CHEMISTRY

RESONANCE ENGLISH

REDUCTION, OXIDATION & HYDROLYSIS REACTIONS

Example

1. $C_8H_{10} \xrightarrow{O_3, H_2O} C_4H_6O_2$ Acid (B), Identify (A) and (B) in the above reaction

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2. A certain hydrocarbon has the formula $C_{16}H_{26}$. Ozonolysis followed by hydrolysis gives $CH_3(CH_2)_4CO_2H$ and succinic acid as the product. What is hydrocarbon

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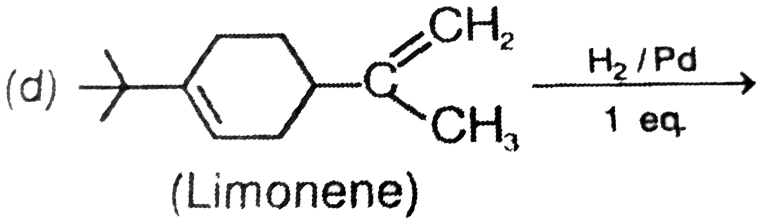
Exercise 1 Part I Subjective Questions

1. Write the hydrogenation product of following species with H_2 / Pd.

(a) 1,2-Butadiene $\xrightarrow{H_2 / Pd}$ (b) trans-2-butene $\xrightarrow{H_2 / Pd}$

(c) Benzaldehyde $\xrightarrow{H_2 / Pd}$ (d)



(Limonene)

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2. Write the hydrogenation product of following species

Benzoylchloride $\xrightarrow{H_2 / Pd / BaSO_4}$

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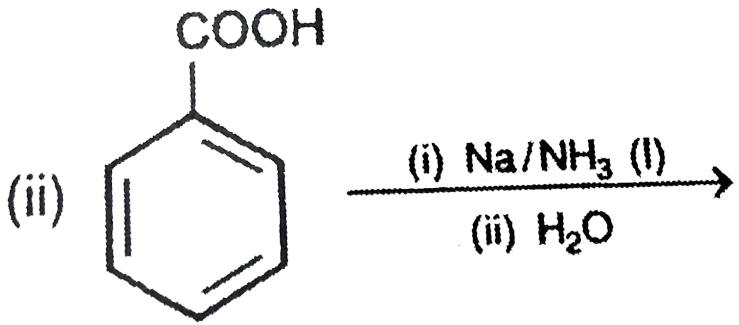
3. Complete the following reactions :

(i) $CH_3 - CH_2 - C \equiv C - CH_2 - (CH_2)_6 - CH_2OH \xrightarrow[(ii)\, H_2O]{(i)\, Na/NH_3(l)}$

(ii)



(ii)

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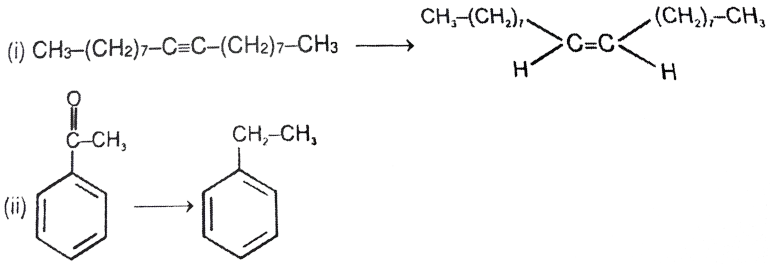
4. Give reaction conditions (reagents and/or catalyst) for effecting the following conversions :



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5. What is the product of each reaction

(a) $AgNo_3 + Na_2C_2O_4 \rightarrow$

(b) $Ca(OH)_2 + SO_2 \rightarrow$

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6. Sodium thiosulphate on reaction with barium chloride forms white precipitate of

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7. Sodium bromide on reaction with silver nitrate forms yellow precipitate of

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8. Write the structural formulas for the products formed when 3-heptyne reacts with $KMnO_4$ under ?

(i) neutral condition at room temp.

(ii) alkaline or acidic condition at higher temp.

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9. Potassium iodide on reaction with lead nitrate forms yellow precipitate of

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10. When t-butanol and n-butanol are separately treated with a few drops of dilute $KMnO_4$ in one case only, the purple colour disappears and brown precipitate is formed. Which of the two alcohols gives the above reaction and which is the brown precipitate?

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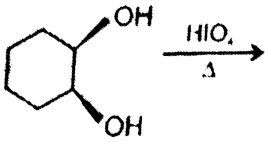
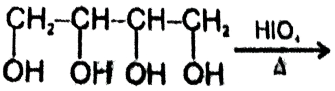
11. Complete the following reactions:

(a) 

(b) 

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12. Complete the following reactions :

(a) $Ph - CH_2 - CH_2 - OH \xrightarrow{Cu\,/\,\Delta}$, (b) $Ph - \underset{\displaystyle OH}{\underset{|}{CH}} - CH_3 \xrightarrow{Cu\,/\,\Delta}$, (c)

$$Ph - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - OH \xrightarrow{Cu\,/\,\Delta}$$

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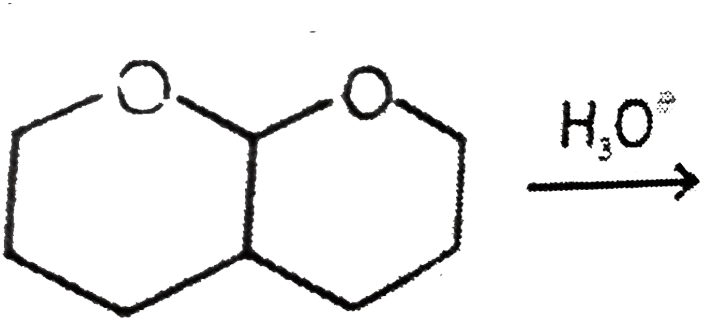
13. Write the products of following reactions



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14. Write the products of following reactions

(a) $CH_3 - C \equiv N \xrightarrow{H_3O^-}$ (b) $CH_3NC \xrightarrow{H_3O^+}$

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15. Reactant $\xrightarrow{H_3O^+} CH_3COOH + HCl$

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16. $CH_3CONH_2 \xrightarrow{H_3O^+}$ Product is :

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17. The hydrolysis of acid anhydride produces.....

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18. Name the gas liberated when BeH_2 reacts with water.

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19. Name the gas liberated when BaH_2 reacts with water.

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Part Ii Only One Option Correct Type

1. Name the gas liberated when AlH_3 reacts with water.

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2. Name the gas liberated when MgH_2 reacts with water.

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3. Name the gas liberated when LiH reacts with water.

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4. Name the gas liberated when NaH reacts with water.

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5. Name the gas liberated when CaH_2 reacts with water.

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6. Which of the following reagents converts both acetaldehyde and acetone to alkanes?

A. Ni / H_2

B. $LiAlH_4$

C. $I_2 / NaOH$

D. Zn-hg/conc.HCl

Answer: D

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7. Stephen reduction $(SnCl_2 / HCl)$ converts cyanides to

A. Aldehydes

B. Ketones

C. Amines

D. Acids

Answer: A

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8. When benzoic acid is treated with $LiAlH_4$, it forms

A. Banzaldehyde

B. Banzyl alcohol

C. Benzene

D. Toluene

Answer: B

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9. Write the hydrolysis product of the following:

(a) Ca_3N_2

(b) $AlCl_3$

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10. $R-C\equiv N \xrightarrow[-40^\circ C]{DIBAL+H,H_\circ O}$ Product

The product formed is :

A. $R-CO-NH_2$

B. $R-CH_2-NH_2$

C. $R-CHO$

D. $R-CH_2-NO_2$

Answer: C

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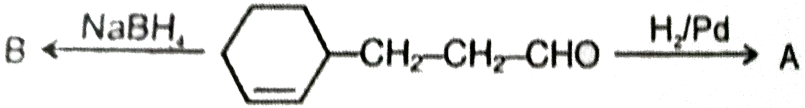
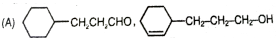
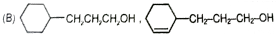
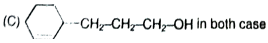
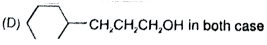
11. Complete the following reaction



A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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12. In the following reaction

$C_2H_5OC_2H_5 + 4[H] \xrightarrow{RedP+HI} 2X + H_2O$, X is

A. Ethane

B. Ethylene

C. Butane

D. Propane

Answer: A

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13. $R - CO - O - R' \xrightarrow[\text{aluminium hydride} - 78^\circ C]{\text{diisobutyl}} Y + R' - OH$

The product Y is

A. $R - CH_2 - OH$

B. $R - CHO$

C. $R - COOH$

D. $R - CH_3$

Answer: B

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14. What happens when barium chloride solution is added to potassium sulphate solution?

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15. Baeyer's reagent decolourises which of the following :

A. Alkane

B. Alkene only

C. Alkene and alkyne both

D. Benzene

Answer: C

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16. Ethanol on reaction will alkaline $KMnO_4$ gives:

A. Ethanal

B. Glyoxal

C. Acetic acid

D. Acrolein

Answer: C

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17. $1-\text{Butyne} \xrightarrow{KMnO_4/\Delta} X+Y$

Identify X and Y ?

A. $CH_3CH_2CH_2COOH + O_2$

B. CH_3CH_2COOH

C. $CH_3CH_2COOH + CO_2 + H_2O$

D. $CH_3CH_2COCH_3 + HCOOH$

Answer: C

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18. An alkyne C_7H_{12} when reacted with alkaline $KMnO_4$ followed by acidification by HCl, yielded a mixture of $CH_3-\underset{\underset{CH_3}{|}}{CH}-COOH$ & CH_3CH_2COOH. The alkyne is -

A. 3-hexyne

B. 2-methyl-2-hexyne

C. 2-methyl-3-hexyne

D. 3-methyl-2-hexyne

Answer: C

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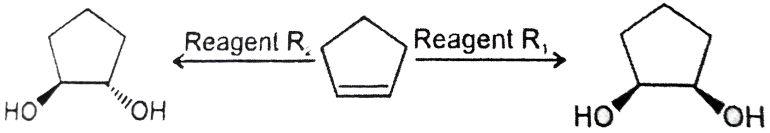
19. Complete the following reaction



A. Cold alkaline $KMnO_4$, OsO_4 / H_2O_2

B. Cold alkaline $KMnO_4$, HCO_3H & H_3O^+

C. Cold alkaline $KMnO_4$, $C_6H_5CO_3H$

D. $C_6H_5CO_3H$, HCO_3H

Answer: B

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20. Glucose as well as fructose are oxidized by periodic acid. The number of moles of $HCOOH$ formed from each mole of glucose and fructose are

A. 5 and 5

B. 5 and 4

C. 5 and 3

D. 4 and 3

Answer: C

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21. Secondary alcohols on heating with copper at $300^{\circ} C$ give,

A. Alkenes

B. Aldehydes

C. Ketones

D. tert-alcohols

Answer: C

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22. The reagent with which both acetaldehyde and acetone react easily, is :

A. Tollens reagent

B. Schiffs reagent

C. H_2 / Ni

D. Fehling 's solution

Answer: C

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23. Which of the following compounds is resistant to periodic acid oxidation ?

A. $\begin{array}{l} CH_2OH \\ | \\ CO \\ | \\ CH_2OH \end{array}$

CH_2OH
|

B. CH_2
|
CH_2OH
CH_2OH
|

C. CH_2OH
|
CH_2OH
CH_2OH

D. |
CH_2OH

Answer: B

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24. What product is obtained when Benzencarbonitrile is hydrolysed.

A. Benzoylchloride

B. Benzenecarboxamide

C. Benzaldehyde

D. Benzoic acid

Answer: D

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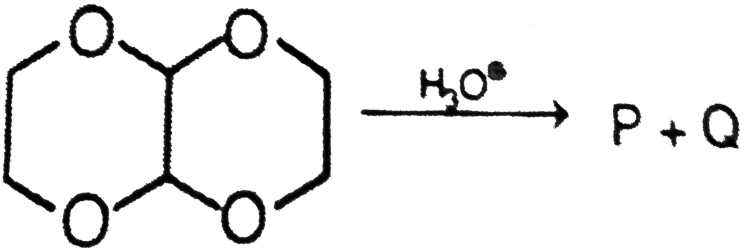
25. The acid catalysed hydrolysis products in the following reactions are -



A. $\begin{matrix} CHO & & CHO \\ | & \& & | \\ CHO & & CHO \end{matrix}$

B. $\begin{matrix} COOH & & CH_2-OH \\ | & \& & | \\ CHO & & CH_2-OH \end{matrix}$

C. $\begin{matrix} CHO & & CH_2-OH \\ | & \& & | \\ COOH & & CHO \end{matrix}$

D. $\begin{matrix} COOH & & \\ | & \& & | \\ CHO & & \end{matrix}$

Answer: C

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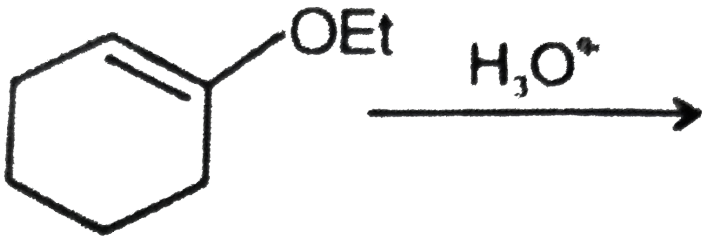
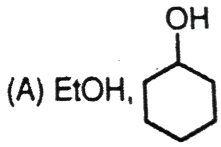
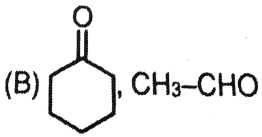
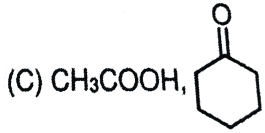
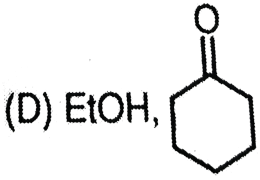
26. 

Product obtained in above reaction are :

A. 

B. 

C. 

D. 

Answer: D

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Part Iii Match The Column

1. $CH_3COOH + NaOH \rightarrow A + B$

$X + NaOH \rightarrow C(gas) + D$

C(gas) is:

A. CH_4

B. CO_2

C. O_2

D. H_2

Answer: A

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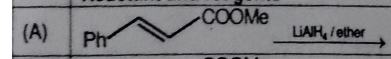
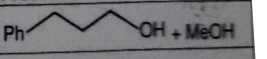
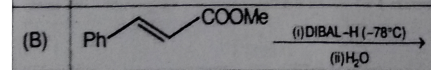
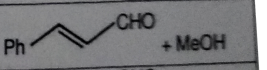
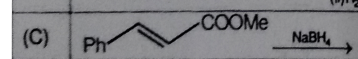
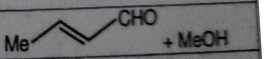
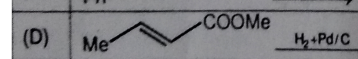
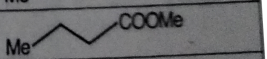
2. Match the following column:

	Column-I Reactant and reagents		Column-II Products
(A)		(p)	
(B)		(q)	
(C)		(r)	
(D)		(s)	
		(t)	No reaction

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Exercise 2 Part I Only One Option Correct Type

1.

$$A \xrightarrow{H_2/NI} \begin{array}{l} CHO \\ | \\ H-C-OH \\ | \\ HO-C-H \\ | \\ H-C-OH \\ | \\ H-C-OH \\ | \\ CH_2OH \end{array} \xrightarrow{\text{Heating with HI}} B$$

A and B can be :

A. Both are n-Hexane

B. Both are Hexan-1,2,3,4,5,6-hexaol

C. A is n-Hexane B is Hexan-1,2,3,4,5,6-hexaol

D. A is Hexane-1,2,3,4,5,6-hexol and B is n-Hexane

Answer: D

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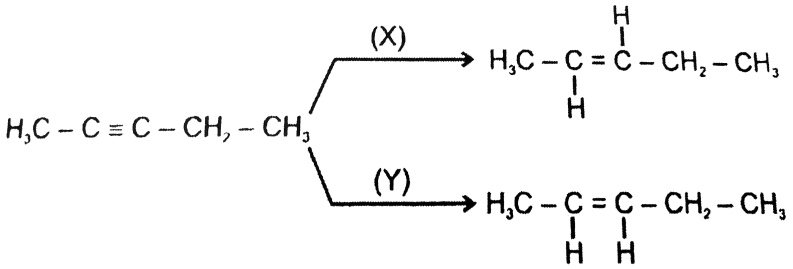
2.



In the above reaction the using reagents X and Y are :

A. Na/liq. NH_3 for X

B. H_2, $Pd/BaSO_4$ for Y

C. $BH_3 - THF + CH_3COOH$ for Y

D. All of these are correct

Answer: D

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3. IUPAC names of the following compounds are

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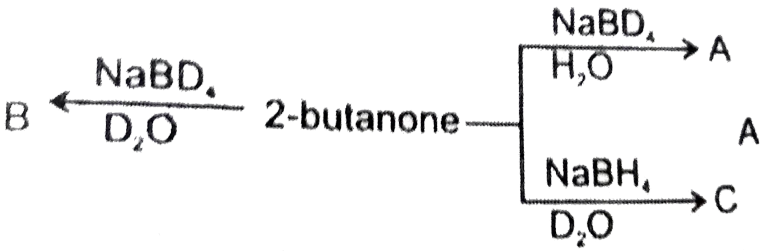
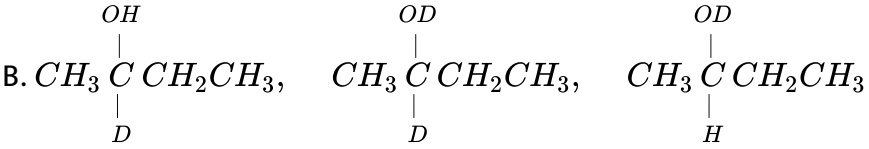
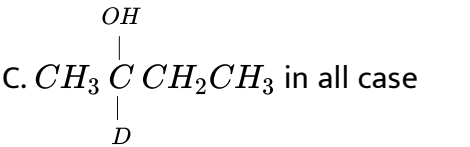
4. Consider reduction of 2-butanone.

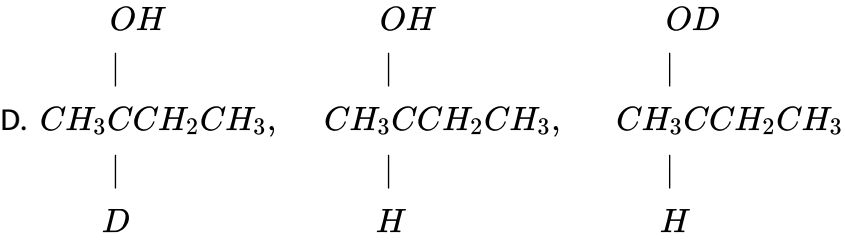


A , B and C are respectively

A. $CH_3\underset{\underset{OH}{|}}{C}HCH_2CH_3$ in all cases

B. 

C. 

D. 

Answer: B

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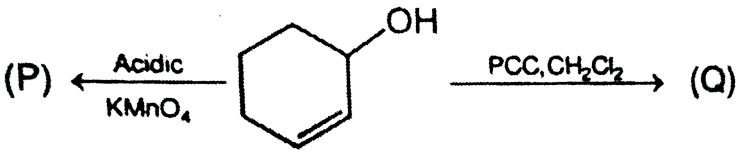
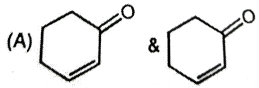
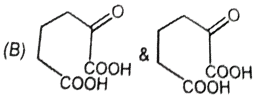
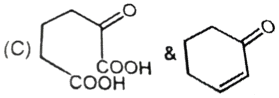
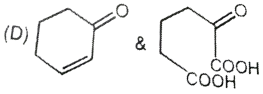
5. Identify P and (Q) respectively in the given reaction :



A. 

B. 

C. 

D. 

Answer: C

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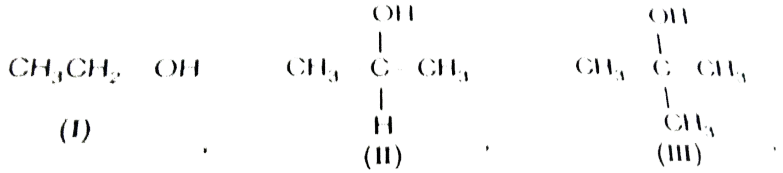
6. Which of the following sets of compounds cannot turn clear orange solution of $CrO_3 / aq.\ H_2SO_4$ of greenish opaque solution



A. I, IV

B. II, III

C. I, II

D. III, IV

Answer: D

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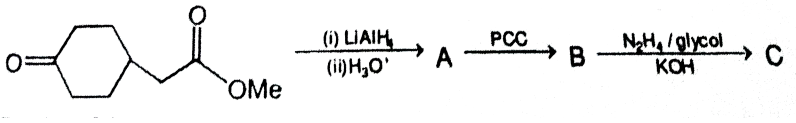
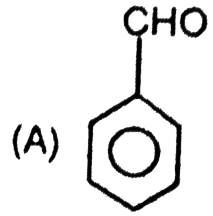
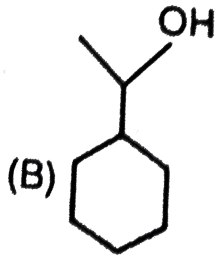
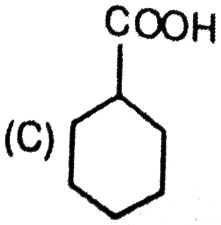
7. 

Product C is :

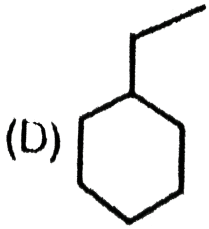
A. 

B. 

C.



D.



Answer: D

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8. The product which is not formed in the following reactions :

$$Ph-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{C}}-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{\overset{\overset{CH_3}{|}}{CH}}-CH-CH_2OH \xrightarrow{HIO_4(\text{excess})}$$

A. $HCOOH$

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

C. $OHC - \overset{\overset{CH_3}{|}}{CH} - CH_2OH$

D. $OHC - \overset{\overset{CH_3}{|}}{CH} - CHO$

Answer: D

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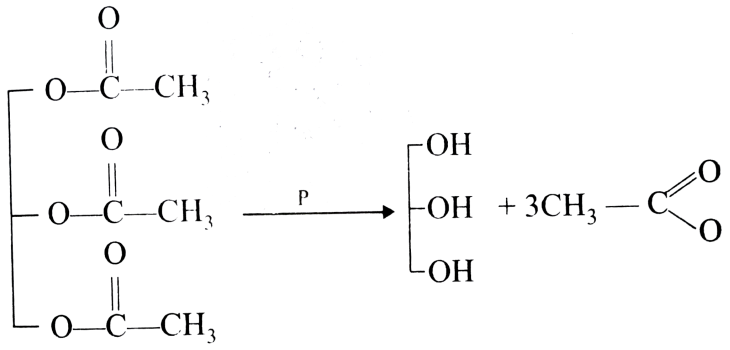
9. Reagent P in the given reaction is :



A. $LiAlH_4$

B. $NaBH_4$

C. $DlBAl - H$

D. OH^-

Answer: D

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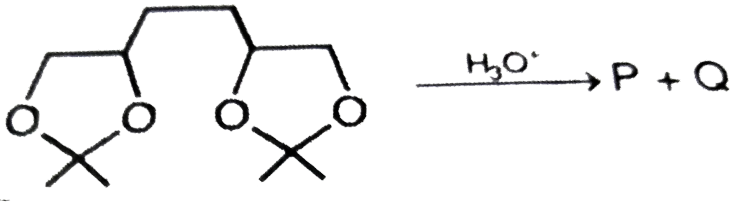
10. 

P and Q are respectively.

A. Acetone and Hexane-1,2,5,6-tetraol.

B. Acetaldehyde and Acetone

C. Acetaldehyde and Hexane-1,2,5,6-tetraol

D. Acetone and Formaldehyde

Answer: A

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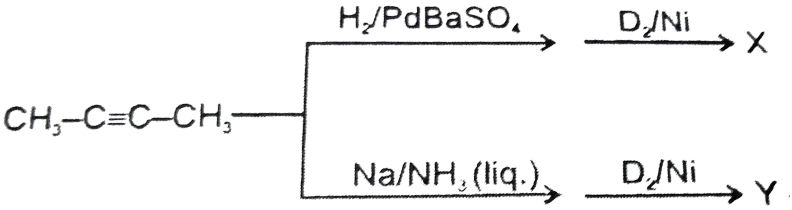
Part Ii Single And Double Value Integer Type

1.



Find x and y

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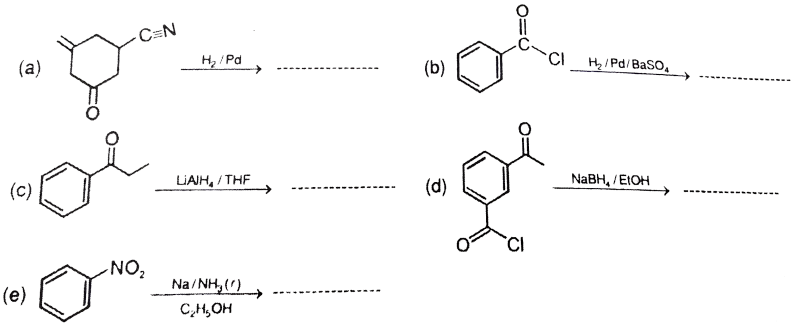
2. Number of reaction which give alcohol as product.



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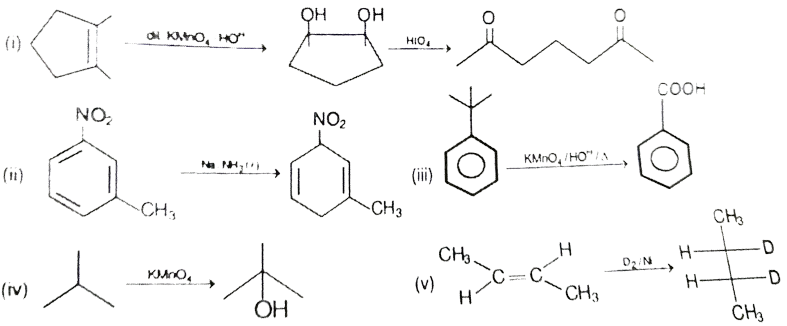
3. How many reactions are correct ?



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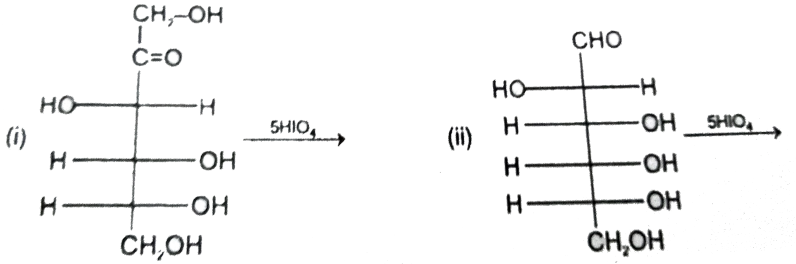
4.



Sum of moles of formaldehyde obtained in the reaction (i) and reaction (ii) ?

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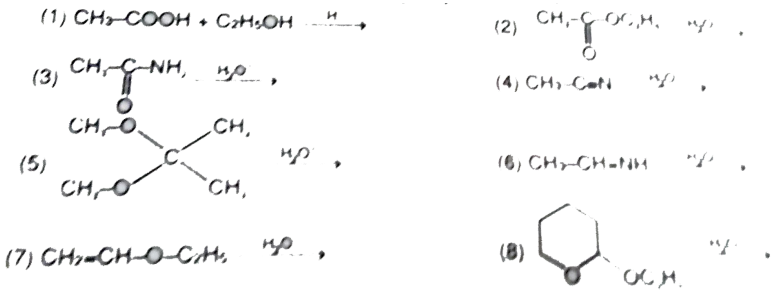
5. How many of following reactions are hydrolysis reactions ?



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Part Iii One Or More Than One Options Correct Type

1. Which of the following catalyst is/are used for partial reduction of alkyne ?

A. $Na / NH_3(l)$

B. Ni_2B or P-2 catalyst

C. Lindlar catalyst

D. Rossenmud catalyst

Answer: A::B::C::D

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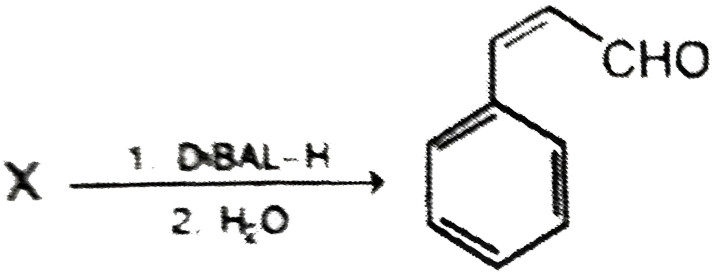
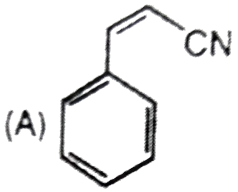
2.

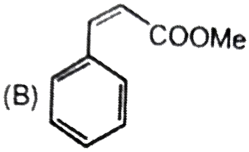


X is

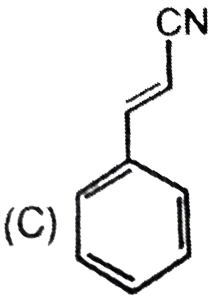
A.

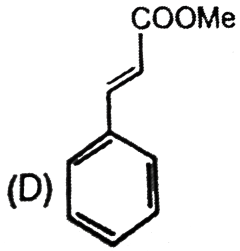


B.



C.



D. 

Answer: A::B::C::D

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3. $C_5H_{10}O \xrightarrow{H_3O^{\oplus}} B + C$, (B) and (C) both give +ve iodoform test. Compound (A) is :

A. $CH_3 - CH = CH - O - CH_2 - CH_3$

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

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

D. None of these

Answer: B::C

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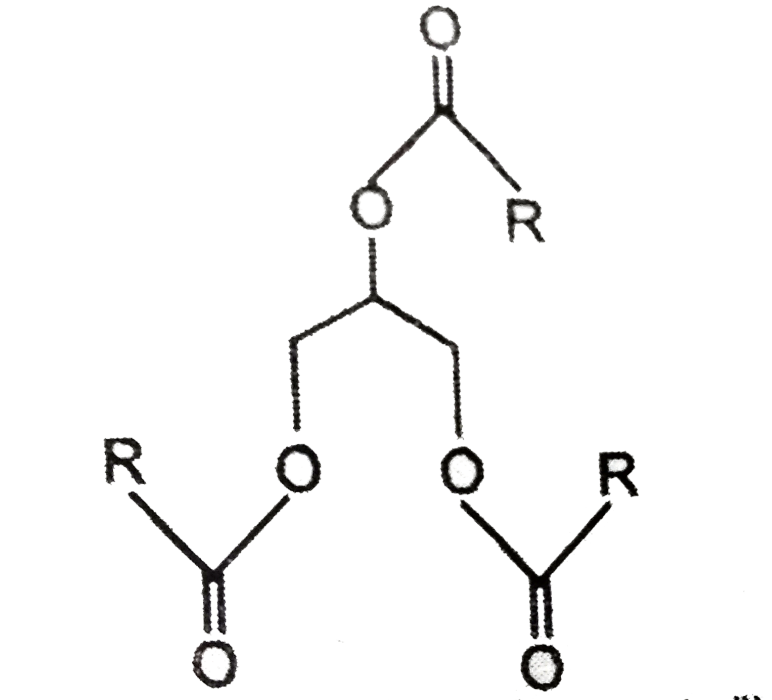


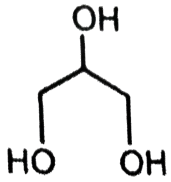
(Principal component of coconut oil)

4.

$\xrightarrow[\substack{100^\circ C \\ \text{(Several hours)}}]{NaOH, H_2O}$ Product Product is obtained in the above reaction is :

A. $R - CO_2Na$

(B)



B.

C. RCHO

D. None of these

Answer: A::B::C::D

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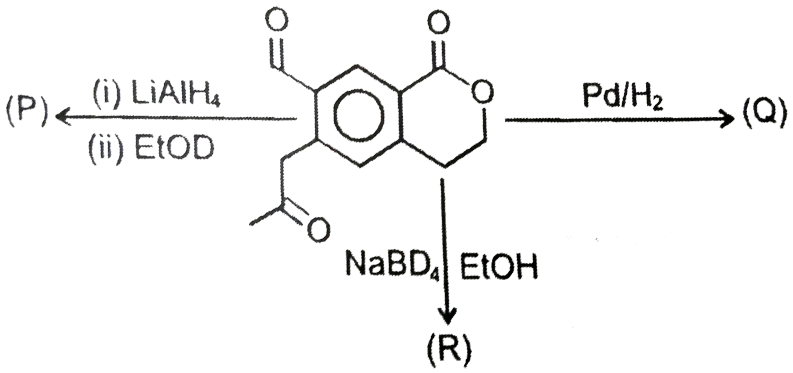
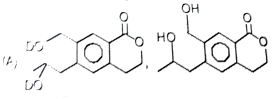
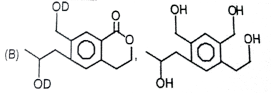
Part Iv Comprehension



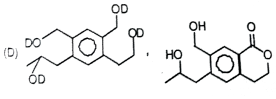
1.

(P) and (Q) respectively are

A. 

B. 

C. 

D. 

Answer: D

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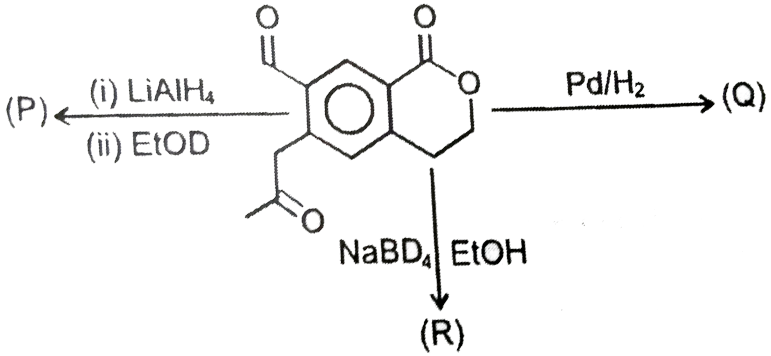
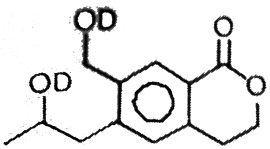
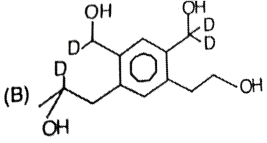
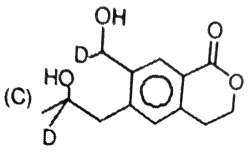
2.

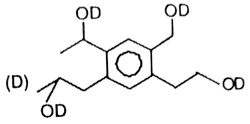


(R) is:

A. 

B. 

C. 

D. 

Answer: C

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3. Oxidation state exhibited by Mn in $KMnO_4$ is

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4. Oxidation state exhibited by Mn in MnO_2 is

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5. Oxidation state exhibited by Mn in MnO_4^{2-} is

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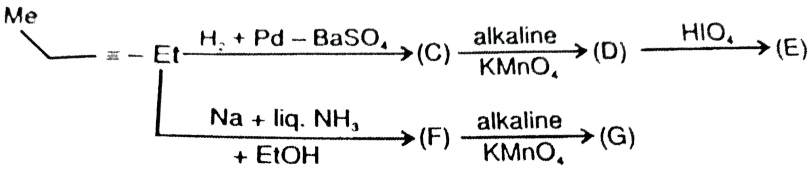
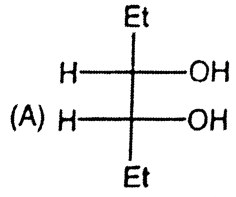
6.

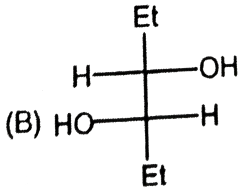


The compound (G) is :

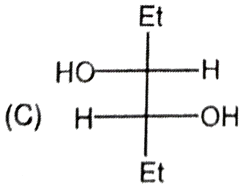
A.



B.



C.



D. Both (B) and (C)

Answer: D

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7. Oxidation state exhibited by Cr in K_2CrO_4 is

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8. Oxidation state exhibited by S in H_2S is

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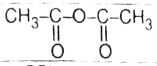
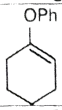
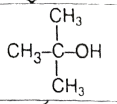
Column-1, 2 and 3 contains starting material, reaction condition and type of reaction respectively.

	Column-1		Column-2		Column-3
(I)		(i)	$KMnO_4$	(P)	Oxidation
(II)		(ii)	Cu/Δ	(Q)	Reduction
(III)		(iii)	H_3O^+	(R)	Hydrolysis
(IV)		(iv)	$LiAlH_4$	(S)	Dehydration

9.

The only correct combination in which product gives positive test with sodium bicarbonate is -

A. (III) (ii) P

B. (I) (iii) Q

C. (II) (iii) R

D. (IV) (i) P

Answer: D

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10. Oxidation state exhibited by Fe in $Fe(CO)_5$ is

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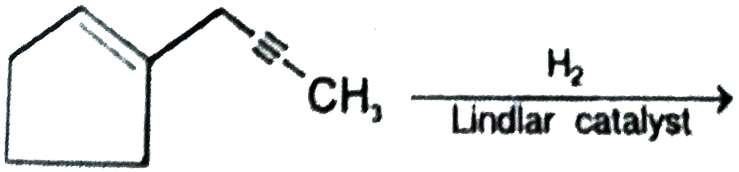
Part I Jee Advanced Previous Years

1. What would be the major product in the following reactions ?



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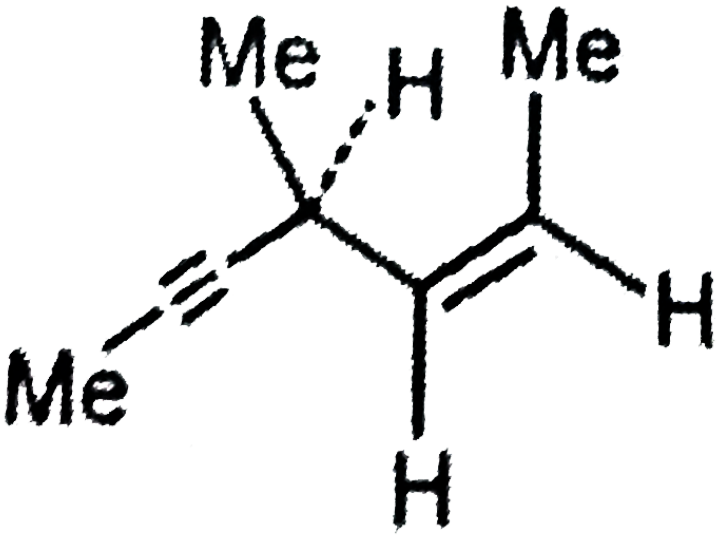
2. Hydrogenation of the adjoining compound in the presence of poisoned palladium catalyst gives.



A. an optically active compound

B. an optically inactive compound

C. a racemic mixture

D. a diastereomeric mixture

Answer: B

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3. 1-propanol and 2-propanol can be best distinguished by :

A. oxidation with alkaline $KMnO_4$ followed by reaction with Fehling solution

B. oxidation with acidic dichromate followed by reaction with Fehling solution

C. oxidation by heating with copper followed by reaction with Fehling solution

D. oxidation with concentrated H_2SO_4 followed by reaction with Fehling solution

Answer: C

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4. Statement I : Dimethyl sulphide is commonly used for the reduction of an ozonide of compound.

Statement II: It reduces the ozonide giving water soluble dimethyl sulphoxide and excess of it evaporates.

A. Assertion is True, Reason is True, Reason is a correct explanation for Assertion.

B. Assertion is True, Reason is True, Reason is NOT correct explanation for Assertion.

C. Assertion is True, Reason is False.

D. Assertion is False, Reason is True

Answer: A

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5. On passing SO_2 gas through calcium hydroxide, we get a white precipitate of

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6. Which of the following is used for the conversion of 2 - hexyne into trans - 2 hexene ?

A. $H_2 . Pt / O_2$

B. $H_2 . Pd / SO_4^{2-}$

C. $Li / NH_3 / C_2H_5OH$

D. $NaBH_4$

Answer: C

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7. Silver nitrate on reaction with sodium iodide gives yellow precipitate of

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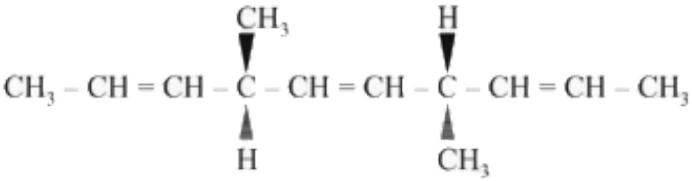
8. Silver nitrate on reaction with potassium chloride gives white precipitate of

Watch Video Solution

9. Silver nitrate on reaction with sodium chromate gives red precipitate of

Watch Video Solution

10. The number of optically active products obtained from the complete ozonolysis of the given compound, is:



A. 0

B. 1

C. 2

D. 4

Answer: A

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11. Consider all possible isomeric ketones including steroisomers of Mw=100, All these isomers are independently reacted with $NaBH_4$ (NOTE: stereoisomers are also separately). The total number of ketones that give a racemic product(s) is/are

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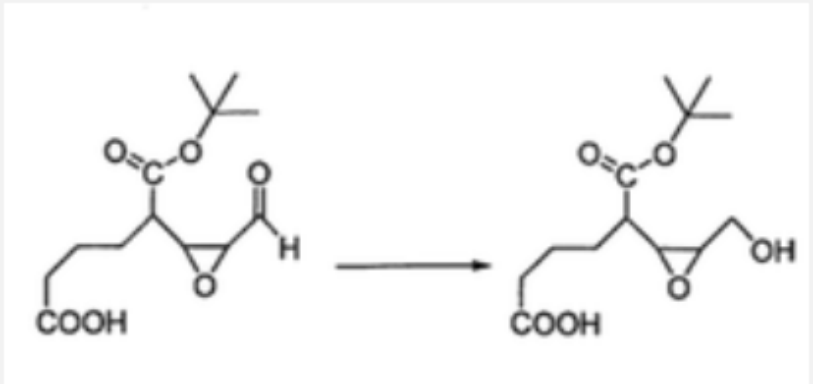
12. Reagent(s) which can be used to bring about the following transformation is(are)



A. $LiAlH_4$ in $(C_2H_5)_2O$

B. BH_3 in THF

C. $NaBH_4$ in C_2H_5OH

D. Raney Ni/H_2 in THF

Answer: C::D

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Part Ii Jee Main Aieee Problems Previous Years

1. But-1-ene may be converted to butane by reaction with

A. Zn-HCl

B. Sn-HCl

C. Zn-Hg

D. Pd/H_2

Answer: D

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2. When $CH_2 = CH - COOH$ is reduced with $LiAlH_4$, the compound obtained will be

A. $CH_3 - CH_2 - COOH$

B. $CH_2 = CH - CH_2OH$

C. $CH_3 - CH_2 - CH_2OH$

D. $CH_3 - CH_2 - CHO$

Answer: B

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3. $AgNO_3$ reacts with sodium hydroxide to give___ colored precipitate of___.

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4. The best reagent to convert pent-3-en-2-ol into pent-3-en-2-one is

A. Pyridinium chloro-chromate

B. Chromic anhydride in galcial acetic acid

C. Acidic dichromate

D. Acidic permanganate

Answer: A

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5. The hydrocarbon which can react with sodium in liquid ammonia is :

1. $CH_3CH_2CH_2C \equiv CCH_2CH_2CH_3$

2. $CH_3CH_2C \equiv CH$

3. $CH_3CH = CHCH_3$

4. $CH_3CH_2C \equiv CCH_2CH_3$

A. $CH_3CH_2C \equiv CH$

B. $CH_3CH = CHCH_3$

C. $CH_3CH_2C \equiv CCH_2CH_3$

D. $CH_3CH_2CH_2C \equiv CCH_2CH_2CH_3$

Answer: A

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6. In the following sequence of reactions, the alkene affords the compound 'B'

$$CH_3CH = CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$$

The compound B is :

A. CH_3COCH_3

B. $CH_3CH_2COCH_3$

C. CH_3CHO

D. CH_3CH_2HO

Answer: C

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7. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is :

A. propane

B. 1-butene

C. 2-butene

D. ethene

Answer: C

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8. Ozonolysis of an organic compound gives formaldehyde as one of products. This confirms the presence of

A. two ethylenic double bonds

B. a vinyl group

C. an isopropyl group

D. an acetylenic triple bond

Answer: B

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9. 2-Hexyne gives trans-2-hexene on treatment with :

A. Pt / H_2

B. Li / NH_3

C. $Pd / BaSO_4$

D. Li / AlH_4

Answer: B

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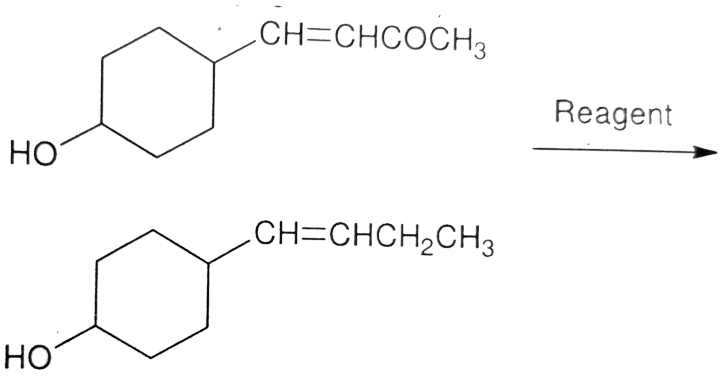
10. In the given transformation, which of the following is the most appropriate reagent ?



A. $NH_2NH_2, \overset{\Theta}{O}H$

B. $Zn - Hg/HCl$

C. Na, Liq, NH_3

D. $NaBH_4$

Answer: A

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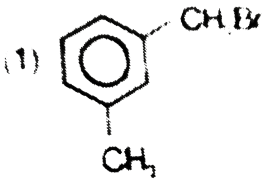
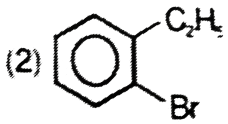
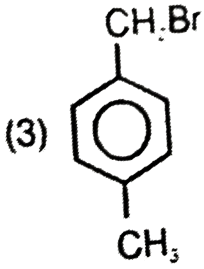
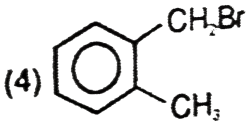
11. Compound (A), C_8H_9Br, gives a white precipitate when warmed with alcoholic $AgNO_3$. Oxidation of (A) gives a acid (B), $C_8H_6O_4$. (B) easily forms anhydride on heating. Identify the compound (A).

A. 

B. 

C. 

D. 

Answer: D

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12. The most suitable reagent for the conversion of $RCH_2OH \rightarrow RCHO$ is

A. $KMnO_4$

B. $K_2Cr_2O_7$

C. CrO_3

D. PCC (Pyridinium Chlorochromate)

Answer: D

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13. In the following squence of reactions

$$\text{Toluene} \xrightarrow{KMnO_4} A \xrightarrow{SOCl_2} B \xrightarrow[BaSO_4]{H_2/Pd}, \text{C} \quad \text{the product C is}$$

A. C_5H_5COOH

B. $C_6H_5CH_3$

C. $C_6H_5CH_2OH$

D. C_6H_5CHO

Answer: D

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14. When C_2O_5OH is heated with acidified $K_2Cr_2O_7$ it forms

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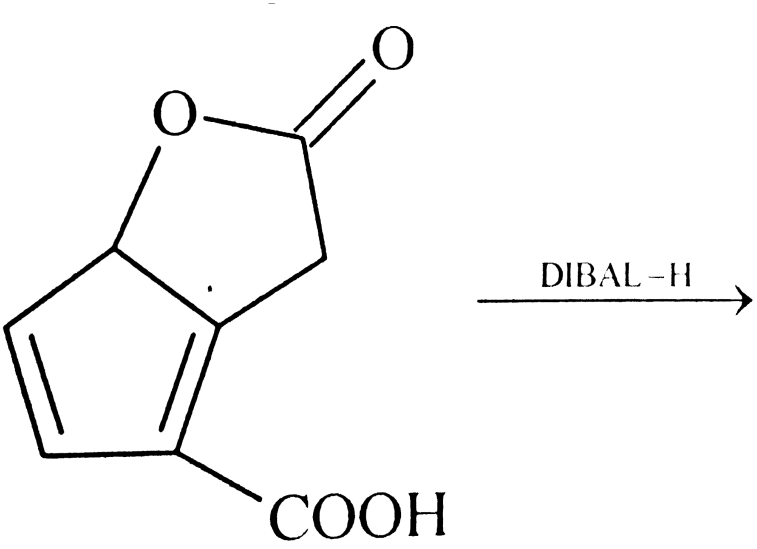
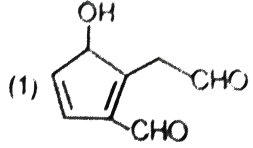
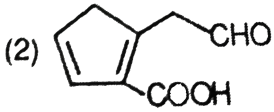
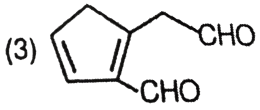
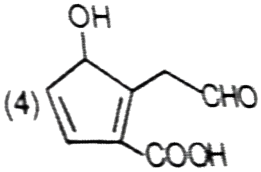
15. The major product obtained in the following reaction is



A. 

B. 

C. 

D. 

Answer: D

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16. The trans-alkenes are formed by the reduction of alkynes with

A. $Na/liq.\ NH_3$

B. $Sn - HCl$

C. $H_2 - Pd/C, BaSO_4$

D. $NaBH_4$

Answer: A

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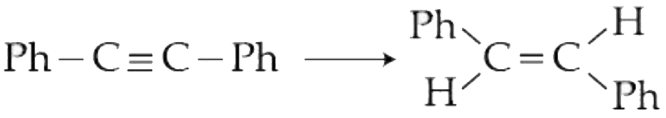
Jee Main Online Problems

1. The reagent needed for converting



is :

A. Cat. Hydrogenation

B. H_2/Lindlar Cat.

C. Li / NH_3

D. $LiAlH_4$

Answer: C

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2. The gas liberated by the electrolysis of Dipotassium succinate solution is :

A. Ethane

B. Ethyne

C. Ethene

D. Propene

Answer: C

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3. CaC_2 and H_2O react to produce:

A. CH_4

B. C_2H_2

C. C_2H_4

D. C_2H_6

Answer: B

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4. Write the products formed in the given reaction, also mention type of reaction:

$CH_3COOH + KOH \rightarrow$

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5. Write the products formed in the given reaction, also mention type of reaction:

$HCOOH + KOH \rightarrow$

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6. When 2-butyne is treated with $H_2/\text{Lindiar's catalyst}$, compound X is produced as the major product and when treated with $Na/liq.\ NH_3$ it produces Y as the major product . Which of the following statements is correct ?

A. X will have higher dipole moment and higher boiling point than Y.

B. Y will have higher dipole moment and higher boiling point then X.

C. X will have lower dipole moment and lower boiling point than Y.

D. Y will have higher dipole moment and lower boiling point than X.

Answer: A

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7. Write the products formed in the given reaction, also mention type of reaction:

$HCOOH + NaOH \rightarrow$

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8. The major product of following reaction is :

$$R - C \equiv N \xrightarrow[(2)\, H_2O]{(1)\, AlH(i-Bu)_2} ?$$

A. $RCONH_2$

B. RCH_2NH_2

C. RCHO

D. RCOOH

Answer: C

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9. On passing SO_3 gas through CS_2, it produces

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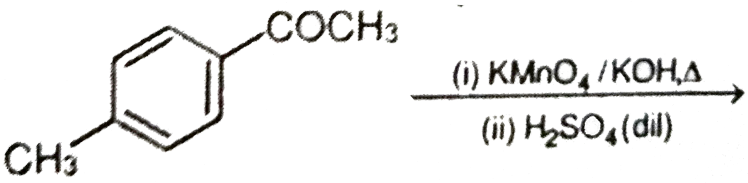
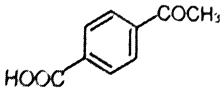
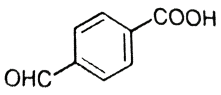
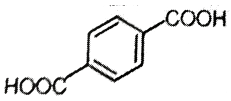
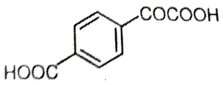
10. The major product of the following reaction is :



A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: C

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11. Name the gas released when HCOONa is heated?

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12. What are the oxidation states of phosphorous in the following:

Na_3PO_4

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13. What are the oxidation states of phosphorous in the following :

H_3PO_3

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Additional Problems For Self Practice Part 1

1. Propyne and propene can be distinguished by .....

A. Conc. H_2SO_4

B. Br_2 in CCl_4

C. Dil. $KMnO_4$

D. $AgNO_3$ in ammonia

Answer: D

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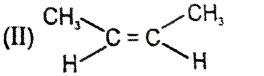
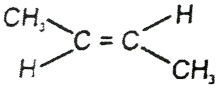
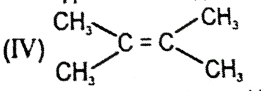
2. The reactivity order towards hydrogenation of the following compounds is

(I) $CH_3-C\equiv C-CH_3$

(II) 

(III) 

(IV) 

A. $I > II > III > IV$

B. $II > III > IV > I$

C. $III > IV > II > I$

D. $IV > III > II > I$

Answer: A

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3. What are the oxidation states of phosphorous in the following:

HPO_3

Watch Video Solution

4. What are the oxidation states of phosphorous in the following :

H_3PO_4

Watch Video Solution

5. What are the oxidation states of phosphorous in the following :

PO_4^{-3}

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6. What are the oxidation states of sulfur in the following :

SO_4^{-2}

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7. 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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8. Complete the given redox reaction

$MnO_2 + HCl \rightarrow$

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9. What happens when calcium chloride reacts with sodium oxalate?

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10. What happens when silver nitrate reacts with sodium chromate?

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11. What are the oxidation states of chromium in the following :

CrO_4^{-2}

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12. An alkene on ozonolysis yields only ethanal. There is an isomer of the alkene which on ozonolysis yields:

A. Propanone and methanal

B. Propanone and ethanal

C. Ethanal and methanal

D. Only propanone

Answer: A

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13. Chromium chloride reacts with sodium hydroxide to form a green precipitate of

Watch Video Solution

14. Which of the following will declourise alkaline $KMnO_4$solution ?

A. C_3H_4

B. CH_4

C. CCl_4

D. C_2H_4

Answer: D

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15. Baeyer's reagent is

A. alkaline permanganate solution

B. acidified permanganate solution

C. neutral permanganate solution

D. aqueous bromine solution

Answer: A

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16. Ferric sulphate reacts with sodium hydroxide to form a reddish brown precipitate of

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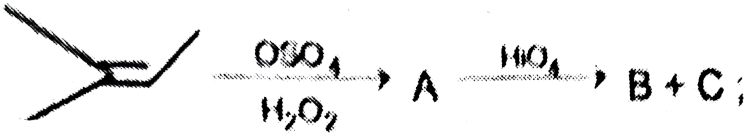
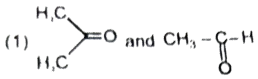
17. 

, Product B and C are respectively :

A. 

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

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

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

Answer: A

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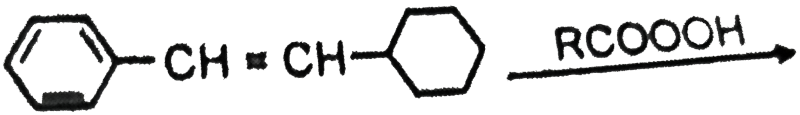
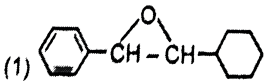
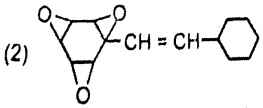
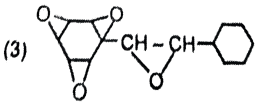
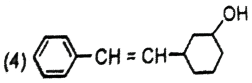
18. Complete the following reaction



A. 

B. 

C. 

D. 

Answer: A

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19. Fenton's reagent is :

A. $FeSO_4 + H_2O_2$

B. $HgSO_4 + H_2O_2$

C. $FeSO_4 + H_2O$

D. None of these

Answer: A

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20. The reagent with which both acetaldehyde and acetone react easily, is :

A. Tollen's reagent

B. Schiffs reagent

C. Grignard reagent

D. Fehling reagent

Answer: C

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21. Heating of sodium acetate with soda lime produces

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22. When acetaldehyde is heated with Fehling's solution, it given a precipitate of :

A. Cu

B. CuO

C. Cu_2O

D. $Cu^+ + Cu_2 + CuO$

Answer: C

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23. Heating of PCl_5 with formic acid produces

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24. Which of the following reaction involves homogeneous reduction ?

A. $CH_2 = CH_2 \xrightarrow{H_2 / Ni} CH_3 - CH_3$

B. $CH_3 - C \equiv C - CH_3 \xrightarrow{\text{Wilkison's catalyst}} CH_3 - CH = CH - CH_3$

C. $CH_3COCl \xrightarrow{H_2 / Pd / CaCO_3 / \text{quinonline}} CH_3CHO$

D. $CH_3C \equiv CH \xrightarrow{H_2 / Pd / CaCO_3 / \text{quinonline}} CH_3CH = CH_2$

Answer: B

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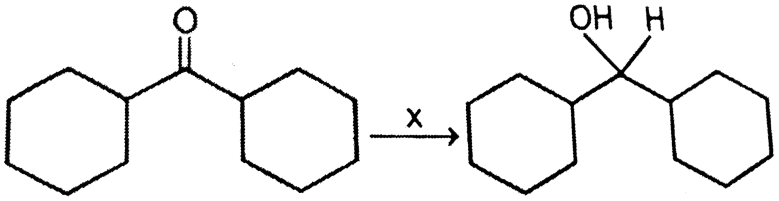
25. 

X is:

A. $NaBH_4 / EtOH$

B. $LiAlH_4 / THF$

C. $Al(OiPr)_3 / CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$

D. All of these

Answer: D

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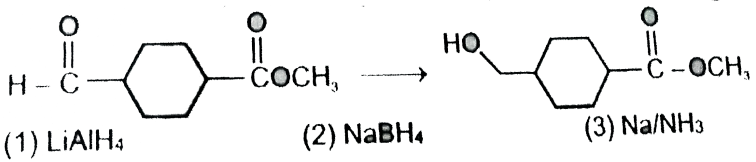
26. Which reducing agent, you can't use to carry out the following transformation.



A. $LiAIH_4$

B. $NaBH_4$

C. Na/NH_3

D. $DIBAL - H$

Answer: B

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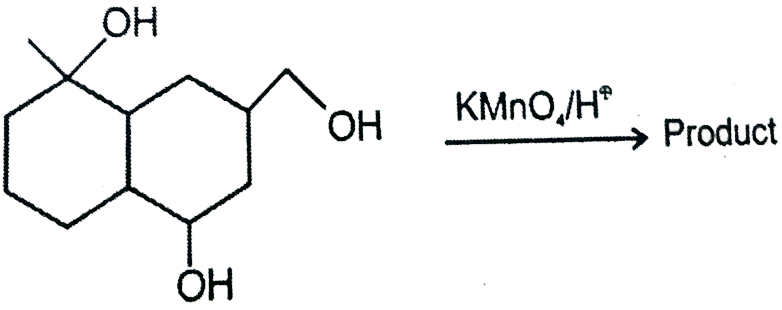
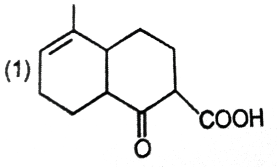
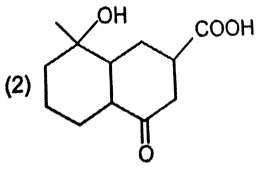
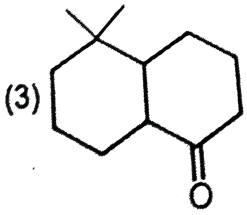
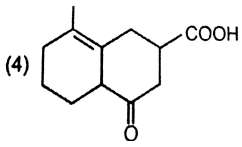
27. Complete the following reaction



A. 

B. 

C. 

D. 

Answer: B

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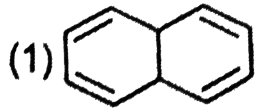
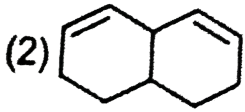
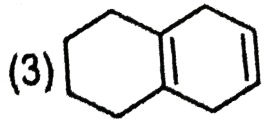
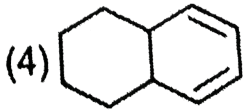
28. An unknown compound decolorizes bromine in carbon tetrachloride, and it undergoes catalytic reduction to give decalin. When treated with warm, conc, potassium permangate, this compound give cis-cyclohexane-

1, 2-dicaboxylic acid and oxalic acid. Possible a structure for th unknown compound is-

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: D

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29. The reaction,

$$Ph - CH_2 - CH = CH - \overset{OH}{\overset{|}{C}}H - CH_3 \xrightarrow[\text{ketone(excess)} / \Delta]{Al(BuO)_3} PhCH_3CH = CH$$

is known as :

A. Wolff-kishner reduction

B. Oppenauer oxidation

C. Meerwein - Ponndorf reaction

D. Clemmensen reduction

Answer: B

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30. The reagent used to convert $RCOOH \rightarrow RCH_2OH$ is

A. $NaBH_4$

B. Na/Alcohol

C. Zn/Hg-HCl

D. $LiAlH_4$

Answer: D

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Part Ii National Standard Examination In Chemistry

1. If 2-pentanone is reacted with $NaBH_4$ follwed by hydrolysis with D_2O the product will be

A. $CH_3CH(OD)CH_2CH_2CH_3$

B. $CH_3CD(OH)CH_2CH_2CH_3$

C. $CH_3CH(OH)CH_2CH_2CH_3$

D. $CH_3CD(OD)CH_2CH_2CH_3$

Answer: A

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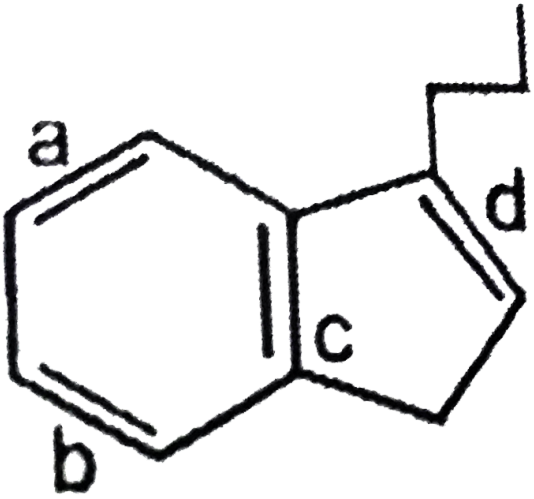
2. If 1 mole H_2 is reacted with 1 mole of the following compound.



Which double bond will be hydrogenated ?

A. c

B. b

C. a

D. d

Answer: D

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3. Which of the following can not be obtained when alkenes are oxidised with $KMnO_4$ and then followed by acid hydrolysis ?

A. alkanoic acids

B. alkanals

C. alkanones

D. carbon dioxide

Answer: B

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4. In the reactin,

$$CH_3CN + 2H \xrightarrow[\text{Ether}]{HCl} X \xrightarrow{\text{Boilling}H_2O} Y$$

the term Y is

A. acetaldehyde

B. ethanamine

C. dimethylamine

D. acetone

Answer: A

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5. A compound is soluble in conc. H_2SO_4. It does not decolourise bromine in carbon tetrachloride but oxidised by chromic anhydride in aqueous sulphuric acid within two seconds, turning organge solution to blue, green and then opaque. The original compound is :

A. an alkane

B. a tertiary alcohol

C. a primary alcohol

D. an ether

Answer: C

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6. If $3-$ hexanone is reacted with $NaBH_4$ followed by hydrolysis with D_2O, the product will be :

A. $CH_3CH_2CH(OD)CH_2CH_2CH_3$

B. $CH_3CH_2CD(OH)CH_2CH_2CH_3$

C. $CH_3CH_2CH(OH)CH_2CH_2CH_3$

D. $CH_3CH_2OD(OD)CH_2CH_2CH_3$

Answer: A

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7. Hydrogenation of benzoyl chloride in the presence of Pd on $BaSO_4$ gives

A. benzyl alcohol

B. benzoic acid

C. bezaldehyde

D. toluene

Answer: C

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8. The reaction, $R_2CO + 4[H] \xrightarrow[\text{Conc. HCl}]{\text{Zn-Hg}} R_2CH_2 + H_2O$ is well known as :

A. Wurtz reaction

B. Rsoenmund reduction

C. Kolbe reaction

D. Clemmensen reduction

Answer: D

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9. Acetone will be obtained on ozonolysis of

A. 1-butene

B. 2-butene

C. isobutene

D. butyne

Answer: C

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10. Which of the following are reducing agents among the following?

A. $LiAIH_4$

B. H_2 / Pd

C. KMnO4

D. $NaBH_4$

Answer: A

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11. Reduction of an isonitrile gives a

A. primary amine

B. secondary amine

C. tertiary amine

D. quaternary ammonium salt.

Answer: B

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12. Methane may be obtained from monochloromethane by

A. reduction with nascent hydrogen (Zn + HCl)

B. reduction with hydrogen (H_2)

C. heating with sodium metal in dry ether

D. hydrolysis with aqueous NaOH.

Answer: A

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13. The compound which does not react with lithium aluminium hydride is

A. 3-penten-2-one

B. methyl benzoate

C. 2-pentanol

D. propanenitrile

Answer: C

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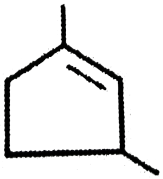
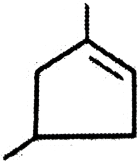
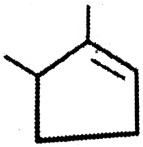
14. The compound which would yield $5-$ Oxo$-2-$ methylhexanal on reductive ozonolysis

A. (A) 

B. (B) 

C. (C) 

D. (D) 

Answer: B

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15. Reduction of methylbenzoate $(C_6H_5COOCH_3)$ to benzyl alcohol (C_6HCH_2OH) can be accomplished using

A. H_2 / Pd

B. $LiAIH_4$

C. $NaBH_4$

D. Zn-Hg/HCl

Answer: B

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16. Oxidation of cyclopentanol to cyclopentanone can be accomplished by using

A. Tollen's reagent

B. chromic acid

C. bromine water

D. Fehling's solution

Answer: B

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17. Carbonyl compounds can generally be converted to hydrocarbons by

A. H_2 / Pt

B. $LiAIH_4$

C. $N_2H_4 - KOH$

D. $K_2Cr_2O_7 - H_2SO_4$

Answer: C

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18. Which of the following reagents would not be a good choice for reducing an aryl nitro compound to an amine?

A. $LiAlH_4$ in ether

B. Fe and HCl

C. H_2/Pt

D. Sn and HCl

Answer: B

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19. Suggest the suitable reagent for the following transformation.

A. meta-chloroperbenzoic acid

B. ozone

C. potassium dichromate

D. alkaline hydrogen peroxide

Answer: D

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20. An isocyanide on reduction with hydrogen in the presence of platinum gives :

A. amide

B. primary amine

C. secondary amine

D. alcohol

Answer: C

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21. Compound X $(C_5H_{10}O)$ is a chiral alcohol. It is catalytically hydrogenated to an achiral alcohol Y $(C_5H_{12}O)$ and oxidized by activated MnO_2 to an achiral carbonyl compound $Z(C_5H_8O)$. Compound X is

A. 1-penten-3-ol

B. 1-penten-2-ol

C. 3-methyl-2-buten-1-ol

D. 2-methyl-2-butene-1-ol

Answer: A

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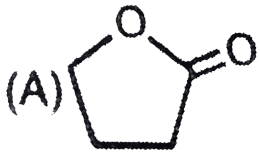
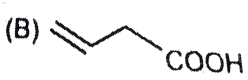
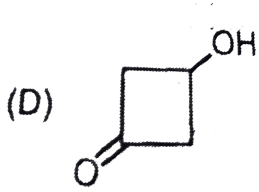
22. 4-Oxobutanoic acid is reduced with Na-borohydride and the product is treated with aqueous acid. The final product is :

A. 

B. 

C. 

D. 

Answer: A

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23. A solution of sodium metal in liquid ammonia is strongly reducing due to the presence of

A. sodium atoms

B. sodium hydride

C. sodium amide

D. solvated electrons

Answer: D

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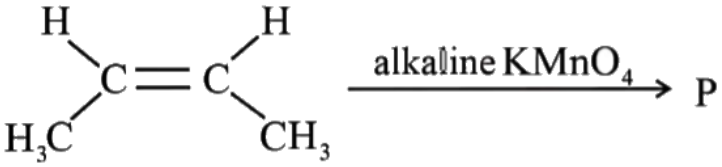
24. Which of the following statements is true for the reaction given below?



A. P is a meso compound of 2,3-butanediol formed by syn addition.

B. P is a meso compound of 2,3-butanediol formed by anti addition.

C. P is a racemic mixture of d-and I-2,3-butanediol formed by anti addition.

D. P is a racemic mixture of d-and I-2,3-butanediol formed by syn addition.

Answer: A

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25. Complete catalytic hydrogenation of napthalene gives decalin $(C_{10}H_{18})$. The number of isomers of decalin formed and the total number of isomers of decalin possible are respectively.

A. 1,2

B. 2,2

C. 2,4

D. 3,4

Answer: A

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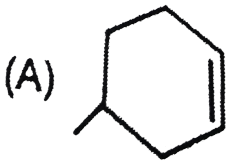
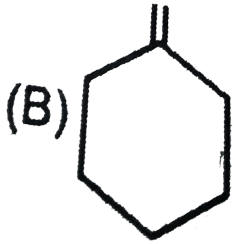
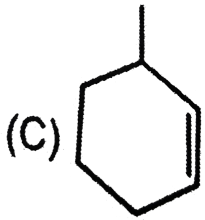
26. Which of the following on treatment with hot concentrated acidified $KMnO_4$ gives 2 - methylhexane -1,6 - dioic acid the only organic product ?

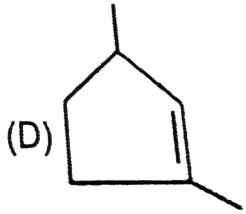
A. 

B. 

C.



D.



Answer: C

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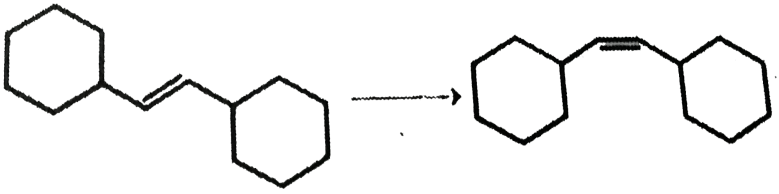
27. The correct sequence of reagents from those listed below for the following conversion is



I. $NaNH_2$ II. Br_2

III. $H_2 / Pd - C$,quinolone IV. H_3O^+

A. IV-I-III

B. III - IV - I

C. II - I - III

D. I - II - III

Answer: C

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Part Iii High Level Problems Subjective Questions

1. An alkene $(A)C_{16}H_{16}$ on ozonolysis gives only one product $(B)(C_8H_8O)$. Compound (B) on reaction with NH_2OH followed by reaction with H_2SO_4, Δ gives N - methyl benzamide the compound 'A' is -

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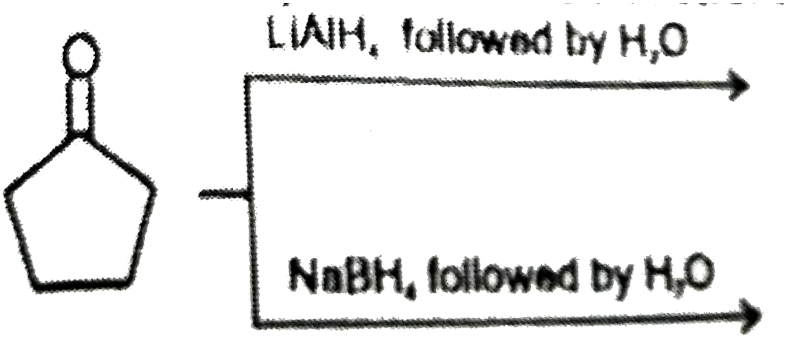
2. What is the product of each reaction



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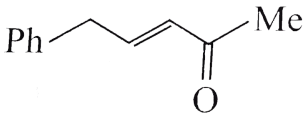
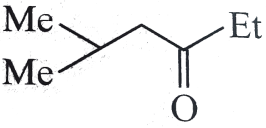
3. Which alcohol is prepared from the following ketones via MPV reduction?

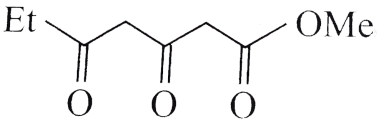
a.



b.



c.



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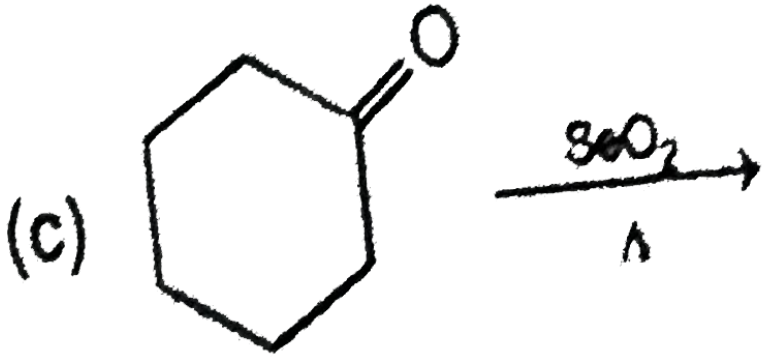
4. Complete the following

(a) $CH_3 - CHO \xrightarrow[\Delta]{SeO_2}$, (b) $H_3C - CH_2 - \overset{\overset{O}{||}}{C} - CH_3 \xrightarrow[\Delta]{SeO_2}$, (c)



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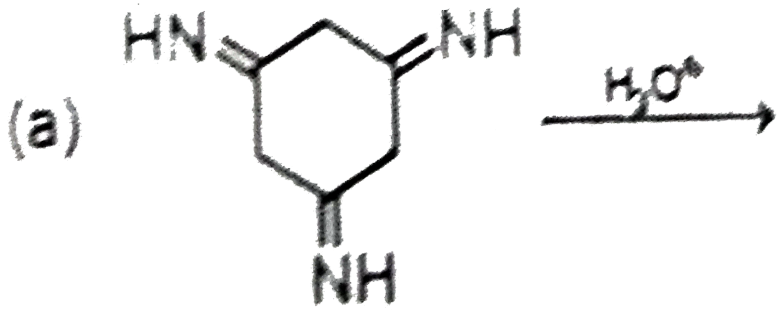
5. Complete the following



(a)

(b) $Ph - O - CH = CH_2 \xrightarrow{H_3O^{\oplus}} A + B$

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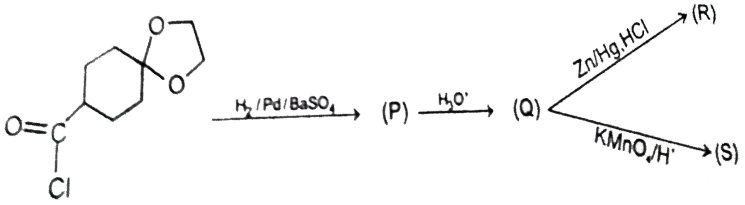
6. Write the products P, Q, R and S in the given reaction sequence.



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Only One Option Correct Type

1. Identify a reagent from the following list which can easily distinguish between 1-butyne and 2-butyne.

A. bromine, CCl_4

B. H_2 Lindlar catalyst

C. dilute H_2SO_4, $HgSO_4$

D. ammonical Cu_2Cl_2 solution

Answer: D

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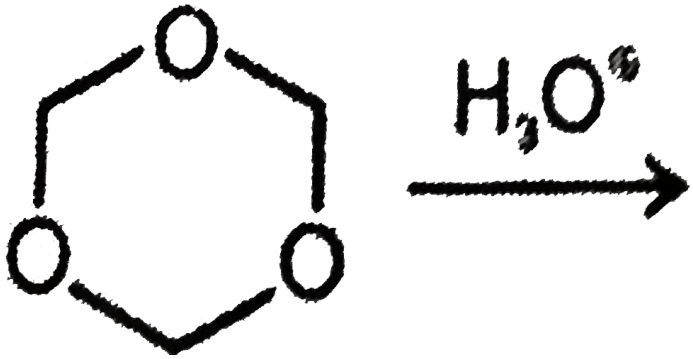
2.



IUPAC name of the compound :

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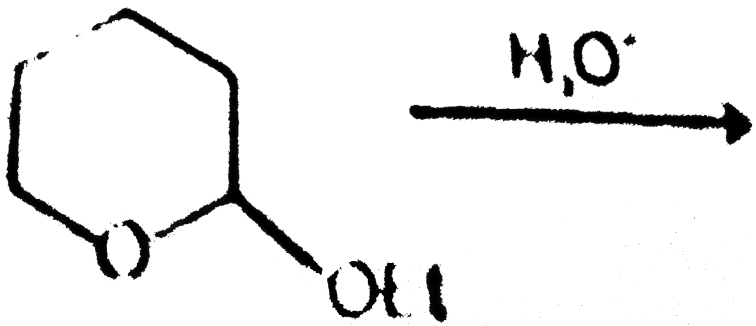
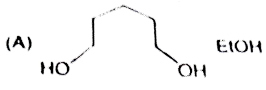
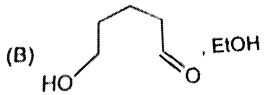
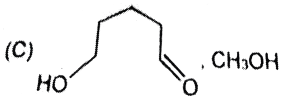
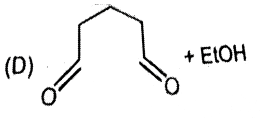
3. 

Product of above reaction is :

A. 

B. 

C. 

D. 

Answer: B

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4. Oxidation state exhibited by Cl in $HClO_4$ is

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Single And Double Value And Integer Type

1. Oxidation state exhibited by Cl in $HClO_3$ is

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2. Oxidation state exhibited by Cl in $HClO_2$ is

Watch Video Solution

3. Oxidation state exhibited by Cl in $HClO$ is

Watch Video Solution

4. Name the gas evolved when:

SiH_4 undergoes hydrolysis.

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5. $MnO_4^- + SO_3^{2-} \rightarrow MnO_4^{2-} + SO_4^{2-}$

Oxidising and reducing agent in given reaction is:

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6. $2FeCl_3 + SnCl_2 \rightarrow 2FeCl_2 + SnCl_4$

Oxidising and reducing agent in given reaction is:

Watch Video Solution

7. $2HgCl_2 + SnCl_2 \rightarrow Hg_2Cl_2 + SnCl_4$

Oxidising and reducing agent in given reaction is:

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One Or More Than Options Correct Type

1. Complete the given redox reaction:

$NaBr + MnO_2 + H_2SO_4 \rightarrow$

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2. Complete the given redox reaction

$H_2S + K_2CrO_4 + H_2SO_4 \rightarrow$

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3. Complete the given redox reaction

$CuO + NH_3 \rightarrow$

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Part Iv Practice Test 2

1. Complete the given redox reaction

$Zn + AgCN \rightarrow$

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Part Iv Practice Test 3

1. Ferrous sulphate reacts with NaOH to gives green precipitate of

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Part Iv Practice Test 4

1. Silver nitrate reacts with sodium oxalate to give white precipitate of

Watch Video Solution

Part Iv Practice Test 5

1. What is the product formed in each case when the following compounds react with H_2O_2?

(i) NaOCl (ii) $Ba(OH)_2$

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Part Iv Practice Test 6

1. What is the product formed in each case when the following compounds react with H_2O_2?

(i) NaOH (ii) N_2H_4

Watch Video Solution

Part Iv Practice Test 7

1. Conversation of chloroethane to butane.

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One And More Than One Option Correct Type

1. What is the product formed in each case when the following compounds react with H_2O_2?

(i) $Ca(OH)_2$ (ii) $NaOCl$

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2. Complete the given redox reaction:

$KMnO_4 + NH_3 \rightarrow$

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3. What is the product formed in each case when the following compounds react with H_2O_2?

(i) N_2H_4 (ii) MnO_2

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4. Which among the following dioxides form H_2O on passing H_2 gas through them?

A. SO_2

B. MnO_2

C. NO_2

D. All of the above

Answer:

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5. Name the gas evolved when:

SnH_4 undergoes hydrolysis.

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Comprehension Type

1. Colour of ppt formed when $HgCl_2$ reacts with KI is

A. Orange

B. Blue

C. Green

D. White

Answer: A

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2. Oxyacid formed when BH_3 reacts with H_2O is:

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3. Oxyacid formed when PH_3 reacts with H_2O is:

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