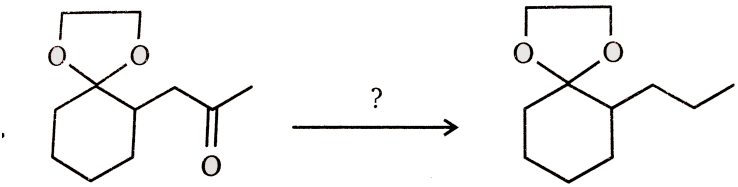
9. 

Above conversion can be carried out by :

A. Clemmensen reduction

B. Wloff-Kishner reduction

C. $LiAIH_4$

D. $NaBH_4$

Answer: B

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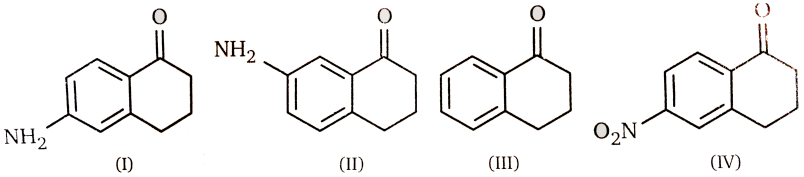
10. Increasing order of equilibrium constants for the formation of a hydrate :



A. $IV < III < II < I$

B. $IV < III < I < II$

C. $I < II < III < IV$

D. $II < III < I < IV$

Answer: C

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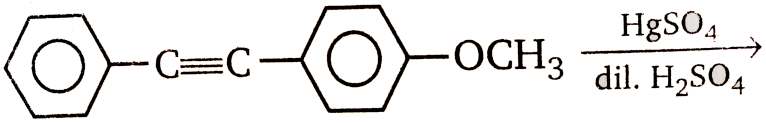
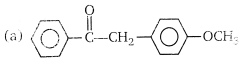
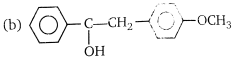
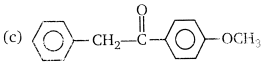


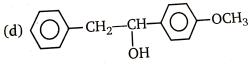
11.

Product (A) is :

A. 

B. 

C. 

D. 

Answer: C

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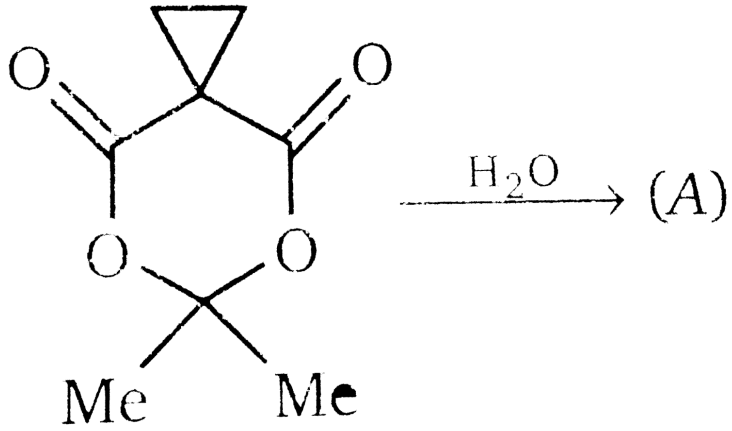
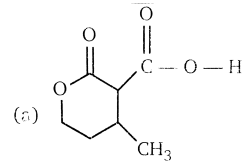
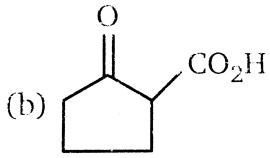
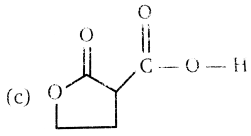
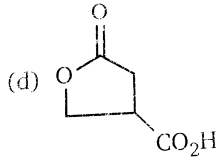
12. 

Predict the product of hydrolysis of the above molecule .

A. 

B. 

C. 

D. 

Answer: C

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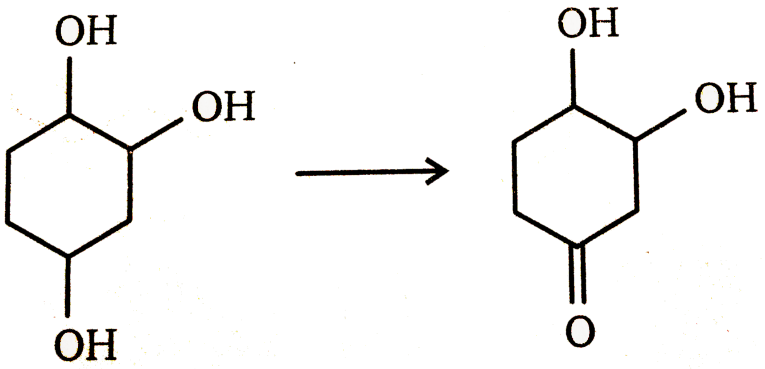
13.



This conversion can be achieved by :

A. $Me_2C\frac{\emptyset}{H^+}, H_3O^{\oplus}, KMnO_4/HO^-$

B. $Me_2C\frac{\emptyset}{H^+}, KMnO_4, H_3O^{\oplus}$

C. $KMnO_4/NaO_4, Me_2CO/H^+, H_3O$

D. $KMnO_4/NaIO_4, H_3O^+, Me_2CO/H^+$

Answer: B

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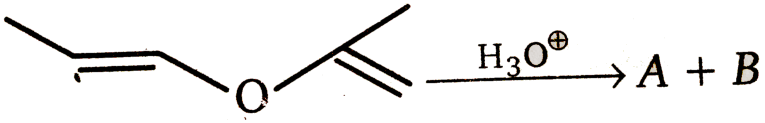
14. 

$\xrightarrow{H_3O^{\oplus}} A + B$. Compound (A) & (B) can be differentiated by :

A. 2-4 DNP

B. Fehling solution

C. Lucas reagent

D. $NaHSO_3$

Answer: B

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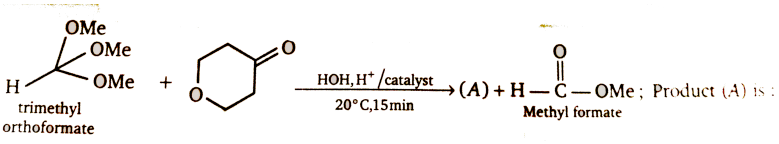
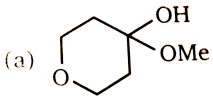
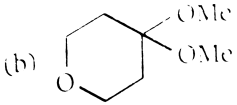
15. 

$\xrightarrow[20^{\circ}C, 15\text{min}]{HOH, H^{+}/\text{catalyst}} (A) + H - \underset{\text{Methyl formate}}{\overset{O}{\overset{||}{C}} - OMe}$, Product (A) is :

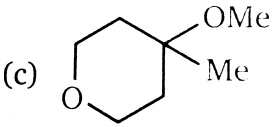
A.



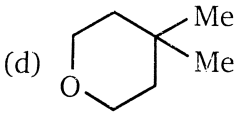
B.



C.



D.



Answer: B

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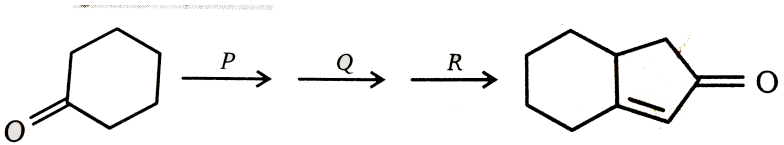
16.



Reagents to carry out above conversion , P ,Q, R respectively are :

A. $H_2C = CH - CH_2 - Br, \left(HO^{\ominus}\right), \left[HO^{\ominus}, \Delta\right]$, Wacker-process

B. $H_2C = CH - CH_2 - Br, \left(HO^{\ominus}\right)$, Wacker-process , $HO^{\ominus}, \Delta$

C. wacker process , $H_2C = CH - CH_2 - Br\left(HO^{\ominus}\right), HO^{\ominus}(\Delta)$

D. Wacker process , $HO^{\ominus}(\Delta), H_2C = CH - CH_2 - Br\left(HO^{\ominus}\right)$

Answer: B

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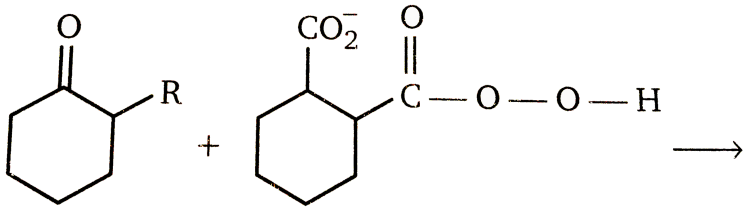
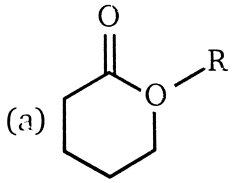
17.

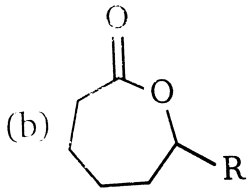


Above reaction is a Baeyer Villiger rearrangement of an asymmetric ketone with magnesium mono peroxo pthalate hexahydrate (in the drawing , Mg^{+2} is omitted for clearity) identify major product .

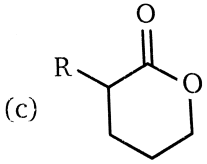
A.



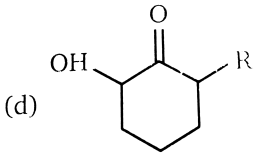
B.



C.



D.



Answer: B

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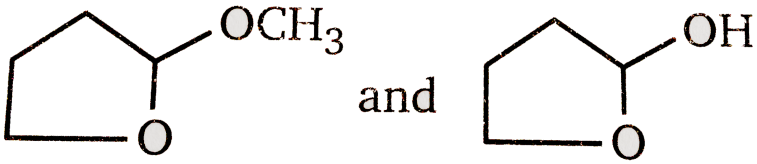

18.

Above compounds can be differentiated by following reagent :

A. 2-4 DNP

B. Tollen's reagent

C. Lucas reagent

D. $NaHSO_3$

Answer: B

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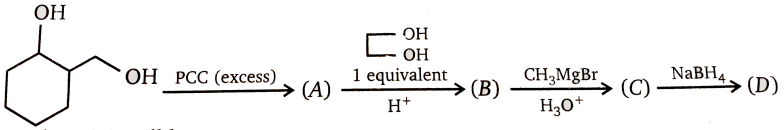
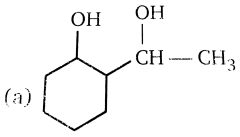


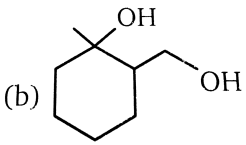
19. Product (D) will be :

Product (D) will be :

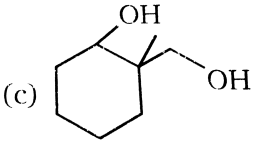
A.



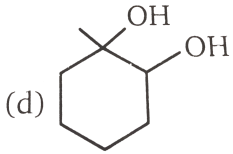
B.



C.



D.



Answer: B

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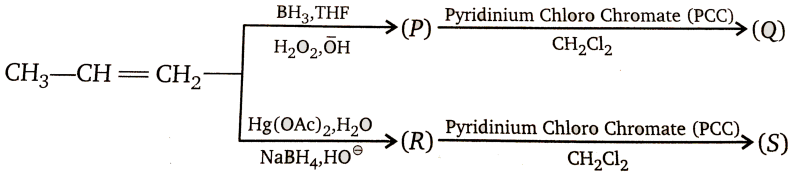
20.



Relationship between products (Q) and (S) is :

A. Positional isomer

B. Chain isomer

C. Stereoisomer

D. Functional isomer

Answer: D

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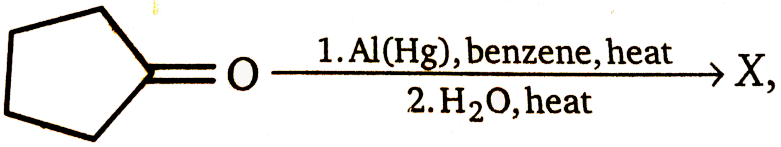
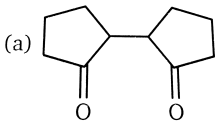
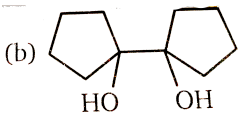
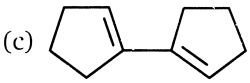
21. In the reaction ,

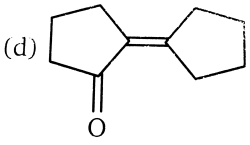


the product (X) is :

A. 

B. 

C. 

D. 

Answer: B

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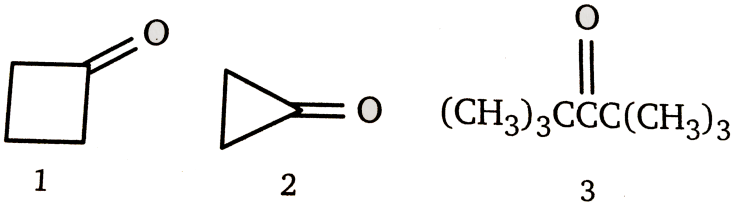
22. Rank the following in order of increasing value of the equilibrium constant for hydration , $K_{\text{hyd.}}$ (smallest value first) .



1 2 3

A. $1 < 2 < 3$

B. $3 < 1 < 2$

C. $2 < 1 < 3$

D. $2 < 3 < 1$

Answer: B

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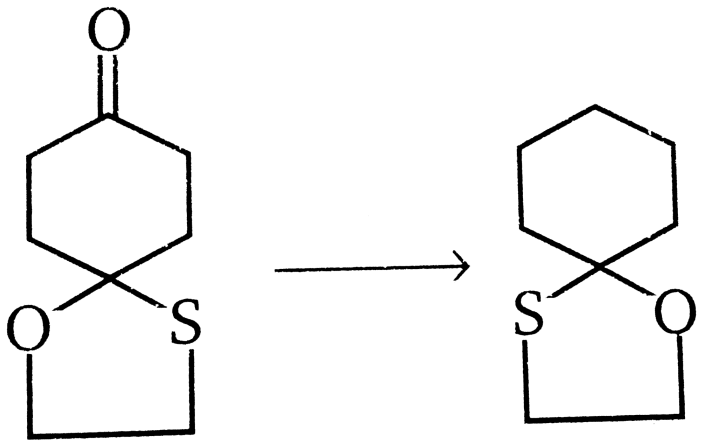

23.

Above conversion can be achieved by :

A. Zn(Hg) , HCl

B. $NH_2 - NH_2 / KOH / \Delta$

C. $LiAlH_4$

D. H_2 / Ni

Answer: B

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24. Which sequence represents the best synthesis of hexanal ?

$$\underset{\text{Hexanal}}{CH_3CH_2CH_2\,CH_2\,CH_2CH=O}$$

A. 1. $CH_3CH_2CH_2CH_2Br + NaC \equiv CH$

2. H_2O, H_2SO_4, $HgSO_4$

B. 1. $CH_3CH_2CH_2CH=CH_2 + CH_3\overset{\overset{O}{||}}{C}OOH$

2. CH_3MgBr , diethyl ether

3. H_3O^+

4. $P\mathbb{C}$, CH_2Cl_2

C. 1. $CH_3CH_2CH_2CH_2\overset{\overset{O}{||}}{C}CH_3$

2. $CH_3\overset{\overset{O}{||}}{C}OOH$ 3. $LiAlH_4$

H_2O 5. $P\mathbb{C}$, CH_2Cl_2

D. (d) 1. $CH_3CH_2CH_2CH_2MgBr + H_2C\text{—}CH_2$ (O)

Answer: D

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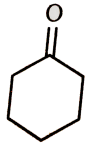
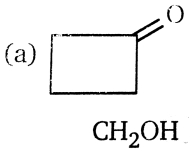
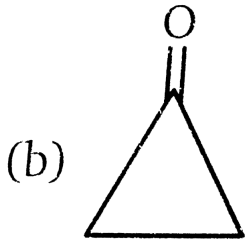
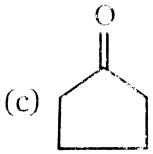
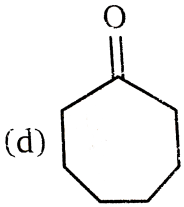
25.  $\xrightarrow{HNO_3}(A)\xrightarrow{Ca(OH)_2}(B)$, Product (B) in this reaction is :

Product (B) in this reaction is :

A. 

B. 

C. 

D. 

Answer: C

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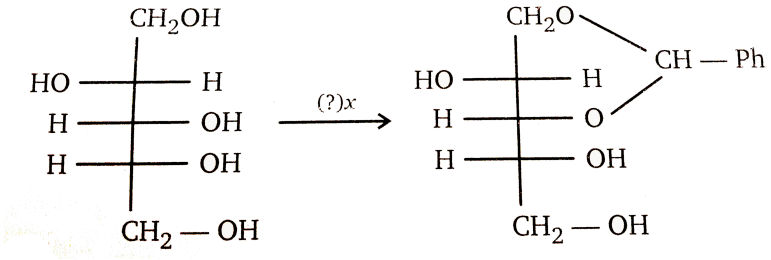
26.



Compound (x) in the above reaction is :

A. $Ph - \overset{O}{\overset{||}{C}} - CH_3$

B. $Ph - \overset{O}{\overset{||}{C}} - H$

C. $Ph - CH_2 - \overset{O}{\overset{||}{C}} - H$

D. $Ph - CH_2 - \overset{O}{\overset{||}{C}} - CH_3$

Answer: B

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27. $Ph - \overset{\overset{O}{||}}{C} - CH_3 \xrightarrow[HCl]{NaNO_2} (A) \xrightarrow[\text{heat}]{AC_2O} (B) \xrightarrow{H_3O^+} (C)$

Product (C) of the above reaction is :

A. $Ph - CO_2H$

B. $Ph - \overset{\overset{O}{||}}{C} - CO_2H$

C. $Ph - \overset{\overset{O}{||}}{C} - \overset{\overset{O}{||}}{C} - H$

D. $Ph - \overset{\overset{O}{||}}{C} - CH_2OH$

Answer: B

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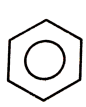
28.  $\xrightarrow[2HCl]{H-\overset{\overset{O}{||}}{C}-H} (A) \xrightarrow{AgNO_2} (B)$; Product (B) of the reaction is :

Product (B) of the reaction is :

A. $Ph - CH_2 - NO_2$

B. $Ph - CH_2 - ONO$

C. $Ph - CHO$

D. $Ph - O - N = O$

Answer: A

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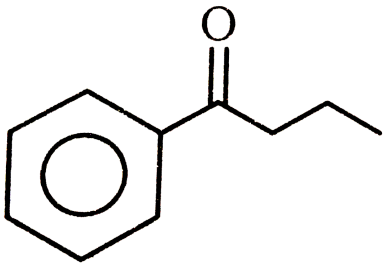
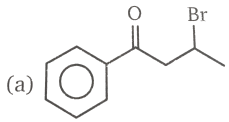


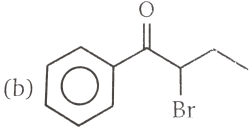
$\xrightarrow[0.75 \text{ mole } \%,\ AlCl_3\ Et_2O]{Br_2} (A)\ ;\ (100\%)$

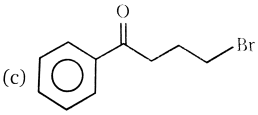
29.

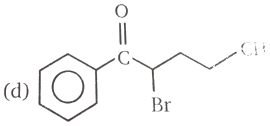
Product (A) of the above reaction is (bromination occur not in the benzene ring):

A.



B. 

C. 

D. 

Answer: B

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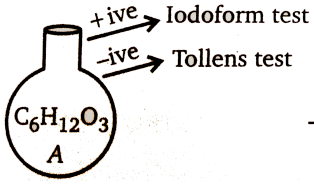
30. 

$\xrightarrow[\text{drop of } H_2SO_4]{H_2O}$ Positive Tollens test

$\xrightarrow[\text{drop of } H_2SO_4]{H_2O}$ Positive Tollens test

Compound (A) is :

A. $CH_3 - \overset{\overset{O}{\|}}{C} - \underset{\underset{OCH_3}{|}}{CH} - \underset{\underset{OCH_3}{|}}{CH_2}$

B. $CH_3 - \overset{\overset{O}{\|}}{C} - \overset{\overset{OCH_3}{|}}{\underset{\underset{OCH_3}{|}}{C}} - CH_3$

C. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - \underset{\underset{OCH_3}{|}}{CH} - OCH_3$

D. $H - \overset{\overset{O}{\|}}{C} - CH_2 - CH_2 - \underset{\underset{OCH_3}{|}}{CH} - OCH_3$

Answer: C

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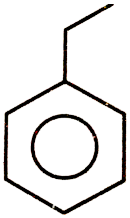
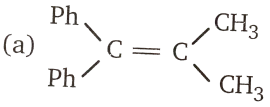
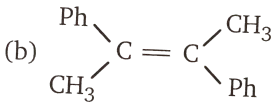
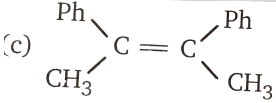
31. $\underset{(A)}{C_{16}H_{16}} \xrightarrow{O_3} \underset{C_8H_8O}{(B)} \xrightarrow[HO^-/\Delta]{NH_2-NH_2}$  ;

Reactant (A) in this reaction is :

A. (a) 

B. (b) 

(c) 

C.

D. both (b) and (c)

Answer: D

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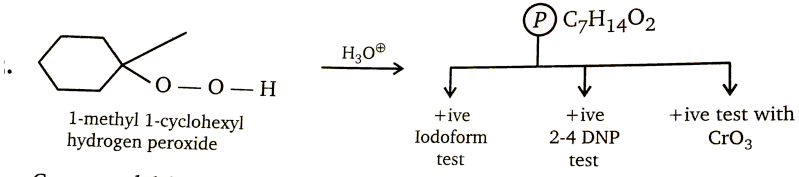
32.



Compound (P) is :

Compound (P) is :

A. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - CH_2 - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_3$

B. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - \underset{\underset{OH}{|}}{CH} - CH_2 - CH_2 - CH_3$

C. $CH_3 - \overset{\overset{O}{\|}}{C} - CH_2 - CH_2 - CH_2 - CH_2 - CH_2 - OH$

D. $CH_3 - \overset{\overset{O}{\|}}{C} - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_3}{|}}{\overset{\overset{OH}{|}}{C}} - CH_3$

Answer: C

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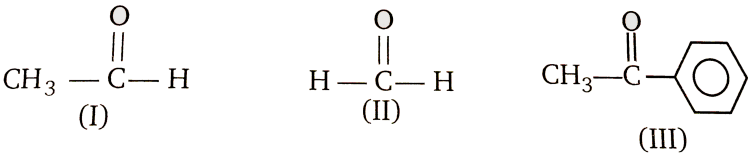
33. Correct order of reactivity of following compounds towards Grignard reagent ?



A. $I > II > III$

B. $II > I > III$

C. $II > III > I$

D. $I > III > II$

Answer: B

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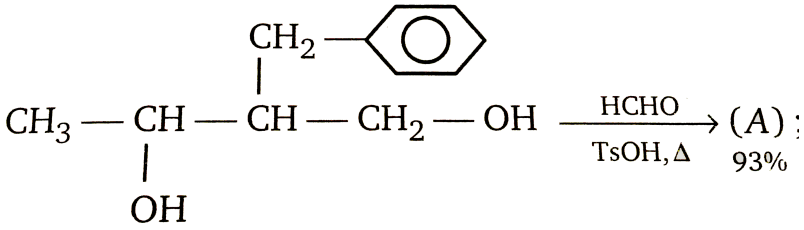
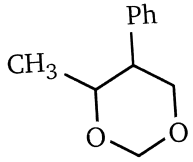


34.

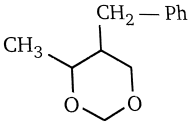
Product (A) is :

(a)



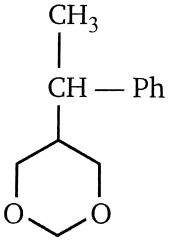
A.

(b)



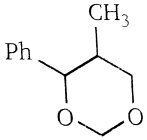
B.

(c)



C.

(d)



D.

Answer: B

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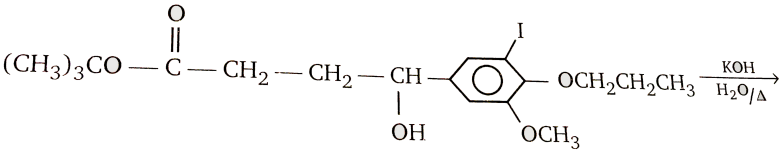
35.



Total number of products obtained in above reaction is :

A. 2

B. 3

C. 4

D. 5

Answer: A

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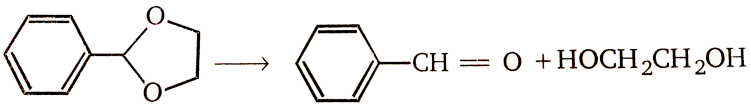
36. What reagent and /or reaction conditions would you choose to bring about the following conversion ?



A. 1. $LiAlH_4$, 2. H_2O

B. H_2O, H_2SO_4 , heat

C. H_2O, $NaOH$, heat

D. $P\mathbb{C}$, CH_2Cl_2

Answer: B

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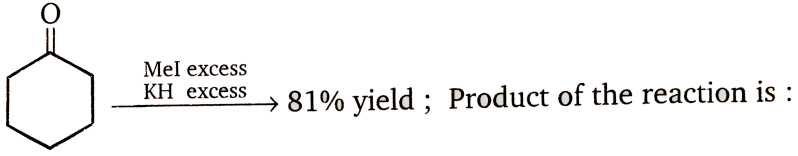
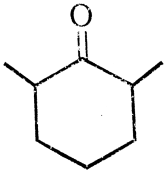
37.

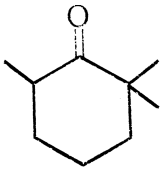


81 % yield , Product of the reaction is :

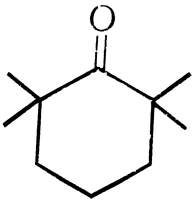
A. (a)



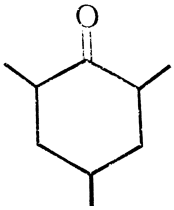
B. (b)



C. (c)



D. (d)



Answer: C

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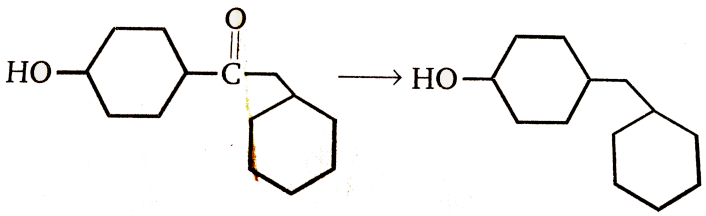

38.

The above reduction can be best carried out by :

A. Clemmensen reduction

B. Wolff-Kishner reduction

C. $NaBH_4$

D. None of these

Answer: D

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39. $CH_3 - C \equiv CH \xrightarrow[\text{dil.}H_2SO_4]{HgSO_4} (A)$

$CH_3 - C \equiv CH \xrightarrow[(2)\,H_2O_2/HO^-]{(1)\,BH_3.THF} (B)$

Product (A) and (B) is differentiated by :

A. 2-4 DNP

B. NaOI

C. Na-metal

D. $NaHSO_3$

Answer: B

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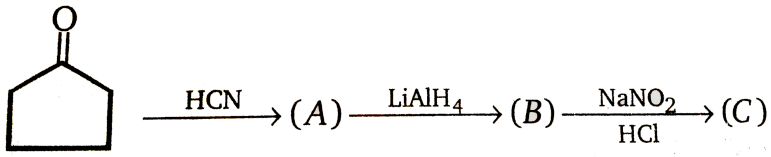
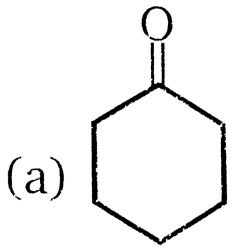
40.

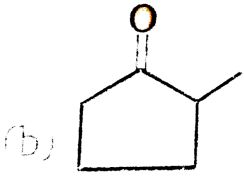


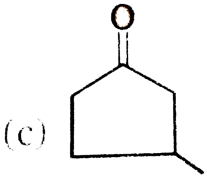
$\xrightarrow{HCN}(A)\xrightarrow{LiAlH_4}(B)\xrightarrow[HCl]{NaNO_2}(C)$

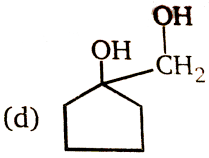
End product (C) in above reaction is :

A.



B. 

C. 

D. 

Answer: A

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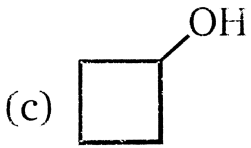
41. Compound (X)C_4H_8O , which reacts with 2,4-DNP derivative and gives negative haloform test is :

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

B. $CH_3 - \underset{\underset{CH_3}{|}}{CH} - CHO$

C. 

D. $CH_3 - CH_2 - \overset{OH}{\overset{|}{C}}H - CH_3$

Answer: B

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42. When a nucleophile encounters a ketone , the site of attack is :

A. the carbon atom of the carbonyl

B. the oxygen atom of the carbonyl

C. both the carbon and oxygen atoms , with equal probability

D. no attack occurs as ketones do not react with nucleophiles

Answer: A

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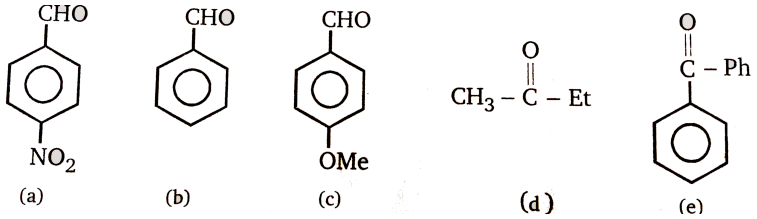
43. The correct order of rate of reaction toward nucleophilic addition reaction :



A. $a > b > c > d > e$

B. $a > b > d > c > e$

C. $a > d > e > b > c$

D. $a > b > e > d > c$

Answer: A

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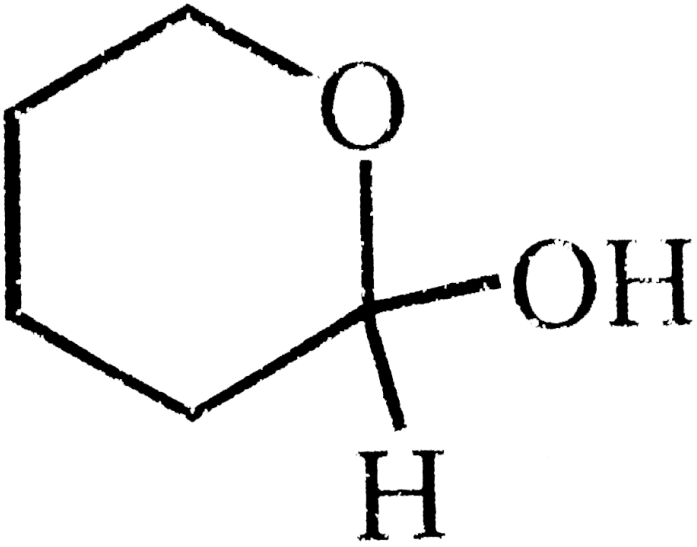
44. The structure



would be best classified as a(an) :

A. Acetal

B. hemiacetal

C. Hydrate

D. Cyanohydrin

Answer: B

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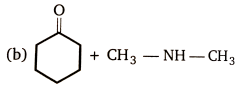
45. Which of the following pairs of reactants is most effective in forming an enamine ?

A. $CH_3CH_2\overset{O}{\overset{||}{C}}H + \left[(CH_3)_2CH\right]_2NH$

B. 

C. $(CH_3)_3C\overset{O}{\overset{||}{C}}H + (CH_3)_2NH$

D. None of these form an enamine .

Answer: B

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46. The reaction of $C_6H_5CH = CHCHO$ with $LiAlH_4$ gives :

A. $C_6H_5CH_2CH_2CH_2OH$

B. $C_6H_5CH = CHCH_2OH$

C. $C_6H_5CH_2CH_2CHO$

D. $C_6H_5CH_2CHOHCH_3$

Answer: A

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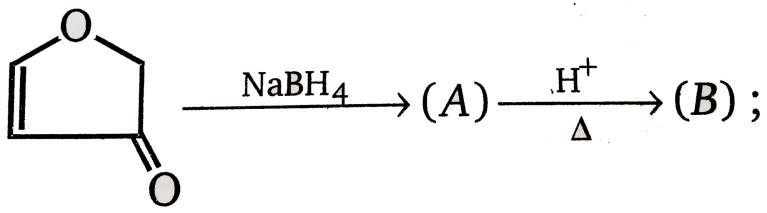
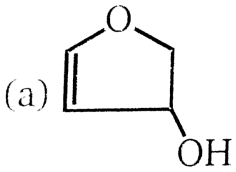
47.

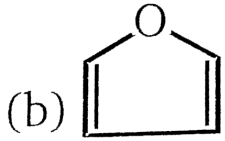


Product (B) of the reaction is :

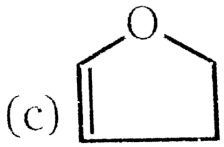
A.



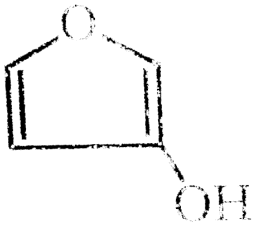
B.



C.



D.



Answer: B

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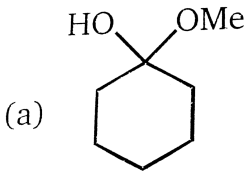
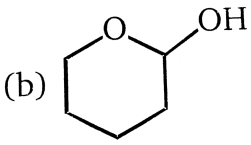
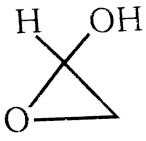
48. Which of following compound is hemiacetal ?

A.



B.



C. (c) 

D. all of these

Answer: D

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49. $Ph - CH_2 - C \equiv N \xrightarrow[THF]{LDA} \xrightarrow{CH_3I} 71\,\%$, Find product of the reaction will be :

A. $Ph - CH_2 - CH_2 - NH_2$

B. $Ph - CH_2 - NH_2$

C. $Ph - \underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}} - C \equiv N$

D. $Ph - CH = C = N - CH_3$

Answer: C

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50. $Ph - CH = CH - \overset{\overset{O}{||}}{C} - CH_3 \rightarrow Ph - CH = CH - CO_2H$

Above conversion can be achieved by :

A. $KMnO_4$, Δ followed by H^+

B. $I_2 / NaOH$ followed by H^+

C. H_2 / Pt

D. $LiAiH_4$

Answer: B

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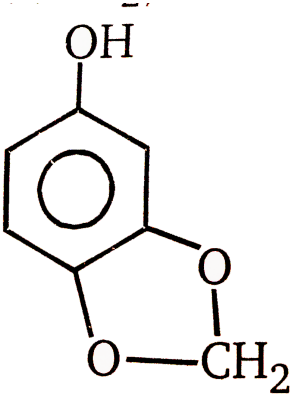
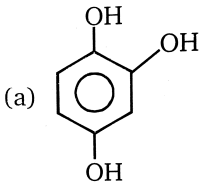
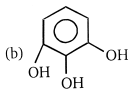
51. 

$\xrightarrow{H_3O^{\oplus}}$ Products ;

$\xrightarrow{H_3O^{\oplus}}$ Products , Product of the reaction is/are :

(a) 

A.

B. (b)  (c) HCHO

C. HCHO

D. Both (a) and (c)

Answer: D

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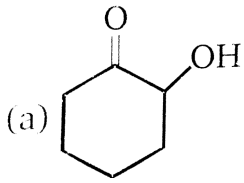
52.

Product (A) of the reaction is :

A. 

B.

C.

D.

Answer: B

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53.

Product (C) of the reaction is :

A.

B.

C. 

D. 

Answer: B

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54. 

Product (A) of the reaction will be :

A. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

B. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

C. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

D. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

Answer: C

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55. $R-\overset{\overset{O}{||}}{C}-H \xrightarrow{R-NH_2} R-CH=N-R$. This reaction gives best yield at :

A. pH 1-2

B. pH 4-5

C. pH 10-11

D. pH 13-14

Answer: B

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56. An aromatic compound A of the molecular formula $C_8H_{10}O$ on reaction with iodine and dilute NaOH gives a yellow precipitate . The structure of the compound is expected to be:

A. 

B. $C_6H_5CHOHCH_3$

C. 

D. 

Answer: B

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57. Compound A (molecular formula C_3H_8O) is treated with acidified potassium dichromate to form a product B (molecular formula C_3H_6O) . B forms a shining silver mirror on warming with ammonical silver nitrate , B when treated with an aqueous solution of $NH_2NHCONH_2$ and sodium acetate gives a product C . identify the structure of C .

A. $CH_3CH_2CH = NNHCONH_2$

B. $CH_3\underset{\underset{CH_3}{|}}{C} = NHHCONH_2$

C. $CH_3\underset{\underset{CH_3}{|}}{C} = NCONHNH_2$

D. $CH_3CH_2CH = NCONHNH_2$

Answer: A

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58. In the reaction , the acid obtained will be :

$$CH_3CHO + HCN \rightarrow CH_3CH(OH)Cn \xrightarrow{H-OH} CH_3CH(OH)COOH$$

A. D-isomer

B. L-isomer

C. $(80\,\%\,D + 20\,\%\,L)$ mixture

D. (50%D + 50%L) mixture

Answer: D

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59. In the following sequence :

$$CH_3CH_2Cl \xrightarrow{NaCN} (i) \xrightarrow{Ni\,/\,H_2} (ii) \xrightarrow{\text{acetic anhydride}}$$ (iii) , Product (iii) is :

A. $CH_3CH_2CH_2NH_2$

B. $CH_3CH_2CH_2CONHCH_3$

C. $CH_3CH_2CH_2NHCOCH_3$

D. $CH_3CH_2CH_2CONHCOCH_3$

Answer: C

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60. 

Product (G) is :

A. 

B. 

C. 

D. 

Answer: C

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61. Carbonyl compounds can generally be converted to hydrocarbons by :

A. H_2 / Pt

B. $LiAlH_4$

C. $N_2H_4 - KOH / \Delta$

D. $K_2Cr_2O_7 - H_2SO_4$

Answer: C

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62. 

Product (A) is :

A. 

B. 

C. 

D. 

Answer: A

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63. Which statement about the aldol condensation is correct ?

A. A lewis acid is commonly used as a catalyst

B. The initial step is probably the formation of a carbanion

C. A Lewis base is employed to induce carbocation formation

D. The carbon chain is lengthened through the elimination of 1 mole of water

Answer: B

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64. A compound gives a positive test with $I_2/NaOH$ and is extracted from benzene by saturated $NaHSO_3$. It may be :

A. $CH_3(CH_2)_4CHO$

B. $CH_3(CH_2)_3COCH_3$

C. $CH_3CH_2COCH_2CH_3$

D. $CH_3(CH_2)_4CH_2OH$

Answer: B

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65. Which of the following compounds reaction with excess CH_3MgBr and subsequent hydrolysis will give a tertiary alcohol ?

A. C_2H_5CHO

B. $C_2H_5CO_2CH_3$

C. C_2H_5COOH

D. 

Answer: B

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66. 

Reactant (A) and (B) is :

A. $Ph - CH_2 - CH = O + NH_2 - OH$

B. $Ph - CH = O + NH_2 - OH$

C. $Ph - \overset{\overset{O}{||}}{C} - CH_3 + NH_2 - NH_2$

D. $Ph - \overset{\overset{O}{||}}{C} - CH_3 + NH_2 - OH$

Answer: D

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67. $CH_3 - \overset{O}{\overset{||}{C}} - OH \xrightarrow[\Delta]{Ca(OH)_2} (A)$

Product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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68. Which of the following does not form a stable hydrate on addition of H_2O ?

A. $Ph - \overset{O}{\overset{||}{C}} - \overset{O}{\overset{||}{C}} - \overset{O}{\overset{||}{C}} - \ - \ Ph$

B. 

C. 

D. 

Answer: D

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69. Consider the following sequence of reactions .

The ketone (A) is :

A. 

B. 

C. 

D. 

Answer: B

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70. In the reaction ,

the product (X) is :

A. 

B. 

C. 

D. 

Answer: C

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71. The conversion of acetophenone into benzoic acid can be achieved by its reaction with :

A. sodium hydroxide followed by acidification

B. iodine and sodium hydroxide , followed by acidification

C. hydrooxylamine followed by reaction with H_2SO_4

D. m-chloroperoxobenzoic acid

Answer: B

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72. In which of the following compounds the methylenic hydrogens the most acidic ?

A. $CH_3COCH_2CH_3$

B. $CH_3CH_2COOC_2H_5$

C. $CH_3CH_2CH(COOC_2H_5)_2$

D. CH_3COCH_2CN

Answer: D

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73. Which is the major product of the following reaction ?

A. 

B. 

C. 

D. 

Answer: D

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74. $Ph-\overset{\overset{O}{||}}{C}-OH \xrightarrow{SOCl_2} (A) \xrightarrow[Pd-BaSO_4]{H_2} (B)$

Product (B) is:

A. $Ph-\overset{\overset{O}{||}}{C}-H$

B. $Ph - CH_2 - OH$

C. $Ph - CH_2 - Cl$

D. $Ph - CH = CH_2$

Answer: A

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75. The presence of unsaturation in organic compounds can be tested with :

A. Schiff's reagent

B. Tollen's reagent

C. Fehling's reagent

D. Baeyer's reagent

Answer: D

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76. Which of the following gives iodoform test ?

A. CH_3CH_2OH

B. C_2H_5CHO

C. $(CH_2OH)_2$

D. None of these

Answer: A

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77. Which of the following β-keto carboxylic acid does not undergo decarboxylation on heating ?

A. 

B. 

C. 

D. None of these

Answer: A

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78.

$$HOCH_2CH_2CH_2-\overset{\overset{O}{||}}{C}-OCH_2CH_3 \xrightarrow{PCC} (A) \xrightarrow[(\text{1molar equivalent})]{H_2C=CHMgBr} (B) \xrightarrow{NH_4}$$

Product (D) is :

A. 

B. $H_2C=CH-CH_2-\underset{\underset{OH}{|}}{C}-CO_2H$

C. $H_2C=CH-\underset{\underset{OH}{|}}{C}-CH_2-\overset{\overset{O}{||}}{C}-O-\overset{\overset{O}{||}}{C}-CH_3$

D. $H_2C=CH-CH_2-\underset{\underset{OH}{|}}{CH}-CH_2-\overset{\overset{O}{||}}{C}-O-H$

Answer: A

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79. The compound shown in the below undergoes racemization on reaction with aqueous acid .

Which of the following structures best represents the intermediate responsible for this process ?

A. 

B. 

C. 

D. 

Answer: C

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80. The final product of the following sequence of reaction is :

$$(CH_3O)_2CHCH_2CH_2CH_2Br \xrightarrow{Mg} \xrightarrow{H_2C=O} \xrightarrow[\text{heat}]{H_3O^+}$$

A. $CH_3O\overset{\overset{O}{||}}{C}CH_2CH_2CH_2CH_2OH$

B. $CH_3\overset{\overset{O}{||}}{C}CH_2CH_2CH_2CH_2OH$

C. $H\overset{\overset{O}{||}}{C}CH_2CH_2CH_2CH_2OH$

D. $H\overset{\overset{O}{||}}{C}CH_2CH_2CH_2\overset{\overset{O}{||}}{C}H$

Answer: C

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81. The amino ketone shown below undergoes a spontaneous cyclization on standing . What is the major product of this intramolecular reaction ?

A. 

B. 

C. 

D. 

Answer: D

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82. Compound (A)$C_6H_{12}O$ is optically active . Compound (A) give negative Tollens test and positive test with 2-4-di-nitro phenyl hydrazine . Identify A.

A. $CH_3-\overset{\overset{O}{||}}{C}-CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_3$

B. $CH_3-\overset{\overset{O}{||}}{C}-\underset{\underset{CH_2-CH_3}{|}}{CH}-CH_3$

C. $H-\overset{\overset{O}{||}}{C}-CH_2-\underset{\underset{CH_2-CH_3}{|}}{CH}-CH_3$

D. $CH_3-\overset{\overset{O}{||}}{C}-CH_2-CH_2-CH_2-CH_3$

Answer: B

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83. 

Product (A) of the reaction is :

A. 

B. 

C. 

D. 

Answer: B

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84. 

Product (Q) will be :

A. 

B. 

C. 

D. 

Answer: B

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85. $Ph - CH_3 \xrightarrow{CrO_2Cl_2} (A) \xrightarrow{\text{conc.}KOH} Ph - CH_2OH + (B)$

Product (B) of above the reaction is :

A. $Ph - CO_2H$

B. $Ph - CO_2^-$

C. $Ph - CHO$

D. $Ph - CH_3$

Answer: B

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86. 

$\xrightarrow[(ii)\,H^+]{(i)\,KCN}$ Product , Product obtained in the reaction is :

A. Diastereomer

B. Racemic

C. Meso

D. Optically pure enantiomer

Answer: A

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87. 

$\xrightarrow{NH_2OH}(A)\xrightarrow{H^+}(B)\xrightarrow{LAH}(C)$, Product(C) of the reaction is :

A. 

B. 

C. 

D. 

Answer: B

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88. 

Product (A) and (C) is :

A. 

B. 

C. 

D. 

Answer: C

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89. $Ph - \overset{\overset{OH}{|}}{CH} - CH_3 \xrightarrow{PCC} (A) \xrightarrow{NH_2 - NH - \overset{\overset{O}{||}}{C} - NH_2} (B)$

Product (B) is :

A. $Ph - \overset{\overset{CH_3}{|}}{C} = N - \overset{\overset{O}{||}}{C} - NH - NH_2$

B. $Ph - \underset{\underset{CH_3}{|}}{C} = N - NH - \overset{\overset{O}{||}}{C} - NH_2$

C. $Ph - CH = N - \underset{\underset{CH_3}{|}}{N} - \overset{\overset{O}{||}}{C} - NH_2$

D. $Ph - CH = N - \overset{\overset{O}{||}}{C} - NH_2$

Answer: B

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90. 

Product (P) is :

A. Hemiacetal

B. Acetal

C. Alcohol

D. Alkane

Answer: B

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91. 

Product of rearrangement is :

A. 

B. 

C. 

D. 

Answer: C

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92. 

The correct order of decreasing value of K_{eq} is :

A. $a > b > c > d$

B. $d > a > b > c$

C. $d > b > a > c$

D. $d > a > c > d$

Answer: B

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93. Product (B) of the given reactions is :

A. 

B. 

C. 

D. 

Answer: B

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94. End product (C) of the reaction is :

A. 

B. 

C. 

D. 

Answer: B

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95. 

Compound (A) will be :

A. $Ph - C \equiv C - C \equiv C - CHO$

B. $Ph - C \equiv C - CH = CH - CHO$

C. $Ph - CH = CH - C \equiv C - CHO$

D. $Ph - CH = CH - C = CH - CO_2H$

Answer: C

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96. Match the following columns

A. 

B. 

C. 

D. 

Answer: C

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97. Which pair of reactants compounds may be used to make given acetal?

A. 

B. 

C. 

D. 

Answer: D

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98. 

(A) & (B) are isomers , Isomer (B) is :

A. 

B. 

C. 

D. 

Answer: B

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99. 

(A) and (B) is differentiated by :

A. NaH

B. 2-4 DNA

C. Tollen's reagent

D. $NaHSO_3$

Answer: C

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100. Which of the following pairs cannot be differentiated by Tollen's reagent ?

A. Benzaldehyde and benzyl alcohol

B. Hexanal and 2-hexanone

C. 2-Hexanol and 2-hexanone

D. Pentanal and diethyl ether

Answer: C

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101. An optically active compound $C_6H_{12}O$ gives positive test with 2, 4-dinitrophenyl hydrazine , but negative with Tollen's reagent , what is the structure of the compound?

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - CH_2 - CH_3$

B. $H - \overset{\overset{O}{||}}{C} - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_2 - CH_3$

C. $CH_3 - \overset{\overset{O}{||}}{C} - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

D. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - \underset{\underset{CH_3}{|}}{CH} - CH_3$

Answer: C

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102. Compound (A)$C_6H_{12}O_3$, when treated with I_2 in aqueous sodium hydroxide gives yellow precipitate. When A is treated with Tollens reagent

no reaction occur . When A is hydrolysed and then treated with Tollens reagent , a silver mirror is formed in test tube . Compound (A) will be :

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - \underset{\underset{OCH_3}{|}}{CH} - OH$

B. $CH_3 - \overset{\overset{O}{||}}{C} - \underset{\underset{OCH_3}{|}}{\overset{\overset{OCH_3}{|}}{C}} - CH_3$

C. $CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - CH(OCH_3)_2$

D. $H - \overset{\overset{O}{||}}{C} - CH_2 - CH_2 - CH(OCH_3)_2$

Answer: C

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103. $\begin{matrix} CH_2 - CH_2 - CO_2H \\ | \\ CH_2 - CH_2 - CO_2H \end{matrix} \xrightarrow[BaCO_3]{\Delta} A \xrightarrow{NH_2 - NH_2} B \xrightarrow[KOH]{\text{heat}} (C),$

Product (C) obtained is :

A. $CH_3 - CH = CH - CH_2$

B. 

C. 

D. 

Answer: C

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104. Which of following does not react with $NaHSO_3$ (sodium bisulphite)?

A. $CH_3 - \overset{O}{\overset{||}{C}} - H$

B. $CH_3 - \overset{O}{\overset{||}{C}} - Et$

C. $Et - \overset{O}{\overset{||}{C}} - Et$

D. $Ph - CH_2 - \overset{O}{\overset{||}{C}} - CH_3$

Answer: C

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105. 

Product (A) is :

A. 

B. 

C. 

D. 

Answer: C

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106. 

Product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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107. 

Product (B) in this reaction is :

A. 

B. 

C. 

D. 

Answer: A

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108. 

Arrange the following reagent in the correct order in which above transformation is carried out :

A. $KOD/D_2O, H^+/\Delta, LiAlH_4$

B. $H^+/\Delta, KOD/D_2O, LiAlH_4$

C. $KOD/D_2O, LiAlH_4, H^+/\Delta$

D. $LiAlH_4, H^+/\Delta, KOD/D_2O$

Answer: C

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109.

$$CH_3 - \overset{O}{\overset{||}{C}} - H \xrightarrow{HCN} (A) \xrightarrow{H_3O^{\oplus}} (B) \underset{\Delta}{\longrightarrow} (C) \xrightarrow{LiAlH_4} (D) \xrightarrow{HIO_4} HCHO$$

+ (E)`

Compound (C) can show geometrical isomerism . Product (E) of the reaction will be :

A. $CH_3 - \overset{\overset{O}{||}}{C} - CH_3$

B. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - H$

C. $CH_3 - CHO$

D. $HCHO$

Answer: C

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110. Arrange in their increasing order of equilibrium constants for hydration ?

A. $A < B < C < D < E$

B. $A < C < B < E < D$

C. $A < C < E < B < D$

D. $C < A < B < E < D$

Answer: B

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111. End product of the following sequence of reactions are :

A. 

B. 

C. 

D. 

Answer: C

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112. $Ph - CH_2 - CN \xrightarrow[(2)\, CH_3 - \overset{\overset{O}{\|}}{C} - Cl \\ (3)\, H_3O^{\oplus} / \Delta]{(1)\, EtONa} (P)$, Product (P) of the reaction will be :

A. $Ph - CH_2 - \overset{\overset{O}{\|}}{C} - H$

B. $Ph - CH_2 - \overset{\overset{O}{\|}}{C} - CH_3$

C. $Ph - \underset{\underset{CH_3}{|}}{CH} - \overset{\overset{O}{\|}}{C} - H$

D. $Ph - \underset{\underset{CH_3}{|}}{CH} - \overset{\overset{O}{\|}}{C} - CH_3$

Answer: B

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113.

Products of the reaction are :

A. Racemic mixture

B. Diastereomers

C. Meso

D. Mixture of meso compound and optically active compound

Answer: B

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114. $(A) \xrightarrow[\text{dil.}H_2SO_4]{HgSO_4} (B) \xrightarrow{LiAlH_4} \underset{\text{recemic mixture}}{(C)}$

$\therefore$ reactant (A) is :

A. $CH_3 - C \equiv CH$

B. $HC \equiv CH$

C. $CH_3 - C \equiv C - CH_3$

D. $Ph - CH = CH_2$

Answer: C

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115. $CH_3CH_2 - \overset{\overset{O}{||}}{C} - CH_3 \xrightarrow[HCl]{NaNO_2}$, Major product of this reaction is :

A. $CH_3\underset{\underset{NO}{|}}{CH} - \overset{\overset{O}{||}}{C} - CH_3$

B. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH = N - OH$

C. $CH_3 - \underset{\underset{N-OH}{||}}{\overset{\overset{O}{||}}{C}} - C - CH_3$

D. $CH_3 - CH_2 - \underset{\underset{N-OH}{||}}{C} - CH_3$

Answer: C

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116. 

Product (A) & (B) are :

A. 

B. 

C. 

D. 

Answer: A

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117. 

Product (B) is :

A. 

B. 

C. 

D. 

Answer: A

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118. 

Product (A) is :

A. 

B. 

C. 

D. 

Answer: A

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119. 

Product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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120. $R-\overset{\overset{O}{||}}{C}-R \underset{(\text{catalyst})}{\overset{HCN}{\rightleftharpoons}} R-\overset{\overset{OH}{|}}{\underset{\underset{CN}{|}}{C}}-R$

Which of the following can be used as a catalyst in the above reaction ?

A. Cl^-

B. $CH_3-\overset{\overset{O}{||}}{C}-O^-$

C. $Et-O^-$

D. HSO_4^-

Answer: C

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121. Arrange in following carbonyl compounds in decreasing order of their reactivity in nucleophilic addition reaciton .

A. $ii > iii > i > iv$

B. $ii > i > iv > iii$

C. $iii > ii > i > iv$

D. $iii > i > iv > ii$

Answer: B

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122. The following reaction were carried out .

The final product formed in the above reaction sequence is :

A. 

B. 

C. 

D. 

Answer: B

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123. 

Yield of each step as actually carried out in the laboratory is given above .

What is overall yield of reaction ?

A. $42\ \%$

B. $31\ \%$

C. $21\ \%$

D. $60\ \%$

Answer: C

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124. 

Product (E) is :

A. Nylon 66

B. Nylon 6

C. Styrene

D. Polystyrene

Answer: B

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125. Methyl ketone on reaction with $LiCuMe_2$ gives a major product , whose structure is :

A. 

B. 

C. 

D. 

Answer: A

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126. Which of following is in capable to show iodoform test ?

A. 

B. $Ph - CH = CH - \overset{OH}{\overset{|}{C}}H - CH_3$

C. 

D. 

Answer: C

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127.

$$CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - CH_2 - \overset{O}{\overset{||}{C}} - CH_3 \xrightarrow[\Delta]{(NH_4)_2CO_3} (A) \xrightarrow[\Delta]{CCl_3CO_2Na} \underset{(\text{major})}{(B)}$$

Product (B) of above reaction is :

A. 

B. 

C. 

D. 

Answer: A

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128. 

Product obtained is :

A. 

B. 

C. 

D. None of these

Answer: B

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129. $\underset{\text{Symmetrical Ketone}}{(A)} \xrightarrow{LiAlH_4} (B) \xrightarrow[\Delta]{H^{\oplus}}$ Diastereomers

Reactent (A) is :

A. $CH_3 - \overset{O}{\overset{||}{C}} - CH_3$

B. $CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - CH_3$

C. $CH_3 - CH_2 - \overset{O}{\overset{||}{C}} - CH_2 - CH_3$

D. $CH_3 - CH_2 - CH_2 = O$

Answer: C

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130. 

Value of x in above reaction is :

A. 1

B. 2

C. 3

D. 4

Answer: A

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131. 

Molecular weight of compound (A) is :

A. 58

B. 120

C. 60

D. 182

Answer: A

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132. $Ph_2CH-\overset{\overset{O}{||}}{C}-H \xrightarrow{\text{aqueous acid}} \underset{81\,\%}{(A)} + \underset{2\,\%}{\text{enol}} + \underset{17\,\%}{\text{aldehyde}}$

Product (A) of above reaction will be :

A. $Ph-\underset{\underset{Ph}{|}}{C}=CH-O$

B. $Ph_2Ch-\overset{\overset{OH}{|}}{CH_2}$

C. $Ph_2CH-\overset{\overset{OH}{|}}{CH}-OH$

D. $Ph_2CH-\overset{\overset{O}{||}}{C}-CH_3$

Answer: C

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133. Which of the following will form stable hydrate ?

A. $\mathbb{C}l_3CHO$ (Chloral)

B. 

C. $(CF_3)_2CO$

D. all of these

Answer: D

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134. The pH at which maximum hydrate is present in an solution of oxaloacetic acid :

$$H-O-\overset{O}{\overset{||}{C}}-\overset{O}{\overset{||}{C}}-CH_2-\overset{O}{\overset{||}{C}}-O-H$$

$pK_a = 2.2$ $pK_a = 3.98$

A. pH = 0

B. pH= 12

C. pH = 4

D. pH = 6

Answer: A

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135. Arrange their stabilities of given gem-diols in decreasing order .

A. $I > II > III$

B. $III > II > I$

C. $I > III > II$

D. $III > I > II$

Answer: A

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136. Maximum hydration takes place of :

A. $CF_3\overset{\overset{O}{||}}{C}CF_3$

B. $CH_3\overset{\overset{O}{||}}{C}CH_3$

C. $CH_3\underset{\underset{Cl}{|}}{CH}-\overset{\overset{O}{||}}{C}CH_3$

D. $C_6H_5\overset{\overset{O}{||}}{C}C_6H_5$

Answer: A

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137. The conversion $PhCN \rightarrow PhCOCH_3$, can be achieved most conveniently by reaction with :

A. CH_3MgBr followed by hydrolysis

B. $I_2 - NaOH, CH_3I$

C. dil. H_2SO_4 followed by reaction with CH_2N_2

D. LAH followed by reaction with CH_3I

Answer: A

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138. 

In the above reaction , product (B) is :

A. 

B. 

C. 

D. 

Answer: B

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139. 

Structure of A is :

A. 

B. 

C. 

D. 

Answer: D

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140.

Product (B) is :

A. $Ph - NH - \overset{\overset{O}{||}}{C} - CO_2H$

B. $Ph - NH - \overset{\overset{O}{||}}{C} - CH_2 - CO_2H$

C.

D.

Answer: B

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141.

To carry out above conversion , arrange the following reagents in correct order .

$\underset{(1)}{O_3 / ZN}$ $\underset{(2)}{EtONa / EtOH / \Delta}$ $\underset{(3)}{NaOCl}$ $\underset{(4)}{H^+}$

A. $1 \rightarrow 3 \rightarrow 2 \rightarrow 4$

B. $1 \rightarrow 2 \rightarrow 4 \rightarrow 3$

C. $1 \rightarrow 3 \rightarrow 4 \rightarrow 2$

D. $1 \rightarrow 2 \rightarrow 3 \rightarrow 4$

Answer: D

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142.

$$H_2C = CH - CH_2 - CH_2 - \underset{\displaystyle CH_2 - CH_3}{\overset{\displaystyle HOCH_2}{\overset{|}{\underset{|}{C}}}} - OH \xrightarrow[TsOH]{CH_3 - \overset{\displaystyle O}{\overset{||}{C}} - CH_3} (A) \xrightarrow[(CH_3)_2S]{O_3}$$

Product (B) is :

A. 

B. 

C. 

D. 

Answer: A

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143. 

Identify appropriate reagents for the above reaction :

A. a = Br_2 / CCl_4, $(b) = aq.\ KOH$

B. $a = Br_2 / H^+$, $b = aq.\ KOH$

C. $a = Br_2 / H^+$, $b = alc.\ KOH$

D. $a = Br_2 / HO^-$, $b = aq.\ KOH$

Answer: C

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144. 

Product (X) of this reaction is :

A. 

B. 

C. 

D. 

Answer: B

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145. The K_{eq} values in HCN addition to following aldehydes are in the order :

A. $I > II > III$

B. $II > III > I$

C. $III > I > II$

D. $II > I > III$

Answer: D

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146. 

elation between K_1 and K_2 is :

A. $K_1 = K_2$

B. $K_1 > K_2$

C. $K_2 > K_1$

D. $K_1 = K_2 = 1$

Answer: B

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147. Which of the following is correct for the reaction ?

A. A is cyanohydrin

B. Nucleophilic- addition reaction

C. The above reaction is not shown by alkenes

D. all of these

Answer: D

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148. Which of the following compounds(i through v) should not be classified as an acetal ?

A. ii and iii

B. iv

C. i

D. none (they are all acetals)

Answer: D

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149. In which of reactions final product is NOT a ketone :

A. $CH_3 - C \equiv C - H \xrightarrow{NaNH_2} (A) \xrightarrow{CH_3 - I} (B) \xrightarrow[H_2SO_4]{HgSO_4} (C)$

B.

$$H - C \equiv C - H \xrightarrow{NaNH_2} (C) \xrightarrow{CH_3 - CH_2 - I} (D) \xrightarrow[NaBH_4, H^-]{Hg(OAc)_2, H_2O} (E)$$

C. $R - \overset{\overset{O}{||}}{C} - OH \xrightarrow{NaOH} (A) \xrightarrow{CH_3 - I} (B)$

D. 1-butyne $\xrightarrow{NaNH_2} (A) \xrightarrow{CH_3 - I} (B) \xrightarrow[(2)\, H_2O_2 / HO^{\ominus}]{(1)\, BH_3 . THF} (C)$

Answer: C

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150. The reaction of ethyl methyl ketone with $Cl_2 / \text{excess} OH^-$ gives the following major product

A. $ClCH_2CH_2COCH_3$

B. $CH_3CH_2COCCl_3$

C. $ClCH_2CH_2COCH_2Cl$

D. $CH_3CCl_2COCH_2Cl$

Answer: B

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151. The product obtained from the following sequence of reactions is

$$CH_3 - C \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} A \xrightarrow{NaBH_4} (B)$$

A. propanol

B. 2-propanol

C. 1-propanol

D. propanhe

Answer: B

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152. Which of the following shows oxidation of reactant .

A. 1

B. 1,2

C. 1,2,3

D. All of above

Answer: B

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153. The enolate ion that reacts with

A. 

B. 

C. 

D. 

Answer: C

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154.

$$CH_3 - \overset{O}{\overset{||}{C}} - CH_3 \xrightarrow{NaNH_2} P \xrightarrow{HC \equiv CH} Q \xrightarrow{H_3O^{\oplus}} R \xrightarrow{1H_2 / Pd} S \xrightarrow[D]{Al_2O_3} T$$

What is the final product T.

A. $H_3C - \underset{CH_3}{\overset{|}{C}} = C - \overset{O}{\overset{||}{C}} - CH_3$

B. $CH_3 - \overset{\overset{OH}{|}}{\underset{\underset{H_2C = CH}{|}}{C}} - CH_3$

C. $CH_3 - \overset{\overset{CH_3}{|}}{C} - CH - CH_3$

D. $CH_3 = \overset{\overset{CH_3}{|}}{C} - CH = CH_2$

Answer: D

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155. Select the best choice for example (A to L) from the examples (a to n) given below . Write your choice in the box given .

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156. The following questions refer to the compounds (A to G) shown below :

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157. Match the column :

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158. Complete the following table.

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159. Consider the following reactions and answer A and B .

Suggest a reagent appropriate step(a) the synthesis .

A. HO^{-}/Br_2 (1 mole)

B. H^{+}/Br_2 (1 mole)

C. both (a) and (b)

D. None of these

Answer: b

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160. Consider the following reactions and answer A and B .

Yield of each step as actually carried out in laboratory is given above each arrow . What is overall yield of the reaction ?

A. 60 %

B. 21 %

C. 40 %

D. 68 %

Answer: b

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161. 

Degree of unsaturation present in compound (A + B + C) is ?

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162. Within each set , which compound should be more reactive toward carbonyl addition reaction ?

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163. Match the Column (I) and Column (II) , (Matrix)

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164. Consider reactions A through F . Those carbon atoms undergoing change , as part of a functional group , are marked as C^{12}, C^{14} or starred . In the cases shown , each carbon atom has either been reduced or oxidized . Your job is to identify the change in oxidation state that has occured for each of the marked carbon .

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165. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone introduces a carbon-carbon double bond is place of the bond .

$$R-\overset{\overset{O}{||}}{C}-R+Ph_3P=CH_2 \rightarrow R-\overset{\overset{CH_2}{||}}{C}-R+Ph_3P=O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

Major product (A) is :

A. 

B. 

C. 

D. 

Answer: A

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166. Match the column :

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167. (A) $\xrightarrow[\text{dil.}H_2SO_4]{HgSO_4} (B) \xrightarrow[(2)\,H^{\oplus}\,/\,\Delta]{(1)\,NaBH_4}$ $\begin{array}{l} CH_3 - C - CH_2 - CH_3 \\ \qquad\quad \| \\ \qquad\quad CH - CH_3 \end{array}$

Reactant (A) is :

A. $CH_3 - C \equiv C - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_3$

B. $\begin{array}{l} HC \equiv C - C - C - C \\ \qquad\qquad\quad\;\; | \\ \qquad\qquad\quad C - C \end{array}$

C. $\begin{array}{l} CH_3 - CH - C \equiv CH \\ \qquad\quad | \\ \qquad CH_2 - CH_3 \end{array}$

D. $CH_3 - C \equiv C - CH_2 - CH_2 - CH_3$

Answer: C

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Level 1 Q 121 To Q 150

1. 

What is appropriate reagent to carry out above synthesis ,i.e., A , B , C respectively are :

A. $Br_2 / H^+, LiAlH_4, H^{\oplus}$

B. $Br_2 / H^{\oplus}, NaBH_4, HO^-$

C. $NBS, AlCl_3, HO^-$

D. $Br_2 / HO^-, BF_3, HO^-$

Answer: B

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Level 2

1. Consider the possible formation of an aldehyde or ketone product when each of the ten compounds in the column on the left is treated with each of the reagents shown in the top row . Check the designated answer box if you believe an aldehyde or ketone will be formed .

Assume that the reagents may be present in excess . For each checked reaction , try to draw the structure of the major product (s) .

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2. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone introduces a carbon-carbon double bond is place of the bond .

$$R-\overset{\overset{O}{||}}{C}-R+Ph_3P=CH_2\rightarrow R-\overset{\overset{CH_2}{||}}{C}-R+Ph_3P=O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

$CH_3 - \overset{O}{\overset{||}{C}} - CH_2 - CH_2 - CH_2 - CH_2 - \overset{\oplus}{P}Ph_3 \xrightarrow[\Delta]{Ph-Li} (A)$, Major product (A) is :

A. 

B. 

C. 

D. 

Answer: A

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3. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone introduces a carbon-carbon double bond is place of the bond .

$$R - \overset{O}{\overset{||}{C}} - R + Ph_3P = CH_2 \rightarrow R - \overset{CH_2}{\overset{||}{C}} - R + Ph_3P = O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

Major product (A) is :

A. cis-2 butene

B. trans-2 butene

C. iso-butene

D. 1-butene

Answer: B

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4. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone introduces a carbon-carbon double bond is place of the bond .

$$R-\overset{O}{\overset{||}{C}}-R+Ph_3P=CH_2\rightarrow R-\overset{CH_2}{\overset{||}{C}}-R+Ph_3P=O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

$CH_3-\overset{O}{\overset{||}{C}}-(CH_2)_3-\overset{O}{\overset{||}{C}}-CH_2-\overset{O}{\overset{||}{P}}(OEt)_2\xrightarrow{NaH}(A)$(cyclic). Product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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5. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone

introduces a carbon-carbon double bond is place of the bond .

$$R-\overset{\overset{O}{||}}{C}-R+Ph_3P=CH_2\rightarrow R-\overset{\overset{CH_2}{||}}{C}-R+Ph_3P=O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

Product (A) and (B) respectively are :

A. 

B. 

C. 

D. 

Answer: A

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6. Wittig reaction :

The reaction of a phosphorus ylide with an aldehyde (or) ketone introduces a carbon-carbon double bond is place of the bond .

$$R-\overset{\overset{O}{||}}{C}-R+Ph_3P=CH_2 \rightarrow R-\overset{\overset{CH_2}{||}}{C}-R+Ph_3P=O$$

Mechanism :

Driving force of the reaction is high blood energy of $(P=O).\Delta H=-ve)$

product (A) is :

A. 

B. 

C. 

D. 

Answer: B

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7. (A) $\xrightarrow[\text{dil.}H_2SO_4]{HgSO_4}$ (B) $\xrightarrow[(2)\,H^{\oplus}\,/\,\Delta]{(1)\,NaBH_4}$ $CH_3-\underset{\underset{CH-CH_3}{||}}{C}-CH_2-CH_3$

Product (B) is :

A.

B.

C.

D.

Answer: D

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Solved Problem

1. Write bond-line structures for the keto and enol forms of 3-pentanone.

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2. Treating racemic 2-methyl-phenylbutan-1-one with NaOD in the presence of D_2O produces a deuterium-labeled compound as a racemic form. Write a mechanism that explains this result.

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3. The carbon-carbon bond cleavage step in a retro-aldol reaction involves, under basic conditions, a leaving group that is an enolate, or under acidic conditions, an enol. Write a mechanism for the retro-aldol reaction of 4-hydroxy-4-methyl 2-pentanone under basic conditions (shown above).

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4. One industrial processs for the synthesis of 1-butanol begins with ethanol. Show how this synthesis might be carried out.

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5. Show how each of the four products shown at the beginning of this section is formed in the crossed aldol addition between ethanol and propanal.

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6. outlined below is a practical crossed aldol reaction that can be used for the synthesis of cinnamaldehyde (the essence of cinnamon, used in cooking). Provide the missing ingredients for this recipe.

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Additional Objective Questions Single Correct Choice Type

1. Mixed aldol reactions require

A. only one of the reactants to be able to form an enolate.

B. one of the reactants to be more reactive towards the nucleophile.

C. much stronger bases.

D. (b) and (c).

Answer: D

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2. If formaldehyde and potassium hydroxide are heated, then we get

A. acetylene.

B. methane

C. methyl alcohol

D. ethyl formate.

Answer: C

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3. Cyclohexane on ozonolysis followed by reaction with zinc dust and water gives compound E, on further treatment with aqueous KOH followed by heating yields compound F. The compound F is

A. 

B. 

C. 

D. 

Answer: A

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4. In Cannizzaro reaction given below, the slowest step is

$$2PhCHO \xrightarrow{OH^-} PhCH_2OH + PhCO_2^-$$

A. the abstraction of proton from the carboxylic group.

B. the deprotonation of $PhCH_2OH$.

C. the attack of OH^- at the carboxyl group.

D. the transfer of hydride to the carbonyl group.

Answer: D

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5. Which of the following compounds give $^{14}CHI_3$ as a product when treated with I_2 in presence of NaOH ?

A. 

B. 

C. 

D. all of these

Answer: C

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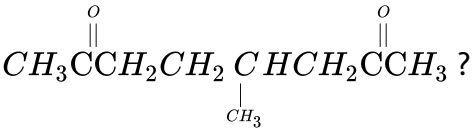
6. What compounds results from the aldol cyclization of



A. 

B. 

C. 

D. 

Answer: C

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7. The Cannizzaro reaction is not given by

A. trimethyl acetaldehyde

B. acetaldehyde

C. benzaldehyde.

D. fromaldehyde.

Answer: B

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8. Benzyl alcohol is obtained from benzaldehyde by

A. Fittig.s reaction

B. Cannizaro.s reaction.

C. Kolbe.s reaction

D. Wurtz.s reaction.

Answer: B

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9. A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives

A. benzyl alcohol and sodium formate.

B. sodium benzoate and methyl alcohol.

C. sodium benzoate and sodium formate.

D. benzyl alcohol and methyl alcohol.

Answer: A

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10. Which reagents would you see to synthesize this compound by an aldol condensation ?

$C_6H_5CH = Ch\overset{O}{\overset{\|}{\mathbb{C}}}C_6H_5$

A. $C_6H_5\overset{O}{\overset{\|}{C}}H$ and $C_6H_5CH_2\overset{O}{\overset{\|}{C}}H$

B. $C_6H_5CH_2\overset{O}{\overset{\|}{C}}H$ and $C_6H_5CH_2\overset{O}{\overset{\|}{\mathbb{C}}}CH_3$

C. $C_6H_5CH = CH\overset{O}{\overset{\|}{C}}H$ and C_6H_5OH

D. $C_6H_5\overset{O}{\overset{\|}{\mathbb{C}}}H_3$ and $C_6H_5\overset{O}{\overset{\|}{C}}H$

Answer: D

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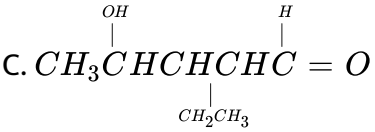
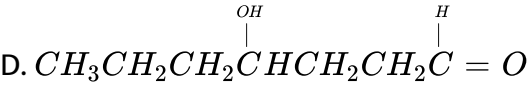
11. Which of these in not among the reaction products when a crossed aldol addition occurs between ethanol and butanal ?

A. $CH_3\overset{OH}{\overset{|}{C}}HCH_2\overset{H}{\overset{|}{C}} = O$

B. $CH_3CH_2CH_2\overset{OH}{\overset{|}{C}}H\underset{CH_3}{\overset{|}{C}}HCH_2\overset{H}{\overset{|}{C}} = O$

C. 

D. 

Answer: B

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12. Acid catalyzed aldol condensation involves

A. carbanion.

B. enolate ion.

C. enol.

D. both (a) and (b)

Answer: C

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13. Which is the only of these compounds which cannot self-condense in the presence of dilute aqueous alkali ?

A. Phenylethanal

B. Propanal

C. 3-Methylpentanal

D. 2,2-Dimethylpropanal

Answer: D

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Additional Objective Questions Linked Comprehension Type

1. A carbonyl compound P,which gives positive iodoform test, undergoes reaction with MemgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes

intramolecular aldol reaction to give predominantly S.

The structure of the carbonyl compound P is

A. 

B. 

C. 

D. 

Answer: B

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2. A carbonyl compound P,which gives positive iodoform test, undergoes reaction with MemgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular aldol reaction to give predominantly S.

The structure of the products Q and R, respectively, are

A. 

B. 

C. 

D. 

Answer: A

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3. A carbonyl compound P,which gives positive iodoform test, undergoes reaction with MemgBr followed by dehydration to give an Olefin Q. Ozonolysis of Q leads to a dicarbonyl compound R, which undergoes intramolecular aldol reaction to give predominantly S.

The structure of the product S is

A. 

B. 

C. 

D. 

Answer: B

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4. An organic compound A $(C_{12}H_{20})$ decolarizes bromine water, and on reductive ozonolysis produces two molecules of B $(C_6H_{10}O)$. Compound B on aldol condensation followed by dehydration of product gives C $(C_{12}H_{18}O)$, which on reduction with N_2H_4/OH_2 regenerates A. COmpound B on reduction with Zn(Hg)HCl produces D (C_6H_{12}), which on monochlorination gives E $(C_6H_{11}Cl)$ as the sole product.

Structure of compound is

A. 

B. 

C. 

D. 

Answer: D

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5. An organic compound A $(C_{12}H_{20})$ decolarizes bromine water, and on reductive ozonolysis produces two molecules of B $(C_6H_{10}O)$. Compound B on aldol condensation followed by dehydration of product gives C $(C_{12}H_{18}O)$, which on reduction with N_2H_4/OH_2 regenerates A. COmpound B on reduction with Zn(Hg)HCl produces D (C_6H_{12}), which on monochlorination gives E $(C_6H_{11}Cl)$ as the sole product.

A. 

B. 

C. 

D. 

Answer: B

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6. An organic compound A $(C_{12}H_{20})$ decolarizes bromine water, and on reductive ozonolysis produces two molecules of B $(C_6H_{10}O)$. Compound B on aldol condensation followed by dehydration of product gives C $(C_{12}H_{18}O)$, which on reduction with N_2H_4/OH_2 regenerates A. COmpound B on reduction with Zn(Hg)HCl produces D (C_6H_{12}), which on monochlorination gives E $(C_6H_{11}Cl)$ as the sole product.

A. 

B. 

C. 

D. 

Answer: D

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Solved Problems

1. Write bond - line formulas for three isomeric compounds that contain a carbonyl group and have the molecular formula C_4H_8O. Then give their IUPAC names .

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2. Provide the reagents for transformations (1),(2), and (3) . 

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3. What is the product of the following reaction ?

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4. Starting with benzyl alcohol , outline a synthesis of phenylethanal.

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5. With 1- butanol as your only organic starting compound, devise a synthesis of 5-nonanone. Begin by writing a restrosynthetic analysis.

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6. Provide the missing reagents and intermediate in the following synthesis.

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7. Synthesize 2-methyl-1-phenylprop-1-ene using a Witting reaction. Begin by writing a tetrosynthetic analysis.

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8. Suggest a sequence of reaction to carry out the following transformation , but one intemediate must be an alkene.

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9. Provide the organic product(s) for the following reactions . If more than one product is formed, indicate which product (if any) is the major one. If no reaction occurs , write " NR". (Hint: Almost any time you are asked to provide a reaction product , you should also be able to write the mechanism for the reaction as well. If you do not know the product , then trying to figure out the mechanism will guide you in the right direction.)

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10. 

Write a mechanism for part (a).

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11. Consider the two Witting reactions shown below. Select the most efficient route and provide three reasons for you choice .

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Additional Objective Questions Single Correct Choice Type

1. Hydrogenation of benzoyl chloride in the presence of Pd and $BaSO_4$ gives

A. benzyl alcohol

B. benzaldehyde

C. benzoic acid

D. phenol

Answer: B

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2. m-chlorobenzaldehyde on reaction with conc. KOH at room temperature gives

A. potassium m-chlorobenzoate and m-hydroxybenzaldehyde.

B. m-hydroxybenzaldehyde and m-chlorobenzyl alcohol.

C. m-chlorobenzyl and m-hydroxybenzyl alcohol.

D. potassium m-chlorobenzoate and m-chlorobenzyl alcohol.

Answer: D

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3. $LiAlH_4$ (LAH) cannot be used to convert carboxylic acids to the corresponding aldehydes because

A. LAH is not sufficiently reactive.

B. RCOOH is converted into RCOOLi.

C. RCOOH is reduced to RCH_2OH.

D. RCOOH is reduced to RCH_3.

Answer: C

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4. In the Cannizzaro reaction given below $2Ph - CHO \xrightarrow{OH^-} Ph - CH_2OH + PhCO_2^-$ the slowest step is

A. the attack of OH at the carbonyl group.

B. the transfer of hydride to the carbonyl group.

C. the abstraction of proton from the carboxylic acid.

D. the deprotonation of $Ph - CH_2OH$

Answer: B

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5. Arrange the given compounds in order of decreasing reactivity for nucleophilic addition reaction.

(i) $H_3C-\overset{\overset{O}{||}}{C}-CH_2-Cl$

(ii) $Cl-CH_2-CHO$

(iii) CH_2O

(iv) $H_3C-\overset{\overset{O}{||}}{C}-CH_3$

A. $(iv)>(iii)>(ii)>(i)$

B. $(iii)>(ii)g>(i)>(iv)$

C. $(ii)>(iv)>(iii)>(i)$

D. $(i)>(ii)>(iii)>(iv)$

Answer: B

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6. In a Cannizzaro reaction, the intermediate which is the best hydride donor is

A. $C_6H_5 - \underset{\underset{OH}{|}}{\overset{\overset{H}{|}}{C}} - O^-$

B. $C_6H_5 - \underset{\underset{O^-}{|}}{\overset{\overset{H}{|}}{C}} - O^-$

C. 

D. 

Answer: D

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7. What carbonyl compound reacts with HCN to give the highest yield of cyanohydrin?

A. Formaldehyde

B. Propanal

C. 2-butanone

D. di-t-butyl ketone

Answer: A

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8. A mixture of benzaldehyde and formaldehyde on heating with aqueous NaOH solution gives

A. benzyl alcohol and sodium formate.

B. sodium benzoate and methyl alcohol.

C. sodium benzoate and sodium formate.

D. benzyl alcohol and methyl alcohol.

Answer: A

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9. Which of the following carbonyl compounds reacts with HCN to give the lowest yield of cyanohydrin?

A. Formaldehyde

B. Propanal

C. 2-Butanone

D. di-t-butyl ketone

Answer: D

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10. Compound A (molecular formula C_3H_8O) is treated with acidified potassium dichromate to form a product B (molecular formula C_3H_6O). B forms a shining silver mirror on warming with ammonical silver nitrate. B when treated with an aqueous solution of $H_2NCONHNH_2 \cdot HCl$ and sodium acetate gives a product C. Identify the structure of C.

A. $CH_3CH_2CH = NNHCONH_2$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C} = NNHCONH_2$

C. $CH_3 - \underset{\underset{CH_3}{|}}{C} = NCONHNH_2$

D. $CH_3CH_2CH = NCONHNH_2$

Answer: A

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11. The reagent which does not react with both acetone and benzaldehyde is

A. $NaHSO_3$

B. phenyl hydrazine .

C. Fehling solution.

D. Grignard reagent.

Answer: C

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12. The formation of cyanohydrin from a ketone is an example of

A. electrophilic addition

B. nucleophilic addition

C. nucleophilic substitution

D. electrophilic substitution

Answer: B

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13. An organic compound C_3H_6O does not give a precipitate with 2,4-dinitrophenyl hydrazine reagent and does not react with metallic sodium. It could be

A. CH_3CH_2CHO

B. CH_3COCH_3

C. $CH_2 = CH - CH_2 - OH$

D. $CH_2 = CH - O - CH_3$

Answer: D

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14. Among the given compounds, the most susceptible to nucleophilic attack at the carbonyl group is

A. MeCOCl

B. MeCHO

C. MeCOOMe

D. MeCOOCOMe

Answer: A

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15. $CH_3CHO + H_2NOH \rightarrow CH_3 - CH = N - OH$

The above reaction occurs at

A. pH=1

B. pH = 4.5

C. any value of pH

D. pH=2

Answer: B

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16. Which of the following is not a common reaction of aldehydes?

A. Nucleophilic acyl addition

B. Nucleophilic acyl substitution

C. Alpha substitution

D. Reduction to a ketone

Answer: D

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17. Which pair of the following carbonyl compounds can be differentiated by $I_2 / NaOH$?

A. $C_6H_5 - CHO$ and $C_6H_5 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

B. $C_6H_5 - \overset{\overset{O}{||}}{C} - CH_3$ and $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_3$

C. $CH_3 - CH_2 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$ and $C_6H_5 - \overset{\overset{O}{||}}{C} - CH_2 - CH_3$

D. $C_6H_5 - \overset{\overset{O}{||}}{C} - \underset{\underset{CH_3}{|}}{C}H - CH_3$ and $C_6H_5 - \overset{\overset{O}{||}}{C} - CH_3$

Answer: D

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