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India's Number 1 Education App

## CHEMISTRY

## BOOKS - CENGAGE CHEMISTRY (HINGLISH)

## GRIGNARD REAGENTS AND ORGANOMETALLIC

## REAGENTS

## Illustration

1. Explain why organocopper and organocadmium reagents react with less reactive acid chlorides even though they do not reacts with more reactive ketones.
2. The reaction of $R^{\prime}-\stackrel{O}{C}-C l$ with $R_{2} C u L i$ or $R_{2} C d$ gives a ketone, but with $R M g X$ it gives a $3^{\circ}$ alcohol.
(a) Explain why $R M g X$ reaction does not give ketone.
(b) Account for the difference in behaviour of RMgX and $\mathrm{R}_{2} \mathrm{CuLi}$ or $R_{2} C d$.
( c) What is the relationship between the reactivity of the organometallic compound and activity of the metal ?

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3. Explain or complete the following reactions.
(i)

$\xrightarrow{\mathrm{NaOEt}} \mathrm{EtO}$

## ii. <br> 

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4. Synthesise the following :
(a) Benzyl alcohol from G. R.
(b) 2-Methyl-2-phenyl propanol from $G . R$.
(c) 2-Cyclopropyl ethanol from $G . R$.
(d) $\alpha$-Phenyl ethanol from MeMgl .
(e) 2-Butanol from acetaldehyde
(f) Triphenyl methanol from benzophenone
(g) $\alpha, \alpha$-Diphenyl ethanol from acetophenone
(h) 1-Cyclopropyl-1-phenyl ethanol from PhMgBr .

(i)
5. Complete the following reactions :
(a) $2 \mathrm{MeMgBr}+C d \mathrm{Cl}_{2} \rightarrow(A) \xrightarrow{\stackrel{\substack{\| \\ \\ 2 P h}}{ } \text { Cl }}(B)+(C)$

c.

(G)

(J)

(K)
e.

(M)
(N)
(H)

f.

g.
$\mathrm{O}^{\prime \prime}\left(\mathrm{CH}_{2}\right)_{4}^{\mathrm{Cl}} \overbrace{\mathrm{O}}^{(\mathrm{U})} \mathrm{Me}+$
(U) $\left.\right|_{\text {(i) }}{ }^{\mathrm{Me}}>-\mathrm{Mg} \mathrm{Br} \quad(\mathrm{V})$
(b)

(ii) $\mathrm{Me}{ }^{-}$
(iii) $\mathrm{H}_{3} \mathrm{O}$
(X)
$\xrightarrow[2, H_{0},]{\text { THF }}(\mathrm{W})$

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6. Complete the following reactions :

c. $\bigodot_{(F)} \mathrm{C} \equiv \mathrm{N}+\underset{(\mathrm{G})}{\mathrm{PhMgBr}} \xrightarrow[2 \cdot \mathrm{H}_{3} \mathrm{O}]{\stackrel{\text { OTHF. }}{\longrightarrow}}(\mathrm{H})$
e.
(b)


(c)
(d)
(e)

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7. Complete the following reactions :

d. $\underset{(\mathrm{G})}{\mathrm{PhCl}}+\mathrm{Mg}+\mathrm{CO}_{2} \xrightarrow{\mathrm{H}_{2} \mathrm{O}}(\mathrm{H})$


e.
(I)

Mc
f. trans-4-Chloro methyl cyclohexane $+\mathrm{Mg}_{\mathrm{g}}$


$\xrightarrow{\substack{\mathrm{Mg}+\mathrm{SO}_{2} / \mathrm{H}_{2} \mathrm{O}}}$| $\mathrm{Mg}+\mathrm{SO}_{3} / \mathrm{H}_{2} \mathrm{O}$ |
| :---: |
| $\mathrm{Mg}+\mathrm{CS}_{2} / \mathrm{H}_{2} \mathrm{O}$ |$(\mathrm{C})$

$$
\begin{equation*}
\xrightarrow[\substack {+\mathrm{CO}_{2} \\
\begin{subarray}{c}{\mathrm{Mg}+\mathrm{SO}_{2} / \mathrm{H}_{2} \mathrm{O} \\
\mathrm{Mg}+\mathrm{SO}_{3} / \mathrm{H}_{2} \mathrm{O} \\
\mathrm{Mg}+\mathrm{CS}_{2} / \mathrm{H}_{2} \mathrm{O}{ + \mathrm { CO } _ { 2 } \\
\begin{subarray} { c } { \mathrm { Mg } + \mathrm { SO } _ { 2 } / \mathrm { H } _ { 2 } \mathrm { O } \\
\mathrm { Mg } + \mathrm { SO } _ { 3 } / \mathrm { H } _ { 2 } \mathrm { O } \\
\mathrm { Mg } + \mathrm { CS } _ { 2 } / \mathrm { H } _ { 2 } \mathrm { O } } } \\
{(\mathrm{R})} \\
{ }\end{subarray}]{\substack{\mathrm{Mg}) \\
\hline}}(\mathrm{S}) \tag{T}
\end{equation*}
$$

h. $\mathrm{RMgBr}+\mathrm{CO}_{2} \xrightarrow[\mathrm{H}_{2} \mathrm{O}]{\text { Fiher. } \Delta}$ Valeric acid
(V)
i. $\mathrm{RMgBr}+\mathrm{CO}_{2} \xrightarrow[112 \mathrm{O}]{\text { Ehher, } \Delta}$ Caproic acid (W)
j. $\quad \mathrm{Br} \xrightarrow{\mathrm{Br}}+\mathrm{Mg} \xrightarrow{\mathrm{H}, \mathrm{O}}(\mathrm{Z})$
(b)
(Y)
(d) $\mathrm{PhCl}+\mathrm{Mg}+\mathrm{CO}_{2} \xrightarrow{\mathrm{H}_{2} \mathrm{O}}(H)$ (G)
(f) trans-4-Chloro methyl cyclohexane $+\mathrm{Mg}+\mathrm{CO}_{2} \xrightarrow{\mathrm{H}_{2} \mathrm{O}}(O)$ ( $N$ )
(g)
(h) $R M g B r+\mathrm{CO}_{2} \xrightarrow[H_{2} I]{\text { Ether, } \Delta}$ Valericacid.
( $U$ )
$\mathrm{H}_{2} \mathrm{I}$
(i) $\underset{(W)}{\mathrm{RMgBr}}+\mathrm{CO}_{2} \xrightarrow[\mathrm{H}_{2} \mathrm{O}]{\text { Ether, } \Delta}$ Caproicacid.
8. Identify the products.


Ethyl-6-hydroxy-4-oxohexanoate
$(\mathrm{E}) \stackrel{\mathrm{H}_{3} \mathrm{O}^{\oplus}}{\leftarrow}(\mathrm{D}) \stackrel{2 \text { mol of }}{\stackrel{\mathrm{MeMgBr}}{\stackrel{1}{2}}}$

## 9. Complete the following reactions :

a. Me

Toluene
(B) $\xrightarrow[\text { ether, } \Delta]{\mathrm{Mg}}(\mathrm{C})$

1. Ethylune oxide
2. $\mathrm{H}_{3} \mathrm{O}^{\oplus}$
(D)
b.

Cyclopentylmethanoyl
chloride

d.

Me


(2) Why cannot be $G$. $R$ or lithium organometallic compounds of

prepared?

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10. Complete the following reactions :
c.

(F) $\stackrel{\mathrm{H}_{2}+\mathrm{Ni}}{\rightleftarrows}$
(E) $\stackrel{\text { Conc. } \mathrm{H}_{2} \mathrm{SO}_{4}}{-\mathrm{H}_{2} \mathrm{O}}$
(D) $\stackrel{\left(\text { (ii) Mether. } \Delta, \mathrm{H}_{2} \mathrm{O}\right.}{(\text { (i) }}$
(C)
(a)


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## Solved Examples

1. 

(A) $\xrightarrow[250^{\circ} \mathrm{C}]{\mathrm{Al}_{2} \mathrm{O}_{3}}(\mathrm{~B})\left(\mathrm{C}_{5} \mathrm{H}_{10}\right) \xrightarrow[\text { (ii) } \mathrm{AgOH}]{\text { (i) } \mathrm{HI}}$ (C)

$(A)$ and $(C)$ are isomers, $(B)$ can be obtained by the products of the reactions of $E t M g B r$ and acetone

. Give the
structures of $(A),(B)$, and $(C)$.

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2. Two different $G . R .(A)$ and $(B)$ give the product $(X)$

on reaction
with $(C)$ and $(D)$ respectively. Give the structures of $(A),(B),(C)$ and $(D)$.
$\rightarrow$ Doces not react apprecta. bly at room temperature

Ammoniacal $\mathrm{AgNO}_{3}$ White precipitate (B)
(i) $\mathrm{I}_{2}+\mathrm{Pt}$
(ii) Boiling with excess HI
3. 11 -Pentane

A sample of 0.42 gm os $(A)$ with excess of $M e M g B r$ gives $224 m l$ of $C H_{4}(g)$ at $S . T . P$ Give the structure of $(A)$ and write the equations involved.

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4. Identify the structures of $(A)$ to ( $D$ ).
(A)

$$
\xrightarrow[\substack{+ \text { Benzoyl } \\ \text { peroxide }}]{\text { Excess of } \mathrm{HCl}}(\mathrm{~B}) \xrightarrow[\text { dryether }]{\mathrm{Mg}}(\mathrm{C}) \xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{G}]{\text { (i) Ethyl acetate }}(\mathrm{D})
$$

5. Identify $(A)$ to $(F)$ and mark the $C^{*}$ carbon in the entire scheme $\mathrm{Ca} \stackrel{*}{\mathrm{C}} \mathrm{O}_{3}+\mathrm{H}_{2} \mathrm{SO}_{4} \rightarrow(\mathrm{~A})(\mathrm{gas})\left[C^{*}\right.$ denotes $\left.C^{14}\right]$.
$\underbrace{}_{\text {(B) }} \mathrm{Br} \frac{\begin{array}{l}\text { (i) } \mathrm{Mg} / \mathrm{THF} \\ \text { (iii) } \text { (gas) } \\ \text { ( } \mathrm{H}_{3} \mathrm{O}^{+}\end{array}}{\text {(a) }}$
(E) $\xrightarrow{\mathrm{O}_{3} / \text { Red. }} \stackrel{*}{\mathrm{C}} \mathrm{H}_{2}=\mathrm{O}+(\mathrm{F})$

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6. Identify $(A)$ to $(C)$.


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7. Identify $(A)$ to $(E)$.
$\mathrm{Me}-(\mathrm{A})-\mathrm{H} \xrightarrow{\mathrm{MeMgBr}} \mathrm{CH}_{4}$ (g) + (B) $\xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}]{\text { (i) }}$ (C)

$$
\xrightarrow{\mathrm{MeI}}(\mathrm{D}) \xrightarrow[\mathrm{Pd}+\mathrm{BaSO}_{4}]{\mathrm{H}_{2}+}(\mathrm{E})
$$

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8. Identify $(A)$ to $(E)$.

$\xrightarrow{\text { NBS }}$
(B) $\xrightarrow[\text { KOH }]{\text { alc. }}(\mathrm{C}) \xrightarrow{\mathrm{PhCO}_{3} \mathrm{H}}(\mathrm{D})$
(A)

9. PhMgBr
10. $\mathrm{H}_{3} \mathrm{O}$
(E)

## 9. Identify $(A)$ to $(D)$.

Ester $\mathrm{A}\left(\mathrm{C}_{7} \mathrm{H}_{14} \mathrm{O}_{2}\right)+2 \mathrm{MeMgBr} \xrightarrow[\text { 2. } \mathrm{H}_{3} \mathrm{O}^{\text {a }}]{\text { 1.THF, }}$ Alcohol B

$$
\left(\mathrm{C}_{6} \mathrm{H}_{14} \mathrm{O}\right)
$$



$$
\mathrm{D}\left(\mathrm{C}_{3} \mathrm{H}_{6} \mathrm{O}\right) \stackrel{\left(\mathrm{O}_{3} / \mathrm{H}_{2} \mathrm{O}\right.}{ } \mathrm{C}\left(\mathrm{C}_{6}, \mathrm{H}_{12}\right)
$$

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How would the ratio of products change if.
(i) $R=E t$

## ii. $\binom{\mathrm{Me}}{\mathrm{Me}}$ or (iso- Pr )

(ii)

## iii. $\left(\begin{array}{c}\mathrm{Me} \\ \mathrm{Me} \\ \mathrm{Me}\end{array}\right)$ or $t-\mathrm{Bu}$

(iii)

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$$
\underset{(\mathrm{A})}{\mathrm{CHD}_{2} \mathrm{I}} \xrightarrow{?} \xrightarrow{?} \xrightarrow{?}{\underset{\mathrm{D}}{\mathrm{H}} \mathrm{(B)}}_{\mathrm{D}}^{\mathrm{OH}}
$$


11. Convert
12.


(ethanol). Prepare pent $-2-e \neq$ using $G$. $R$. Is there more than one way ? If so, which is the best and why ?

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13. Complete the following reaction using $G . R$ and any other compound.


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14. Complete the following reactions :

> Me
> b. $\mathrm{CO}_{2}+$
> (A) $\quad \mathrm{Me}$ (B)
> (D)
(a)
(b)

(c)
g. Ethane nitrile

$$
\underset{\substack{\text { (i) } n-\mathrm{C}_{4} \mathrm{H}_{9} \mathrm{Li},\left(\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus} \\\right. \text { (D) }}}{\substack{\text { (A) }}} \text { (E) }
$$

(d)
15. Convert the following reactions by using $G$. $R$.



c. Isopropanol to $\underset{\mathrm{Me}}{\mathrm{Mc}} \searrow-\mathrm{NH}_{2}$
(a)

1.

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2. 

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3. 


4.

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5.

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# Me <br> 6. $\underset{\text { Me }}{\text { Me }} \xrightarrow{\longrightarrow} \mathrm{H}+\mathrm{Br}_{2} \xrightarrow{h v} \mathrm{~A} \xrightarrow[\text { (ii) } \mathrm{D}_{2} \mathrm{O}]{\text { (i) } \mathrm{Mg} / \text { ether }} \mathrm{B}$ 

6. 

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7. $\mathrm{B} \underset{\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}}{\stackrel{\text { (i) } \mathrm{MeMgBr}^{( }}{ }}$Acrolein $\xrightarrow{\text { LAH }} \mathrm{A}$
8. 

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8. (a)

(b)

(e) $\mathrm{PhMgBr} \underset{\mathrm{H}_{3} \mathrm{O}^{+}}{\stackrel{O_{2}}{\longrightarrow}}$ ?
(f) Phenol + RMgI $\rightarrow$ ?.
9.

9.

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10.

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$$
\text { 11. a. } \mathrm{Ph}-\mathrm{C} \equiv \mathrm{~N} \xrightarrow[\text { (ii) } \mathrm{H}_{2} \mathrm{O}, \mathrm{H}^{\ominus}]{\text { (i) } \mathrm{MeM} \mathrm{MBr}} \mathrm{~A}
$$



$$
\xrightarrow[\text { (ii) } \mathrm{H}_{2} \mathrm{O}]{\text { (i) } \mathrm{MeLi}} \text { (B) }
$$

11. (a)

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12. $\mathrm{PhCH}_{3} \xrightarrow{\mathrm{NBS}} \mathrm{A} \xrightarrow{\mathrm{NaCN}} \mathrm{B} \xrightarrow[\mathrm{H}_{3} \mathrm{O}^{\oplus}]{\square-\mathrm{MgBr}} \mathrm{C}$
13. 

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13. 

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14. 

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15. 

$M e-\stackrel{O}{\|} \mathrm{\|} M e(2 \mathrm{~mol})+B r M g C \equiv C-M g B r o v e s e t\left(H_{3} O^{\oplus}\right)(\rightarrow) A$
b. $\square \mathrm{MgBr}+\mathrm{HCOOEt} \xrightarrow{\mathrm{H}_{2} \mathrm{O}} \mathrm{A}$
c. $\square=\mathrm{O}+\left\langle\mathrm{MgBr} \xrightarrow{\mathrm{H}_{2} \mathrm{O}} \mathrm{A}\right.$

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16. The reaction of $\mathrm{Me}_{3} C M_{g} \mathrm{Cl}$ and $\mathrm{Me} e_{3} \mathrm{C}-\mathrm{C}-C m e_{3}$ after hydrolysis gives a $(A)$ and a $2^{\circ}$ alcohol $(B)$ rather than the expected tri $-t$-butyl carbinol. Provide the structures of $(A)$ and $(B)$ with explanation.

## (D) Watch Video Solution

17. Convert of following :
a. Acetone to $\mathrm{Me}_{\mathrm{Me}}^{\mathrm{MeOH}}$ OH
b. Ethanol to $\left.\mathrm{Me}^{\mathrm{Me}}\right\rangle-\mathrm{CH}=\mathrm{O}$
c. Acetic acid to Butan-2-one

e. $t$-Butanol to

18. In the following reaction sequence, the products $(B)$ to $(E)$ are formed.

> (A)
5-Methylhex-3-yn-1-al

(iii) $\mathrm{H}_{3} \mathrm{O}^{\oplus}$
(E)


The structure of product $(B)$ is :

A.
A.

B.

C.

d.

D.

## Answer: C

2. In the following reaction sequence, the products $(B)$ to $(E)$ are formed.
 (A)
(F) $\stackrel{\text { (i) } 2 \mathrm{Li}}{\stackrel{\text { (ii) } \mathrm{D}_{2} \mathrm{O}}{ }}$
(iii) $\mathrm{H}_{3} \mathrm{O}^{\oplus}$
NBS
+hv
(E)

The structure of product $(C)$ is :

A.
B.

C.


## Answer: D

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3. In the following reaction sequence, the products $(B)$ to $(E)$ are formed.


(iii) $\mathrm{H}_{3} \mathrm{O}^{\ominus}$

(E)

The structure of product $(D)$ is :

A.
b. Me
Me
B.

C.


D.

## Answer: C

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4. In the following reaction sequence, the products $(B)$ to $(E)$ are formed.


NBS
$+\mathrm{h} v$
(E)

The structure of product $(E)$ is :
a.

A.

B.

C.

D.


## Answer: C

5. In the following reaction sequence, the products $(B)$ to $(E)$ are formed.

(E)

The structure of product $(F)$ is:

A.
B.


C.
d. ${ }^{M}$


Answer: D

(B) $\xrightarrow[\text { (ii) }(\mathrm{PhCO})_{2} \mathrm{O}]{\text { (i) } 2 \mathrm{HBr}}$ (C) $+h v$
(i) Mg /ether
(E) $+(\mathrm{F}) \stackrel{\text { (i) } \mathrm{Mg} / \text { ether }}{\stackrel{(\text { (ii) Phenol }}{ }}$
(ii) HCOOEt
6.

The structure of product $(B)$ is :
A.

B.
b.

C.

D.


## Answer: C


7.
$(\mathrm{A})^{2} \mathrm{Br} \longrightarrow$
(E) $+($ F $) \stackrel{(\text { i) } M g / \text { ether }}{\stackrel{(\text { ii) Phenol }}{ }}$
(D)
(i) Mg/ether
(ii) $\mathrm{HCOOEt}^{\text {(iii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}}$

The structure of product $(C)$ is :
A. ${ }^{\text {a. } \mathrm{Br}}$

B.

c.

d. Br
D.


Answer: A
8.


The structure of product $(D)$ is :
A.

b.

B.


D.

9.

The structure of product $(E)$ is :

A.
B.

b. Me
c.

C.
d. HO

D.

## Answer: A


10.


The structure of product $(F)$ is :
a. 1 mol of

b. 2 mol of

C.

d. 2 mol of

D.

$$
(\mathrm{F}) \stackrel{\text { (i) Mg/ether }}{\stackrel{\text { (ii) Methyl ortho formate }}{ }} \text { (E) }
$$

11. 

The structure of product $(B)$ is :
A.

b.

C.
d. Me
D.

c. Cl

B.


12.

The gas $(C)$ is :
A. $\mathrm{CH}_{4}$
B. $C_{2} H_{6}$
C. $\mathrm{C}_{2} \mathrm{H}_{4}$
D. Isobutene

## Answer: B


13.

The structure of product $(D)$ is :
a. $\stackrel{\mathrm{Me}}{ }=-\mathrm{MgBr}$
A.
B.

c.

C.
b. $\underset{\mathrm{Cl}}{ }>\equiv-\mathrm{MgBr}$

Cl


## Answer: B



## But-1-yne

(A)

$$
(\mathrm{F}) \stackrel{\text { (i) } \mathrm{Mg} / \text { ether }}{\stackrel{\text { (ii) Methyl ortho formate }}{ }(\mathrm{E})} \begin{aligned}
& \text { (iii) } \mathrm{H}_{3} \mathrm{O} \text { © }
\end{aligned}
$$

The structure of product $(E)$ is :
A.

B.
b. $\xlongequal[\mathrm{Cl}]{ }=-\mathrm{Me}$
C.
c.

D.


## Answer: C



But-1-yne
(A)
15.
(F) $\underset{\text { (ii) Methyl ortho formate }}{\stackrel{\text { (i) } \mathrm{Mg} / \text { ether }}{\leftrightarrows}}(\mathrm{E})$
(iii) $\mathrm{H}_{3} \mathrm{O}^{\oplus}$

The structure of product $(F)$ is :
A.
a. $\mathrm{O}=\mathrm{HC}$
b. $\mathrm{O}=\mathrm{HC}$
C. OH
D. ${ }^{\text {d. }} \stackrel{\mathrm{Me}}{ }>-\mathrm{Me}$

## Answer: C


16.

The structure of product $(B)$ is :

A.

B.

OMgBr
c.

C.

D.

Answer: C


The structure of product $(C)$ is :
A.


B.

C.

D.


## Answer: A



The structure of product $(D)$ is :
A.

b.

B.

OMgBr
c.

C.

d.

D.

## Answer: B



## O O OH

19. 

(A)

The structure of product $(E)$ is :
A.

B.

C.

D.


Answer: B
 Isopropyl chloride

$\downarrow$| $\mathrm{CH}_{2}=\mathrm{CH}_{2}$ | Me |
| :--- | :--- |
|  | (D) $+\mathrm{E} \longleftarrow$ | $\mathrm{MgBr}{ }^{\mathrm{Me}}{ }^{\text {(ii) } \mathrm{H}_{3} \mathrm{O}^{\ominus}}$

(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{-}]{\text {(i) } \mathrm{HCHO}}(\mathrm{G})$


$$
20 .
$$

The structure of product $(A)$ is :
A. Isopropyl lithium
B. Propyl lithium
C. $\left.{ }_{\mathrm{Me}}^{\mathrm{Me}}\right\rangle\left\langle\mathrm{Me}_{\mathrm{Me}}^{\mathrm{Me}}\right.$
D. Hexane

## Answer: A

(i) $150-$

Isopropyl chloride
21.

The structure of product $(B)$ is :
A.

B.

c.

d.


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Isopropyl chloride
22.
$\left|\mathrm{CH}_{2}=\mathrm{CH}_{2} \quad \mathrm{Me}^{\mathrm{Me}}\right\rangle-\mathrm{MgBr} \mid$ (ii) $\mathrm{H}_{3} \mathrm{O}^{\ominus}$
(D) $+\mathrm{E} \longleftarrow$
(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\ominus}]{\text { (i) } \mathrm{HCHO} / \Delta}$ (G)
$\underset{(\mathrm{H})}{\downarrow}$

The structure of product $(C)$ is :
a.

B.

c.


## D. <br> d. Me <br> H

## Answer: C

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(i) Iso-
butaroic

Me
Isopropyl chloride

(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\ominus}]{\text { (i) } \mathrm{HCHO} / \Delta}$ (G)

23.

The structure of product $(D)$ is :
A.



C.

D.

## Answer: D

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(i) IsO

Isopropyl chloride

24. 

The structure of product $(E)$ is :
a. $\mathrm{Mc} \approx$
A.
B.
b. $\mathrm{Me}_{\mathrm{Me}}^{\mathrm{Me}}=\mathrm{CH}_{2}$
D.


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Isopropyl chloride
$\downarrow_{\text {(i) } \mathrm{HCHO} / \Delta} \begin{aligned} & \mathrm{Me})+\mathrm{E} \longleftarrow\end{aligned} \mathrm{CH}_{2}=\mathrm{CH}_{2} \quad \mathrm{Me}^{\text {(D) }}>\mathrm{MgBr}{\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\ominus}}^{\text {(D) }}$
(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{2} \mathrm{O}^{-}]{\text {(i) } \mathrm{HCHO} / \Delta}$ (G)
$\downarrow \mathrm{H}_{3} \mathrm{O}^{-}$
(H)
25.

The structure of product $(F)$ is :
A.

B.

C.

D. None of these

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26.
(i) ISO-


(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{2} \mathrm{O}^{-}]{\text {(i) } \mathrm{HCHO} / \Delta}$ (G)
$\downarrow \mathrm{H}_{3} \mathrm{O}^{\circ}$
(H)

The structure of product $(G)$ is :
A.

B.

C.


## Answer: A

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Isopropyl chloride
27.
$\downarrow \mathrm{H}_{3} \mathrm{O}^{\circ}$
(H)
(F) $\xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{-}]{\text {(i) } \mathrm{HCHO} / \Delta}$ (G)

The structure of product $(H)$ is :
A.

C. $\mathrm{Me} \quad \mathrm{Me}$
D.
d. $\mathrm{Me} \curvearrowright \mathrm{Me}$

## Answer: A

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28. 

The compound $(B)$ is:
A. $E t-\underset{\substack{\mid \\ P r}}{N}-C H=O$
B. $E t-N=C h-B r$
C. $E t-\stackrel{H}{\stackrel{O}{N}}-\stackrel{O H}{\mathrm{~N}}-\mathrm{H}-\mathrm{Pr}$
D. $E t-\stackrel{H}{\stackrel{\mid}{N}} \stackrel{O}{\|}-\stackrel{I}{C}-\operatorname{Pr}$

## Answer: B

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$$
\begin{align*}
& \mathrm{Et}-\stackrel{W}{\mathrm{~N}} \equiv \mathrm{C} \xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{(i)}]{\text { (i) } \mathrm{PrMghr} / \mathrm{chcr}}(\mathrm{~B}) \xrightarrow{\mathrm{Dil} \cdot \mathrm{HCl}}(\mathrm{C})+(\mathrm{D}) \\
& \text { (A) } \\
& \downarrow_{(\mathrm{Partial}}^{\mathrm{H}_{3} \mathrm{O}^{\oplus}} \underset{\mathrm{H}_{3} \mathrm{O}^{\oplus}}{ }  \tag{E}\\
& \text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus} \\
& \stackrel{\rightharpoonup}{\text { F }} \xrightarrow[\text { Complete hydrolysis }]{\mathrm{H}_{3} \mathrm{O}^{\oplus}}(\mathrm{G})+(\mathrm{H})
\end{align*}
$$

29. 

The compounds $(C)$ and $(D)$, respectively, are :
A. $\mathrm{EtNH}_{2}$ and $\mathrm{PrCH}=\mathrm{O}$
B. $\mathrm{Et}-\mathrm{NH}-\mathrm{Pr}$ and HCOOH
C. $\mathrm{PrNH}_{2}$ and $\mathrm{EtCH}=\mathrm{O}$

## D. $\mathrm{EtNH}_{2}$ and $\mathrm{PrCH}_{2} \mathrm{OH}$.

## Answer: A

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30. 

$$
\begin{aligned}
& \mathrm{Et}-\mathrm{N}^{(1)} \equiv \mathrm{C} \xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{(i)}]{\text { (i) } \mathrm{PrMgBr} / \mathrm{ether}}(\mathrm{~B}) \xrightarrow{\mathrm{Dil} . \mathrm{HCl}}(\mathrm{C})+(\mathrm{D}) \\
& \text { (A) } \\
& \downarrow \underbrace{\text { Patial hydrolysis }} \mathrm{H}_{3} \mathrm{O}^{\oplus} \\
& \text { (i) } \mathrm{PrMgBr} / \text { ether }
\end{aligned}
$$

The structure of product $(E)$ is :

A. a. Et

OH
B.
b. $\operatorname{Pr}$ Pr

## C. c. 1 it


D.
d. Pr


## Answer: B

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31. 

The compound $(F)$ is :
A. $N-E t h y l$ methanamide
B. N-Propylmethanamide
C. N-Ethylbutanamide
D. N-Propylpropanamide

## Answer: A

## D Watch Video Solution

$$
\begin{align*}
& \mathrm{Et}-\mathrm{N} \equiv \mathrm{C} \xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{(i)}]{\text { (i) } \mathrm{Pr} \mathrm{Mg} / \mathrm{chcr}}(\mathrm{~B}) \xrightarrow{\mathrm{Dil} \cdot \mathrm{HCl}}(\mathrm{C})+(\mathrm{D}) \\
& \text { (A) } \\
& \stackrel{\text { Partial hydrolysis }}{\boldsymbol{H}_{3} \mathrm{O}^{\oplus}}{ }^{\oplus} \quad \mathrm{H}_{3} \mathrm{O}^{\oplus}  \tag{E}\\
& \text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus} \\
& (\mathrm{F}) \xrightarrow[\text { Complete hydrolysis }]{\mathrm{H}_{3} \mathrm{O}^{\oplus}}(\mathrm{G})+(\mathrm{H})
\end{align*}
$$

32. 

The compounds $(G)$ and $(H)$, respectively, are :
A. Propanamide and $\mathrm{CH}_{2}=\mathrm{O}$
B. Ethylamine and $\mathrm{CH}_{2}=\mathrm{O}$
C. Ethylamine and HCOOH
D. Propanamide and HCOOH

## D Watch Video Solution

33. 

Which of the following statements is//are correct?
A. When $G$. $R$ reaction with alkyl isocyanide, of electrophile $(\stackrel{\oplus}{M} g X)$ first adds of the $C$ atom of $(\stackrel{\oplus}{N} \equiv \stackrel{\ominus}{C})$ group and then the nucleophile $\left(R^{\ddot{\theta}}\right)$ adds of the same $C$ atom.
B. When $G . R$ reacts with alkyl isocyanide, the nucleophile $\left(R^{\ddot{\theta}}\right)$ first adds to the $C$ atom of $(\stackrel{\oplus}{N} \equiv \stackrel{\ominus}{C})$ group and then the electrophile $(\stackrel{\oplus}{M} g X)$ adds to the same $C$ atom.
C. When $G . R$ reacts with alkyl isocyanide, electrophile $(\stackrel{\oplus}{M} g X)$ adds to the $C$ atom of $(-\stackrel{\oplus}{N} \equiv \stackrel{\ominus}{C})$ group and the
nucleophile $\left(R^{\ddot{\theta}}\right)$ adds of the $N$ atom.
D. when alkyl isocyanide is hydrolysed in dilute acidic medium. $H^{\oplus}$ (electrophile) adds to the $C$ atom of $(-\stackrel{\oplus}{N} \equiv \stackrel{\ominus}{C})$ $\ominus$
group and then $O H$ (nuclephile) adds to the same $C$ atom.

## Answer: A: B

## D Watch Video Solution

## Exercises (Multiple Correct)


obtained by the reaction of $P h M g B r$ and.
A. Ethyl carbonate
B. Benzophenone
C. Ethyl benzoate
D. Benzamide

## Answer: A::B::C

2. 

> A
$3^{\circ}$
alcohol

can
be
obtained by the reaction of ketone (di-isopropyl ketone) and.
A. Isopropyl magnesium bromide
B. Isopropyl lithium
C. Di-isopropyl cadmium
D. Di-isopropyl zinc

Answer: B
3. The coupling between $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}$ and MeBr gives propane in the presence of:
A. MeOTs
B. EtOTs
C. $A g B r$
D. $\mathrm{CuCl}_{2}$

## Answer: A::B::D

## - Watch Video Solution

4. Which of the following halides does not form $G$. $R$ when treated with magnesium in the presence of ether?
A.
a. ${ }^{\mathrm{Br}} \equiv-\mathrm{H}$
B.
b. $\mathrm{HO} \longrightarrow \mathrm{Br}$
C.
c. $\mathrm{O}_{2} \mathrm{~N}-\mathrm{O}-\mathrm{Br}$
D. ${ }^{\text {d. } \mathrm{HOOC}-\mathrm{Br}}$

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

## - Watch Video Solution

5. Which of the following halides does form $G . R$ when treated with magnesium in the presence of ether ?
A. PhBr
B. b. Br
C.
c. Br
D. d. $\mathrm{H}_{2} \mathrm{~N}-\mathrm{O}-\mathrm{Br}$

Answer: A::B::C
6. Acetophenone can be obtained by the reaction of PhMgBr and.
A. Ethane nitrile
B. Ethanamide
C. Ethanoyl chloride
D. Methanamide

## Answer: A::B

D Watch Video Solution
7. Hexan-3-one can be obtained by the reaction of $E t M g B r$ and.
A. Butanamide
B. Propanamide

## C. Butane nitrile

D. Propane nitrile

## Answer: A::C

## D Watch Video Solution

8. 

A
$2^{\circ}$
alcohol

can
obtained by the reaction of di-t-butyl ketone and
A. Isopropyl magnesium bromide
B. $t$ - Butyl magnesium bromide

## C. $E t M g B r$

D. $M e M g B r$

## Answer: A::B::C

## (D) Watch Video Solution

9. 

$\xrightarrow[\substack{2 . \mathrm{MeCOMe}^{( } \\ 3 . \mathrm{H}_{3} \mathrm{O}^{\oplus}}]{\text { 1. } \mathrm{Mg} / \text { ether }}(\mathrm{A})$
The
compound $(A)$ is :

B.

C.
c. $\mathrm{HO} \xrightarrow{\sim}$
D. None of these

## - Watch Video Solution

10. Which of the reagents is the most suitable for the following reaction?

$$
\mathrm{MeMgBr}+\left.(\mathrm{A}) \longrightarrow \mathrm{Me} \longrightarrow\right|_{\mathrm{Me}} ^{\mathrm{Me}} \mathrm{OH}
$$

A. $M e-C \equiv N$
B.

C.

D.


Answer: C

## Watch Video Solution

11. Which of the following would give benzene when reacted with PhMgBr ?
A.

B. $H_{2}$
C. Methyl amine
D. $\mathrm{NH}_{3}$
12. $E t N H_{2}+M e M g I \xrightarrow[\text { in the presence of pyri di ne }]{\text { Heated at high temp. }} \operatorname{Gas}(A)$ The volume of gas $(A)$ obtained at $S . T . P$ when 0.45 gm of $E t N H_{2}$ reacts with $M e M g I$ is.
A. $224 m l$
B. $22.4 m l$
C. 448 ml
D. $44.8 \mathrm{ml}^{`}$

## Answer: C

## - Watch Video Solution

13. Which of the following reactions would give pen $\tan -2-o l$ ?
A.
a. $\square_{\mathrm{O}}^{\mathrm{Me} \xrightarrow[\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}]{\text { (i) } \mathrm{EMgr}} \text {, }}$
B.
b. $\longrightarrow_{\mathrm{Me}}^{\stackrel{\mathrm{O}}{\text { (ii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}}}$
C.

D. $\mathrm{MeCHO} \xrightarrow[\mathrm{H}_{3} \mathrm{O}^{\oplus}]{\mathrm{PrmgBr} / \text { ether }}$

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

## D Watch Video Solution

14. Which of the following reactions would give caproic acid ?
A. $n-C_{5} H_{11} B r \xrightarrow[(i i) C_{2}]{(i) M g / \text { ether }}$
B. $n-C_{5} H_{11} L i \xrightarrow[(i i) H_{3} \mathrm{O}]{(i) \mathrm{CO}_{2}}$
C. $n-\mathrm{C}_{4} \mathrm{H}_{9} \mathrm{Br} \xrightarrow{(i) \mathrm{Mg} / \text { ether }}$
(i) $\mathrm{CO}_{2}$
(iii) $\mathrm{H}_{3} \mathrm{O}^{\oplus}$
D. $n-C_{5} H_{11} M g B r+(C N)_{2} \xrightarrow[(i i) H_{3} O^{\oplus}]{(i) \Delta}$

15. 

Which of the following statements is//are correct ?
A. First mole of $G$. $R$ reacts at $(-O H)$ group and the product
$(A)$ is
 and phenol.
B. Second mole of $G$. $R$ reacts with keto group and the product

C. Second mole of $G$. $R$ reacts with acid chloride group and the
product $(B)$ is


OMgBr .
D. Compound $(D)$ is


## Answer: B

## - Watch Video Solution

16. Which of the statements is/are correct ?
A. In Reformatsky reaction, $\alpha$-bromo ester reacts with aldehyde or ketone in the presence of $M g$ to give $\beta-h y d r \otimes y$ ester.
B. In Reformatsky reaction, $\alpha$-bromo ester reacts with aldehyde or ketone in the presence of $Z n$ to give $\beta-h y d r \otimes y$ ester.
C. Citric acid is prepared by the reaction of $\alpha$ - bromoethyl acetate and ethyl oxaloacetate in the presence of $Z n$ followed by hydrolysis.
D. Citric acid is prepared by the fermentation of molasses in the presence of Aspergillus wentienzymes.

## Answer: B::C::D

## - Watch Video Solution

Exercises (Single Correct)

1. 1-Ethyl-2-methyl oxirane when treated with $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}$, followed by hydrolysis gives:

A.


B.
c. Me
C.

d. Me

D.

Answer: A

## - Watch Video Solution

2. When ethane nitrile is treated with $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}$, followed by hydrolysis, the product is :

A.

O
b. ${ }^{\mathrm{Me}}$
B.

O
C.

d.

D.

O

Answer: D

- Watch Video Solution

3. When methyl orthoformate is treated with followed by hydrolysis, the product is :
A.
a. $\overbrace{\mathrm{Me}}^{\mathrm{Me}}$

O
b.

B. $\quad \mathrm{OH}$
C.

D. ${ }_{\text {d. }}^{\mathrm{Me}} \underbrace{\mathrm{Me}}_{\mathrm{OH}}<_{\mathrm{Me}}^{\mathrm{Me}}$

## Answer: C

## - Watch Video Solution

4. When ethyl ethanoate is treated with excess of $M e M g B r$, followed by hydrolysis, the product is :

A.
B.
b. Me
Me


C.

D.

Answer: A

## - Watch Video Solution

5. When di-isopropyl cadmium is treated with ethanoyl chloride, the product is :

A.

b.

B.

C.

D.

## Answer: B

## Q

6. When
treated with $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}$, followed by hydrolysis, the product is :
A.
a.

B.
b.

C.

D.


## - Watch Video Solution

7. When ethanamide is treated with EtMgBr, followed by hydrolysis, the product is :

B.

C.

c. $\quad \mathrm{OH}$
D. d. Me

## Answer: B

8. Propane is not formed when $\mathrm{C}_{3} \mathrm{H}_{7} \mathrm{MgBr}$ is treated with
A. $H_{2}$
B. Phenol
C. Ethanoic acid
D. 2-Butyne

## Answer: D

- Watch Video Solution

9. Alcohol is not formed when $R M g X$ is treated with
A. Ethanoyl chloride
B. $O_{2}$
C. Oxirane
D. Methyl orthoformate

## Answer: D

## - Watch Video Solution


product is :
A.

B.
b. HO
C.

D. None is correct

## - Watch Video Solution

11. The end product $(C)$ of the following sequence of reaction is :
$C H \equiv C H+M e M g B r(1 \mathrm{~mol}) \rightarrow(A) \xrightarrow[(i i) \mathrm{H}_{3} \mathrm{O}^{\oplus}]{(i) \mathrm{CO}_{2}}(B) \xrightarrow{\mathrm{HgSO}_{4} / \mathrm{H}_{2} \mathrm{SO}_{4}}(C)$

A. H


D.

$\mathrm{A})+\mathrm{MeMgBr} \xrightarrow{\mathrm{H}_{3} \mathrm{O}^{+}} \mathrm{Me} \xrightarrow{ } \mathrm{OH}$
12. 

. Hence,
$C H \equiv C H \xrightarrow[(i i) A]{(i) 1 \operatorname{molof}\left(N a N H_{2}+l i q \cdot N H_{3}\right)}(C)$. The product $(C)$ is :
A. ${ }^{\text {a. }} \mathrm{H}-\equiv \mathrm{OH}_{\mathrm{OH}}$
B. ${ }^{\text {b. }} \mathrm{H}-\equiv \mathrm{OH}_{\mathrm{O}}$
C.
c. $\mathrm{H}-\equiv<_{\mathrm{H}}^{\mathrm{O}}$
D. ${ }^{\text {d. }} \mathrm{H}-\equiv<_{\mathrm{OH}}^{\mathrm{O}}$

Answer: A

$\xrightarrow{\mid \mathrm{HgSO}_{4} / \mathrm{H}_{2} \mathrm{SO}_{4}}(A) \xrightarrow{2 \text { molof } \mathrm{MeMgBr} / \mathrm{H}_{3} \mathrm{O}^{\oplus}}(B) .(B)$ is :
A.
a.

B.

C.

D.


Answer: B

- Watch Video Solution

a.
b.

B.

c.

C.

Me


Answer: A

## D Watch Video Solution

# Me $>-\mathrm{MgBr}$ 

15. When
treated with
followed by hydrolysis, the product is :
A.

B.

C.
D. None of these

Answer: B

product $A$ is :

B.

C.
c.

D.


## Answer: C

## - Watch Video Solution

17. 


(B) are :

A. $A$ and $B \Rightarrow N \equiv$

$\xrightarrow{\left(\mathrm{C}_{2} \mathrm{H}_{5}\right)_{2} \mathrm{Cd}} \mathrm{A}$
(A) and
B. $A$ and $B \Rightarrow N \equiv$

c. $\mathrm{A} \Rightarrow \mathrm{N} \equiv \mathrm{C}$
C.

$$
\mathrm{B} \Rightarrow \mathrm{Me}
$$

d. $\mathrm{A} \Rightarrow \mathrm{N} \equiv \mathrm{C}$
D.


## Answer: D

## D Watch Video Solution

18. 


A.

B.

C.


## Answer: D

- Watch Video Solution



## Answer: C

D Watch Video Solution

## $\mathrm{Br} \xrightarrow[\text { ether }]{\mathrm{Br}} \mathrm{M}$.

20. 

A. a. $\mathrm{BrMg} \sim \mathrm{MgBr}$
B.
b. $\mathrm{BrMg} \sim \mathrm{Br}$
C. $\mathrm{CH}_{2}=\mathrm{CH}_{2}$
D. All

Answer: C

# $\mathrm{Br} \mathrm{Br} \xrightarrow[\text { ether }]{\mathrm{Mg}} A$ 

21. 

A.
a. $\mathrm{BrMg} \sim \mathrm{MgBr}$
B.
b. $\mathrm{BrMg} \longrightarrow \mathrm{Br}$
C.

D. All

Answer: C

Watch Video Solution

D. None of these

## Answer: D

## - Watch Video Solution

23. Ethylmercaptan is prepared by the reaction of the following, followed by hydrolysis :
A. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{SO}_{2}$
B. $C_{2} H_{5} M g B r+S$
C. $C_{2} H_{5} M g B r+C S_{2}$
D. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{H}_{2} \mathrm{~S}$.

## (D) Watch Video Solution

24. Methyl oxirane on reaction with $\mathrm{CH}_{3} \mathrm{MgBr}$, followed by hydrolysis, gives alcohol. By which of the following mechanisms does the reaction proceed?
A. $S N^{1}$
B. $S N^{2}$
C. $S N^{i}$
D. $S E$

## Answer: B

25. Benzonitrile on reaction with $C_{2} H_{5} \mathrm{MgBr}$, followed by hydrolysis, gives.
A. a. $\mathrm{Ph} \xrightarrow{ } \mathrm{Me}$
B.

C.

D.


## Answer: A

## - Watch Video Solution

26. Acetoisonitrile on reaction with $C_{2} H_{5} \mathrm{MgBr}$ followed by hydrolysis, gives compound $(A)$, which one further hydrolysis gives
$(B)$ and $(C)$.
$(B)$ and $(C)$ are :
A. $\mathrm{MeNH}_{2}$ and EtCHO
B. $\mathrm{EtNH} \mathrm{H}_{2}$ and MeCHO
C. $\mathrm{MeNH}_{2}$ and EtCOOH
D. $\mathrm{EtNH}_{2}$ and MeCOOH

## Answer: A

D Watch Video Solution
$\mathrm{CH}_{2} \mathrm{Br}$

$\xrightarrow[\text { ether }]{\mathrm{Mg}} \mathrm{A}$. (A) is:
$\mathrm{CH}_{2} \mathrm{MgBr}$
a.

A.

Cl
b. $\bigcirc$
B.
$\mathrm{CH}_{2} \mathrm{MgBr}$


MgCl

C.
D. None of these

Answer: A
28. Propane dithioic acid is prepared by the reaction of the following, followed hy hydrolysis :
A. $C_{3} H_{7} \mathrm{MgBr}+\mathrm{CS}_{2}$
B. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{CS}_{2}$
C. $\mathrm{C}_{3} \mathrm{H}_{7} \mathrm{MgBr}+\mathrm{SO}_{2}$
D. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{SO}_{2}$

## Answer: B

## D Watch Video Solution

29. Propylsulphinic acid is prepared by the reaction of the following, followed by hydrolysis :
A. $\mathrm{C}_{3} \mathrm{H}_{7} \mathrm{MgBr}+\mathrm{SO}_{2}$
B. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{SO}_{2}$
C. $\mathrm{C}_{3} \mathrm{H}_{7} \mathrm{MgBr}+\mathrm{SO}_{3}$
D. $\mathrm{C}_{2} \mathrm{H}_{5} \mathrm{MgBr}+\mathrm{SO}_{3}$.

## Answer: A

## - Watch Video Solution


30.

A.
C.

Me
D.

## Answer: C

## Watch Video Solution

31. Ethanoic propanoic anhydride on reaction with excess of $M e M g B r$ gives the major product.
A.


B.

C. c. Me

O

D.
d. Me Me

Answer: A

## - Watch Video Solution

32. Reactivity of $M e M g B r$ with the following in the decreasing order is :



(i)
iii. Ph Ph
A. $(i)>(i i)>(i i i)>(i v)$
B. $(i v)>(i)>(i i)>(i i i)$
C. $(i)>(i i i)>(i i)>(i v)$
D. $(i v)>(i i)>(i i i)>(i)$

## - Watch Video Solution

33. 



Product.
The major product is :
A.

B.

C.

D.


## Watch Video Solution

34. 

Reactivity
with the
following $G . R$ in the decreasing order is :
(i) $M e M g B r$
(ii) $E t M g B r$
(iii) $\mathrm{Me}_{2} \mathrm{CH}-\mathrm{MgBr}$
(iv) $M e_{3} C-M g B r$.
A. $(i)>(i i)>(i i i)>(i v)$
B. $(i v)>(i i i)>(i i)>(i)$
C. $(i)>(i i)>(i v)>(i i i)$
D. $(i v)>(i i)>(i i i)>(i)$

## Answer: A

## D Watch Video Solution


35.

B.

c.

C.

## D. <br> 

## Answer: B

## (D) Watch Video Solution

36. Reactivity of $E t M g B r$ with the following in the decreasing order is :
(i) HCHO
(ii) MeCHO
(iii) MeCOMe
(iv) $\mathrm{Cl}_{3} \mathrm{C}-\mathrm{CHO}$.
A. $(i)>(i i)>(i i i)>(i v)$
B. $(i v)>(i i i)>(i i)>(i)$
C. $(i v)>(i)>(i i)>(i i i)$
D. $(i i i)>(i i)(i)>(i v)$

## Answer: C

## - Watch Video Solution

37. Reactivity of $P h M g B r$ with the following in the decreasing order is :
(i) PhCHO

$$
\mathrm{Me}-\mathrm{O}-\mathrm{CHO}
$$

(ii)
(iii)

(iv)
A. $(i)>(i v)>(i i)>(i i i)$
B. $(i i i)>(i i)>(i v)>(i)$
C. $(i)>(i i i)>(i i)>(i v)$
D. $(i)>(i i)>(i i i)>(i v)$

Answer: A
38. Reactivity of $\operatorname{PrMgBr}$ with the following in the decreasing order is :
(i) Alcohol
(ii) Aldehyde
(iii) Ketone
(iv) Ester.
A. $(i v)>(i i i)>(i i)>(i)$
B. $(i)>(i i)>(i i i)>(i v)$
C. $(i i)>(i i i)>(i)>(i v)$
D. $(i v)>(i)>(i i i)>(i i)$

## Answer: B

( Watch Video Solution
39. Reactivity of HCHO with the following $G . R$ in the decreasing order is :
(i) PhMgBr
(ii) $\mathrm{PhCH}_{2} \mathrm{MgBr}$

(iii)

(iv)
A. $(i v)>(i i i)>(i i)>(i)$
B. $(i)>(i i)>(i i i)>(i v)$
C. $(i i i)>(i i)>(i)>(i v)$
D. $(i i)>(i i i)>(i)>(i v)$

Answer: D
40. Which of the following $3^{\circ}$ alcohols does propyl ester give during reaction with $E t M g B r$ ?

B.

C.
c. $\mathrm{Me} \underbrace{\stackrel{\mathrm{OH}}{\mathrm{Me}} \mathrm{Me}}_{\mathrm{Me}}$
D.


## Answer: A

41. Ethyl ester reacts with $\operatorname{PrMgBr}$ to give $2^{\circ}$ alcohol. The alcohol
is :
a. $\mathrm{Me} \sim_{\mathrm{OH}}^{\mathrm{Me}}$
A.

B.

c. Me OHe
C.
d. Me Me

## Answer: B

## - Watch Video Solution

42. Methyl ester reacts with $E t M g B r$ to give $3^{\circ}$ alcohol


The ester is :
A. Methyl propanoate
B. Methyl butanoate
C. Methyl ethanoate
D. Methyl formate

Answer: B
43. Propyl ester reacts with isopropyl magnesium bromide to give


The ester is :
A. Propyl methanoate
B. Isopropyl formate
C. Propyl ethanoate
D. Isopropyl ethanoate

## Answer: A

44. Propyl lithium reacts with ethene to give a compound $(A)$, which on reaction with methanal followed by acidic hydrolysis gives compound $(B)$. The compound $(B)$ is :
A. Hep $\tan -1-o l$
B. Hep $\tan -2-o l$
C. Hexan-1-ol
D. Hexan - 2-ol

## Answer: C

## (D) Watch Video Solution

45. Coupling reaction between $R M g X$ and $R^{\prime} X$ takes place to give $R-R^{\prime}$ in the presence of which of the following reagents ?
A. $R^{\prime}-O T s$
B. $\mathrm{CoCl}_{2}$
C. $\mathrm{MnCl}_{2}$
D. All

## Answer: D

## (D) Watch Video Solution

46. Phenyl isocyanide + Benzyl magnesium bromide $\xrightarrow[2 \cdot H_{3} O^{\oplus}]{\text { 1.Ether } \Delta}(A)$. The compound $(A)$ is :
A.


B.


Ph
C. ${ }^{\text {c. }} \mathrm{Ph} \bigcap \mathrm{N}=\mathrm{CH}-\mathrm{Ph}$
D. d. $\mathrm{Ph}-\mathrm{N}=\mathrm{CH} \bigcirc \mathrm{Ph}$

## Answer: D

## D Watch Video Solution

47. The compound $(A)$ in the previous question is further hydrolysed in dilute acidic medium to give compounds $(B)$ and $(C)$.

The compounds $(B)$ and $(C)$ are :
A. $\mathrm{PhNH}_{2}$ and $\mathrm{PhCH}=\mathrm{O}$
B. $\mathrm{PhCH}_{2} \mathrm{NH}_{2}$ and $\mathrm{PhCH}=\mathrm{O}$
C. $\mathrm{PhNH}_{2}$ and $\mathrm{PhCH}_{2} \mathrm{CH}=\mathrm{O}$
D. $\mathrm{PhCH}_{2} \mathrm{NH}_{2}$ and $\mathrm{PhCH}_{2} \mathrm{CH}=\mathrm{O}$.

## Answer: C

## Exercises Archives (Single Correct)

1. $\mathrm{Me}_{3} \mathrm{C}-\mathrm{MgCl}$ on reaction with $\mathrm{D}_{2} \mathrm{O}$ produces :
A. $M e_{3} C D$
B. $M e_{3} C O D$
C. $(C D)_{3} C D$
D. $(C D)_{3} C O D$.

## Answer: A

## - Watch Video Solution

2. Ethyl ester $\xrightarrow[\text { excess }]{\text { MeMgBr }} P$. The product $P$ will be :

A.
Me
B.

C.
d.


Answer: A

## - Watch Video Solution

3. The order of reactivity of phenyl magnesium bromide with the following compounds is :

## (I) <br> Me

(I)

(II)

(III)
A. $I I>I I I>I$
B. $I>I I I>I I$
C. $I I>I>I I I$
D. All react with the same rate

## Answer: C

## D Watch Video Solution

4. When phenyl magnesium bormide reacts with $t-b u \tan o l$ the product would be :
A. Benzene
B. Phenol
C. t-Butyl benzene
D. t-Butyl pheyl ether

Answer: A

## Exercises Archives (True/False)

1. The reaction of methyl magnesium iodide with acetone followed by hydrolysis gives secondary butanol.

## - Watch Video Solution

## Exercises Archives (Subjective)

1. Write the structural formula of the main organic product formed when ethyl acetate is treated with double the molar quantity of MeMgBr and the reaction mixture is poured into $\mathrm{H}_{2} \mathrm{O}$.
2. Compound $X$ (molecular formula $C_{5} H_{8} \mathrm{O}$ ) does not react appreciably with Lucas reagent at room temperature but gives a precipitate with amononiacal silver nitrate with excess of $M e M g B r, 0.42 g m$ of $X$ gives $224 m l$ of $C H_{4}$ at $S . T$. $P$ Treatment of $X$ with $H_{2}$. in the presence of $P t$ catalyst followed by boiling with excess of $H I$, gives n-pentane. Suggest the structure for $X$ and write the equations involved.

## - Watch Video Solution

3. Identify the major products in the following reaction.
$\mathrm{C}_{6} \mathrm{H}_{5} \mathrm{COOH}+\mathrm{MeMgI} \rightarrow ?+?$.

## D Watch Video Solution

4. In the following reactions, identify the compounds $A, B, C$ and D.
(i) $\mathrm{PCl}_{5}+\mathrm{SO}_{2} \rightarrow \mathrm{~A}+\mathrm{B}$
(ii) $\mathrm{A}+\mathrm{MeCOOH} \rightarrow \mathrm{C}+\mathrm{SO}_{2}+\mathrm{HCl}$
(iii) $2 C+M e_{2} C d \rightarrow 2 D+C d C l_{2}$.

## - Watch Video Solution

5. 1,4-Pentadiene reacts with excess of HCl in the presence of benzoyl peroxide to give compound $X$, which upon reaction with excess of $M g$ in dry ether forms $Y$. Compound $Y$ on treatment with ethyl acelate followed by treatment with dilute acid yields $Z$. Identify the structure of componds. $X, Y$ and $Z$.

## - Watch Video Solution

6. A hydrocarbon $A$ of the molecular formula $C_{8} H_{10}$. On ozonolysis gives only the compound $B\left(C_{4} H_{6} O_{2}\right)$. The compound $B$ can also be obtained from the alkyl bromide $C\left(C_{3} H_{5} B r\right)$ upon treatment with Mg in dry ether followed by the addition of $\mathrm{CO}_{2}$ and acidification. Identify $A, B$ and $C$ and also give equations for the reactions.

## D Watch Video Solution

7. An ester $A\left(C_{4} H_{8} O_{2}\right)$, on treatement with excess of methyl magnesium bormide followed by acidification, gives an alcohol $B$ as the sole organic product. Alcohol $B$ on oxidation with NaOCl followed by acidification gives acetice acid. Deduce the structures of $A$ and $B$. Show the reactions involved.

## - Watch Video Solution

8. Cyclobutyl bromide on treatment with magnesium in dry ether forms an organometallic compound $(A)$. The organometallic compound ( $A$ ) reacts with ethanol to give an alcohol $(B)$ after mild acidification. Prolonged treatment of alcohol $(B)$ with an equivalent amount of HBr gives 1-bromo-1-methylcyclopentane (C) Write the structures of $(A)$ and $(B)$, and explain how $(C)$ is obtained from (B).

## D Watch Video Solution

9. Identify $Z+Y$ in the following synthetic scheme and write their structures. Explain the formation of labelled formaldehyde $\left(\mathrm{H}_{2} \mathrm{C}^{*} \mathrm{O}\right)$ as one of the products when compound $(Z)$ is treated with $H B r$ and subsequently ozonolysed. Take $C^{*}$ as carbon in the entire scheme.
$B a C^{*} O_{3}+H_{2} S O_{4} \rightarrow X\left(C^{*}=C^{14}\right)$

$$
\mathrm{Br} \xrightarrow[\substack{\text { (ii) } \mathrm{X} \\ \text { (iii) } \mathrm{H}_{3} \mathrm{O} \text { • }}]{\text { (i) } \mathrm{Mg}, \text { ther }}(\mathrm{Y}) \xrightarrow{\mathrm{LiAlH}_{3}}(\mathrm{Z})
$$

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## Exercises Archives (Linked Comprehension)

1. In the following reaction sequence, products $\mathrm{I}, \mathrm{J}$, and L are formed.
$K$ represents a reagent.

$$
\begin{aligned}
& \text { Hex-3-ynal } \xrightarrow[\text { (ii) } \mathrm{PBr}_{3}]{\text { (i) } \mathrm{NaBH}_{4}} \mathrm{I} \xrightarrow[\substack{\text { (ii) } \mathrm{CO}_{2} \\
\text { (iii) } \mathrm{H}_{3} \mathrm{O}^{\oplus}}]{\text { (i) } \mathrm{Mg} \text { ether }} \mathrm{J} \xrightarrow{\mathrm{C}} \\
& \mathrm{~L} \underset{\mathrm{Pd} / \mathrm{BaSO}_{4} \text {, quinoline }}{\mathrm{H}_{2}} \overbrace{\mathrm{O}}^{\mathrm{Me}}
\end{aligned}
$$

The structures of product $I$ is :

b. Me
c. Br d.
$\stackrel{\mathrm{Me}}{ }={ }^{\mathrm{Br}}$

The structures of compounds $J$ and $K$, respectively, are :
a. $\stackrel{\mathrm{Me}}{ } \overline{\mathrm{COOH}}$ and $\mathrm{SOCl}_{2}$
b. M
 and $\mathrm{SO}_{2} \mathrm{Cl}_{2}$
c.
COOH and $\mathrm{SOCl}_{2}$
d. ${ }^{\mathrm{Me}} \equiv-\mathrm{COOH}$ and $\mathrm{CH}_{3} \mathrm{SO}_{2} \mathrm{Cl}$

The structure of product $L$ is :

## Me a. $\searrow \equiv$ CHO

