### **GRIGNARD REAGENT**



## LEVEL- ]

1. What is the major product of the following reaction?

$$\begin{array}{c}
CH_3MgI \\
Et_2O
\end{array}
\xrightarrow{H_3O^{\oplus}}$$

(a) 
$$CH_3$$
  $CH_2 - OH$ 

(b) 
$$CH_2 - CH_3$$

(c) 
$$CH_3$$

Reaction- 2; O - Et  $CH_3 - C - CH_3$   $CH_3 - C - CH_3$   $CH_2 - Cl$ 

What is the ratio of (x/y) in above problem?

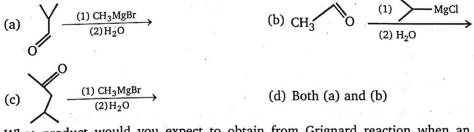
(a) 1.5

(b) 2

(c) 2.5

(d) 3

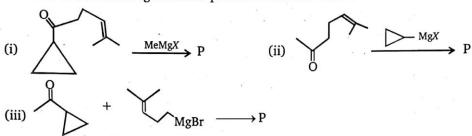
4. In which of the following reaction 2° alcohol is obtained as a product?



**5.** What product would you expect to obtain from Grignard reaction when an excess of phenylmagnesium bromide reacts with dimethyl carbonate CH<sub>3</sub>OCOOCH<sub>3</sub>?

In which of the following reactions product formed is same?

001 001 001 001 001



- (a) (i) and (ii)
- (b) (ii) and (iii)
- (c) (i) and (iii)
- (d) (i), (ii) and (iii)
- 7. Which of the following reaction sequences would be the best for synthesis of 2-pentanone?

(a) 
$$CH_{3} - CH_{2} - CH_{2} - C - H \xrightarrow{CH_{3}MgI \atop Et_{2}O} \xrightarrow{H_{3}O^{\oplus}} CH_{2} - CH_{2} \xrightarrow{CH_{3}MgI \atop Et_{2}O} \xrightarrow{H_{3}O^{\oplus}} CH_{3} - CH - O$$
(c)  $CH_{3} - CH_{2} - CH_{2} - C \equiv N \xrightarrow{CH_{3}MgI \atop Et_{2}O} \xrightarrow{H_{3}O^{\oplus}} CH_{3} - CH_{3}$ 

(c) 
$$CH_3 - CH_2 - CH_2 - C \equiv N \xrightarrow{CH_3MgI} \xrightarrow{H_3O^{\oplus}}$$

(d) 
$$CH_3 - CH_2 - CH_3 - H_3O \rightarrow H_3$$

8. 
$$CO_2CH_3$$
 $\xrightarrow{x \ CH_3MgI}$ 
 $H^+$ 
 $C(CH_3)_2$ 
 $C(CH_3)_2$ ; Dimethyl phthalate

Number of moles (x) of Grignard reagent consumed in the above reaction is:

- (a) 2
- (b) 3
- (c) 4
- (d) 5

Which of the following combinations can not be used to prepare alcohol given above?

- (a) PhMgBr + 2-butanone  $\xrightarrow{\text{NH}_4\text{Cl}}$
- (b) EtMgBr + Ph  $-\stackrel{\parallel}{C}$  -CH<sub>3</sub>  $\xrightarrow{NH_4Cl}$
- (c)  $CH_3MgBr + Ph C Et \xrightarrow{NH_4Cl}$
- (d) EtMgBr + Ph C -CH<sub>2</sub> CH<sub>3</sub>  $\xrightarrow{\text{NH}_4Cl}$

10. Et—O—C—O— Et—
$$(1) CH_3MgBr (excess)$$
 (A), Product (A) is:

(a) 
$$CH_3 - C - O - Et$$
  
OH

(d) 
$$CH_3 - CH_2 - CH_3$$

11. PhMgBr + 
$$O \longrightarrow O \longrightarrow O \longrightarrow (A)$$
. Product (A) is:

N-Methoxy-N-methyl benzamide 1-equivalent

13. Point out the incorrect synthesis:

(a) 
$$MgBr$$

$$(a) \qquad (b) \qquad (c) \qquad$$

(c) 
$$PhMgBr + \xrightarrow{(1)} O Ph - CH_2 - CH_2 - OH$$

(d) 
$$PhMgBr + \frac{(1) HCHO}{(2) H^+} Ph - CH_2 - OH$$

14. 
$$CH_3 - C - O - H \xrightarrow{NaH CO_3} (A) \xrightarrow{(i) PhMgBr} (B)$$
 $(gas) \xrightarrow{(ii) H_3O^{\oplus}} (B)$ 

$$CH_{3} - S - O - H \xrightarrow{\text{NaH CO}_{3}} (C) \xrightarrow{\text{(i) PhMgBr}} (D)$$

Product (B) and (D) in the above reaction are:

15. OH OEt 
$$(2)$$
  $(A)$ ; Product  $(A)$  in this sequence is :

(a) 
$$OH$$
 (b)  $OH$  (c)  $OH$  (d)  $OH$ 

16. 
$$CH_3 \xrightarrow{CH_3MgBr \atop diethyl \text{ ether}} \xrightarrow{NH_4Cl \atop H_2O} Products.$$

Comment on optical activity of the products. They are ;

- (a) racemic mixture
- (b) diastereomers

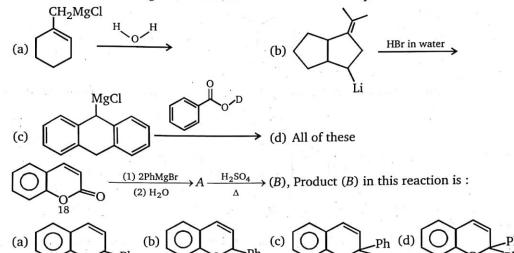
(c) meso forms

(d) optically inactive due to absence of chiral centre

#### **Grignard Reagent**

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In which of the following reaction an acid-base reaction takes place?



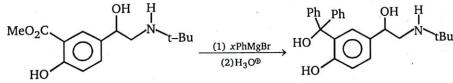
All of the following compounds react with ethylmagnesium bromide. Alcohols are formed 19. from three of the compounds. Which one does not give an alcohol?

(a) 
$$O$$
CH
(b)  $O$ 
COCH<sub>3</sub>
(c)  $O$ 
CH<sub>2</sub>OCCH<sub>3</sub>
(d) Ph -O -C-O - H

- A student was carrying out a Grignard reaction between PhMgBr and ethyl benzoate. She ran 20. out of anhydrous ether just after the Grignard reagent was made. Which of the following solvents can still be used to dissolve the ethyl benzoate for its reaction with already formed PhMgBr?
  - (a) acetone

21.

- (b) ethyl acetate
- (c) absolute alcohol (d) benzene



Number of equivalents of Grignard reagent (x) used in reaction (1) is:

- (a) 3 equivalent
- (b) 4 equivalent
- (c) 5 equivalent
- (d) 6 equivalent

24.

22. 
$$(1) \text{ Mg; ether}$$

$$(2) \text{ Ph-CHO}$$

$$(3) \text{ H}_3\text{ O} \oplus$$

$$(3) \text{ H}_3\text{ O} \oplus$$

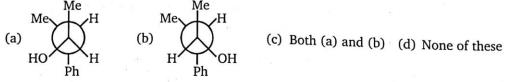
$$(3) \text{ H}_3\text{ O} \oplus$$

The given product can not be obtained in the above reaction. Identify the correct product obtained.

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

**23.** Which of the following gives two isomers of 3° alcohol, when treated with phenyl magnesium bromide?

(a) (b) (c) (d) (d) 
$$\stackrel{D}{\longleftarrow}$$
 Me  $\stackrel{O}{\longleftarrow}$  Product of the reaction is :



25. 
$$\xrightarrow{RMgBr}$$
 Product; The product of the reaction is:

(a)  $HSO_2 - CH_2 - CH_2 - CH_2 - CH_2 - R$  (b)  $H - SO_2(CH_2)_3 - R$ 

(c)  $\xrightarrow{SO_2}$   $MgBr$  (d)  $H - SO_2(CH)_3 - R$ 

**26.** When carboxylic acid reacts with organolithium reagents to give ketones, side reaction sometimes occur. For example,

Value of (x) in above reaction is:

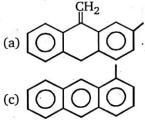
- (a) 2
- (b) 3
- (c) 4
- (d) 5
- **27.** Which of the following alcohol can not be prepared by the reaction of acid chloride with excess of Grignard reagent followed by acidification?

(a) 
$$Ph \xrightarrow{OH} Ph$$

$$CH_3$$

- (b) Ph——CH
- (c) Et Et
- (d)  $CH_3$  Et

Product (B) of the above reaction is:



- **29.** The reaction of elemental sulphur with Grignard reagent followed by acidification leads to the formation of
  - (a) mercaptan
- (b) sulphoxide
- (c) thioether
- (d) sulphonic acid

+ MgBrCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>MgBr $\xrightarrow{\text{(i)}THF}$  product; Product of the reaction is :

(a) 
$$HO = (CH_2)_3 = C = CH_2 = CH_2 = CH_3$$
 (b)

(d) 
$$HO$$
  $CH_2 - CH_2 - CH_3$ 

31. 
$$\bigcirc \stackrel{\text{OH}}{\underset{\text{C}}{||}} - \text{Cl} \xrightarrow{\text{(i) } x \text{ CH}_3 \text{MgBr}} \bigcirc \stackrel{\text{OH}}{\underset{\text{C}}{||}} - \text{CH}_3$$

Number of moles of CH<sub>3</sub>MgBr consumed in above reaction is :

(a) 2

(b) 4

(c) 6

(d) 8

**32.** End product of the given reaction is :

33. Which of the following compound is not a suitable solvent for Grignard reaction?



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(b)

(1, 4-dioxane)

(c) CH<sub>3</sub> - O - CH<sub>2</sub> - CH<sub>2</sub> - O - CH<sub>3</sub>

34.  $\xrightarrow{\text{Br}} \xrightarrow{\text{Mg}} \text{Predict major product of the reaction}$ :

(a) / /

(b) /

(c) /

(d) /\/

**35.** Which of the following reaction sequences would be the best for synthesis of t-butyl alcohol?

(a) 
$$CH_3CH_2MgBr + CH_2 - CH_2 \xrightarrow{Et_2O} \xrightarrow{H_3O\oplus}$$

(b) 
$$CH_3CH_2CH_2MgBr \xrightarrow{CO_2} \xrightarrow{H_3O^{\oplus}}$$

(c) 
$$CH_3MgBr + CH_3 - C - CH_3 \xrightarrow{Et_2O} \xrightarrow{H_3O^{\oplus}}$$

(d) 
$$CH_3CH_2MgBr + CH_3 - C - H \xrightarrow{Et_2O} \xrightarrow{H_3O^{\oplus}}$$

What is the major product of the following reaction?

$$CH_3 - C \equiv N \xrightarrow{CH_3MgI} \xrightarrow{H_3O^{\oplus}}$$

- Products; Product obtained in this reaction are:
  - (a) diastereomers
- (b) racemic
- (c) pure enantiomer (d) meso
- **38.**  $CH_3CO_2Et + (CH_2)_5(MgBr)_2 \xrightarrow{(2) H^+} C_7H_{14}O$ ; compound (A) will be:

(c) 
$$CH_3 - C - (CH_2)_4 - CH_3$$

-OH

$$(d) \bigcap_{Ph} C - Ph$$

40. MeO OMe 
$$\frac{n-Bu_2Cu_Li}{(n-Bu=n-butyl group)}$$
 Product of the reaction will be :

Cl-C-O-Me (?); Product of this reaction is:

(b) 
$$CO_2Me$$
(c)



Ethyl acetoacetate when reacts with one mole methyl magnesium iodide then product of 42. reaction will be:

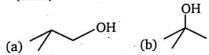
(a) 
$$CH_3 - C - CH_2 - C - CH_3$$

(c) 
$$CH_3 - C - CH - CO_2Et$$

$$MgBr$$

(d) 
$$CH_2^- - C - CH_2 - CO_2Et$$

**43.**  $CH_3MgBr + Et - O - C - O - Et \xrightarrow{(2)} H^{\oplus} (A)$ ; Product A is:







- For the sequence of reactions,  $A \xrightarrow{C_2H_5MgI} B \xrightarrow{H_2O/H^+}$  tert-Pentyl alcohol. The compound A in the sequence is:
  - (a) 2-Butanone
- (b) Acetaldehyde (c) Acetone
- (d) Propanal
- **45.** PhMgBr + CH<sub>3</sub> CN  $\xrightarrow{\text{H}_3\text{O}^{\oplus}}$  (A) Ph C O H  $\xrightarrow{\text{(1) excess CH}_3\text{-Li}}$  (A)
  - Same product (A) will form in both reactions. A is:
- (a)  $Ph C CH_3$  (b) Ph CHO (c)  $Ph C CH_3$  (d)  $Ph CH_2 CO_2H$   $CH_3$

- Which of the following Grignard reagent can be prepared?
  - (a)  $Br Mg CH_2 CH_2 CH_2 O H$  (b)  $Br Mg CH_2 CH_2 SH$
  - (c)  $BrMg CH_2 CH_2 NH_2$
- (d)  $\operatorname{BrMg} \operatorname{CH}_2 \operatorname{CH}_2 \operatorname{N} \operatorname{CH}_3$
- In the reaction sequence: 47.

$$(i) CH3MgBr/CuCl (ii) H2O/H+ (X), Product (X) will be:$$

- $CH_3MgBr(excess)$   $\rightarrow A. A$  (alcohol) can also be obtained by :  $(C_2H_5O)_2CO$ 48. H<sub>3</sub>O<sup>+</sup>
  - (a) CH<sub>3</sub>CH<sub>2</sub>CHO

- (d) as in (b) and (c)
- The principal product of the reaction between methyl butanoate and 2 moles of  $CH_3MgBr$ 49. after hydrolysis is:
  - (a) C<sub>3</sub>H<sub>7</sub>COCH<sub>3</sub>

(b)  $C_3H_7C(OH)(CH_3)_2$ 

(c) C<sub>3</sub>H<sub>7</sub>CHOHCH<sub>3</sub>

- (d)  $C_3H_7COCH(CH_3)_2$
- Which of the following compounds will form hydrocarbon on reaction with Grignard reagent? 50.
  - (a) CH<sub>3</sub>CH<sub>2</sub>OH
- (b) CH<sub>3</sub>CHO
- (c) CH<sub>3</sub>COCH<sub>3</sub>
- (d) CH<sub>3</sub>CO<sub>2</sub>CH<sub>3</sub>
- What is the product (B) of the following reaction sequence? 51.

Br 
$$\xrightarrow{\text{Mg}} A$$

$$A + \xrightarrow{\text{Mg}} (1) \text{Et}_2\text{O} \xrightarrow{\text{(2)}} B$$

$$OH \qquad OH \qquad CH_3$$

$$OH \qquad CH_3 \qquad CH_3$$

$$OH \qquad OH \qquad CH_3$$

$$OH \qquad OH \qquad OH$$

- **52.** Which, if any, of the following pairs of reagents could be used to prepare 2-phenyl-2-butanol?
  - (a)  $CH_3CH_2MgBr + Ph C CH_3$
- (b)  $CH_3CH_2MgBr + C_6H_5CH_2CH$
- (c)  $CH_3MgI + C_6H_5CH_2CCH_3$
- (d)  $C_6H_5MgCl + CH_3CCH_2CH_2CH_3$
- **53.** What is the product of the following reaction?

$$O + 2CH_3MgBr \xrightarrow{1. diethyl \text{ ether}} Produc$$

- (a) HO CHC H<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH OH
- (b) CH<sub>3</sub>OCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CHCH<sub>3</sub>
- (c) HOCH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>CH<sub>2</sub>C OH

  CH<sub>3</sub>
- (d)  $HOCH_2CH_2CH_2CH_2CHOCH_3$  $CH_3$
- 54.  $Ph \longrightarrow Mg \longrightarrow A \xrightarrow{1. \text{ HCHO}} B$  ; Product (B) is :

 $CH_3$ 

(a) 
$$CH_2 - OH$$

- (b)  $Ph C \equiv C CH_2 CH_2 CH_2 OH$
- (c)  $Ph C \equiv C CH_2 CH_2 OH$
- (d)  $Ph CH_2 C \equiv C CH_2 CH_2 OH$
- **55.** What sequence of steps represents the best synthesis of 4-heptanol (CH<sub>3</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>2</sub>CHOH?
  - (a)  $CH_3CH_2CH_2MgBr(2moles) + formaldehyde(H_2C = O)$  in diethyl ether followed by  $H_3O + O$
  - (b)  $CH_3CH_2CH_2MgBr + butanol (CH_3CH_2CH_2CH = O)$  in diethyl ether followed by  $H_3O+$
  - (c)  $CH_3CH_2CH_2CH_2MgBr + acetone[(CH_3)_2C = O]$  in diethyl ether followed by  $H_3O^+$
  - (d)  $(CH_3CH_2CH_2)_2CHMgBr + formaldehyde (H_2C = O)$  in diethyl ether followed by  $H_3O + CH_2CH_2$
- 56. Et  $(1) \text{ MeMgBr} \longrightarrow \text{Comment on stereochemistry of products}$ :
  - (a) diastereomers

(b) racemic

(c) single stereoisomer

(d) meso

57. 
$$CH \longrightarrow CH_3MgBr \longrightarrow xCH_4$$
 $CH_2 \longrightarrow SH$ 
 $(Excess)$ 

What is the value of x in the above reaction?

(a) 1

(b) 2

(c) 3

- (d) 4
- **58.** 0.40 g of an organic compound (A), (M.F.-  $C_5H_8O$ ) reacts with x mole of  $CH_3MgBr$  to liberate 224 mL of a gas at STP. With excess of  $H_2$ , (A) gives pentan-1-ol. The correct structure of (A) is:

(a) 
$$CH_3 - C \equiv C - CH_2 - CH_2 - OH$$

(b) 
$$CH_3 - CH_2 - C \equiv C - CH_2 - OH$$

(c) 
$$H - C \equiv C - CH_2 - CH_2 - CH_2 - OH$$

(d) 
$$H - C \equiv C - CH_2 - CH - CH_3$$

**59.** 
$$CH_3 - CH = CH_2 \xrightarrow{Br_2} \xrightarrow{Mg} \xrightarrow{CH_3 - C - CH_3} \xrightarrow{H^+} \xrightarrow{\Delta} (X)$$

$$(low conc.)$$
(major)

End product (X) of the above reaction is:

$$\begin{array}{c} {\rm CH_2} \\ \parallel \\ {\rm (a) \ CH_2} = {\rm CH} - {\rm CH_2} - {\rm C} - {\rm CH_3} \end{array}$$

(b) 
$$H_2C = CH - CH = C - CH_3$$
  
 $CH_3$ 

(c) 
$$H_2C = CH - CH_2 - C - CH_3$$

(d) 
$$H_2C = CH - CH_2 - CH - CH_2 - OH$$
  $CH_3$ 

**60.** 
$$CH_2 - CH - CH_2 - Br \xrightarrow{Mg} (A) \xrightarrow{CH_3I} (B)$$
; Product (B) is:

(a) 
$$CH_2 - CH - CH_2 - CH_3$$

(b) 
$$CH_3 - O - CH_2 - CH_2 - CH_3$$

(c) 
$$H_2C = CH - CH_2 - O - CH_3$$

(d) 
$$H_2C - CH - CH_3$$

**61.** Compound A was treated with a large excess of CH<sub>3</sub>MgBr. The resulting product was exposed to POCl<sub>3</sub>/pyridine to give compound B, as one of many products:

Which of the following compounds can be A?

**62.** Identify product Z in the following reaction sequence:

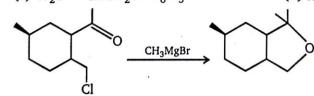
$$H_2C = CHCH_2Br \xrightarrow{NaCN} Y \xrightarrow{1. C_6H_5MgBr, diethylether} Z$$

(a) 
$$H_2C = CHCH_2CC_6H_5$$

(b) 
$$H_2C = CHCH_2NHCC_6H_5$$

(c) 
$$H_2C = CHCH_2CHC_6H_5$$

(d) 
$$H_2C = CHCH_2CHC_6H_5$$



(Consider all steps and intermediate) correct statement is :

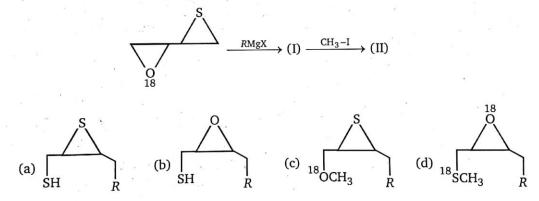
(a) Nucleophilic addition

63.

- (b) Nucleophilic substitution reaction
- (c) Product obtained is chiral
- (d) All

**64.** Which combination(s) of alkyl bromide and epoxide can be used to prepare the following product by addition of the Grignard reagent derived from the alkyl bromide to the epoxide?

**65.** What will be the final major product?



**66.** Give the expected product of the following reaction.

	ANSWERS — LEVEL 1														
1.	(b)	2.	(d)	3.	(b)	4.	(d)	5.	(c)	6.	(d)	7.	(c)	8.	(c)
9.	(d)	10.	(c)	11.	(b)	12.	(b)	13.	(b)	14.	(c)	15.	(b)	16.	(b)
17.	(d)	18.	(d)	19.	(d)	20.	(d)	21.	(c)	22.	(b)	23.	(b)	24.	(c)
25.	(c)	26.	(b)	27.	(d)	28.	(d)	29.	(a)	30.	(b)	31.	(b)	32.	(b)
33.	(d)	34.	(b)	35.	(c)	36.	(c)	37.	(b)	38.	(b)	39.	(b)	40.	(a)
41.	(b)	42.	(c)	43.	(b)	44.	(c)	45.	(c)	46.	(d)	47.	(b)	48.	(d)
49.	(b)	50.	(a)	51.	(a)	52.	(a)	53.	(c)	54.	(b)	55.	(b)	56.	(a)
57.	(c)	58.	(c)	59.	(b)	60.	(c)	61.	(d)	62.	(a)	63.	(d)	64.	(b)
65.	(c)	66.	(d)												



# LEVEL-2

#### 1. Comprehension

Grignard reagent is usually prepared by

$$R - X + Mg \xrightarrow{Et_2O} RMgX$$

Grignard reagent

$$Ar - X + Mg \xrightarrow{Et_2O} ArMgX$$

Grignard reagent

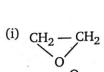
Grignard reagent acts as a strong base. Grignard reagent carry out nucleophilic attack in absence of acidic hydrogen. Grignard reagent form complex with its ether solvent. Complex formation with molecule of ether is an important factor in the formation and stability of Grignard reagent.

- A. What is the correct order of reactivity of halides with magnesium?
  - (a) R Cl > R Br > R I
- (b) R Br > R Cl > R I
- (c) R I > R Br > R Cl
- (d) R I = R Br = R Cl
- B. Which of the following will undergo acid-base reaction with Grignard reagent?
  - (a)  $HC \equiv CH$

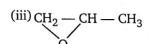
(b) R - OH

(c)  $R - CO_2H$ 

- (d) All of these
- **C.** Which of the following reactants give primary alcohol as a major product when reacts with *RMgX* followed by acidification?



(ii) H-C-H



- (iv) CH<sub>3</sub> C -H
- (v) [
- (vi)

- (a) i, ii, v
- (b) i, ii, v, vi
- (c) ii, iv, vi
- (d) v, iv, iii, vi
- **D.** Cl C O Et  $\xrightarrow{\text{(1) } x \text{RMgX}}$  3° alcohol. Value of x is:
  - (a) 2
- (b) 3
- (c) 4
- (d) 5
- E.  $H-O-CH_2-CH_2-C-O-Et \xrightarrow{(1) \times PhMgBr} HO-CH_2-CH_2-C-Ph$ , Value of x is:
  - (a) 2
- (b) 3
- (c) 4
- (d) 5

F. Which of the following Grignard reagents is not possible?

(a) 
$$HS - CH_2 - CH_2 - CH_2MgBr$$

(b) 
$$HO - CH_2 - CH_2 - CH_2MgBr$$

(c) 
$$NH_2 - CH_2 - CH_2 - CH_2MgBr$$

**G.** How many different Grignard reagents when react with EtOH, give *n*-butane as product (excluding stereoisomerism).

2. Match the column I and II. (Matrix)

	Column (I)		Column (II)				
1	Reactant	Product					
(a)	$ \begin{array}{c} O \\    \\ PhMgBr + Cl - C - O - Et \xrightarrow{H^{\oplus}} \end{array} $ (excess)	(p)	Ph – CH <sub>2</sub> – OH				
(b)	$ \begin{array}{c} O \\    \\ PhMgBr + H - C - O - Et \xrightarrow{H^{\oplus}} \end{array} $ (excess)	(q)	Ph – CH – Ph OH				
(c)	$ \begin{array}{c} O \\    \\ PhMgBr + H - C - H \xrightarrow{H^{\oplus}} \end{array} $ (excess)	<b>(r)</b>	OH 				
(d)	$ \begin{array}{c} O \\    \\ PhMgBr + CH_3 - C - O - Et \xrightarrow{H^{\oplus}} \end{array} $ (excess)	(s)	OH 				

3. Match the column I and II. (Matrix)

	Column (I)	Column (II)			
	Reaction	Reactant			
(a)	$PhMgBr + (A) \xrightarrow{H^{\oplus}} 1^{o}alcohol$	<b>(p)</b>	$\begin{array}{ccc} & \text{O} & \cdot & \text{O} \\ &    & &    \\ \text{CH}_3 - \text{C} - \text{CH}_2 - \text{C} - \text{CH}_3 \end{array}$		
<b>(b)</b>	PhMgBr + (B) $\longrightarrow$ 2°alcohol	(q)	O    CH <sub>3</sub> - C - CH <sub>3</sub>		
(c)	PhMgBr + (C) $\longrightarrow$ 3°alcohol	(r)	O    CH <sub>3</sub> -C-H		
(d)	$PhMgBr + (D) \xrightarrow{H^{\oplus}}$	(s)	О    Н – С – Н		

Match the missing reactant A, B, C, D

4. Match the column I and II. (Matrix)

	Column (1)	Col	Column (II)		
	Reaction		Moles of PhMgBr used		
(a)	$\begin{array}{c} O \\    \\ PhMgBr + Et - O - C - O - Et \xrightarrow{H^{\oplus}} 3^{\circ}alcohol \end{array}$	(p)	1		
(b)	PhMgBr + HO - CH <sub>2</sub> - C - CH <sub>3</sub> $\xrightarrow{H^{\oplus}}$ 3° alcohol	(q)	2		
(c)	O $  $ PhMgBr + CH <sub>3</sub> - C - CH <sub>3</sub> $\xrightarrow{H^{\oplus}}$ 3°alcohol	(r)	3		
(d)	$\begin{array}{c} O \\ \parallel \\ C - Cl \\ \longrightarrow \\ HO \end{array} \longrightarrow 3^{o} alcohol$	(s)	4		

5. When 20 g of a compound (A) (M.F. =  $C_4H_{10}O_4$ ) reacts with excess of  $CH_3MgBr$ , 14.6 L of  $CH_4$  is obtained at STP. What is structural formula of (A) ?

$$\begin{array}{c} {\rm CH_2OH} \\ | \\ ({\rm b}) \ {\rm HO-CH_2-C-CH_2OH} \\ | \\ {\rm OH} \end{array}$$

(d) Both (a) & (b)

#### **SUBJECTIVE PROBLEMS**

1.

$$OH \xrightarrow{O} H \xrightarrow{excess} H^{\oplus} \xrightarrow{H^{\oplus}} X$$

How many geometrical isomer of (X) is possible?

2. How many isomer of  $C_4H_8O$  when reacts with  $CH_3MgBr$  followed by acidification to give  $2^\circ$  alcohol (only consider carbonyl isomers)?

(including stereoisomer)

3.

Total number of RMgX are consumed in the following reaction

$$Cl = N$$

$$C \equiv N$$

- **4.** How many isomers of  $C_4H_{10}O$  reacts with  $CH_3MgBr$  to evolve  $CH_4$  gas ? ( Excluding stereoisomer)
- 5. How many carbonyl isomers of  $C_5H_{10}O$  which reacts with PhMgBr to give racemic mixture?
- **6.** How many moles of Grignard reagent will consume when it reacts with following compound?

#### ANSWERS — LEVEL 2

**6.** 8

1. 
$$A-c$$
;  $B-d$ ;  $C-a$ ;  $D-b$ ;  $E-b$ ;  $F-d$ ;  $G-b$ 

**2.** 
$$a-r$$
;  $b-q$ ;  $c-p$ ;  $d-s$ 

3. 
$$a-s$$
;  $b-r$ ;  $c-q$ ;  $d-p$ 

**4.** 
$$a-r$$
;  $b-q$ ;  $c-p$ ;  $d-s$ 

#### **Subjective Problems**

**1.** 4 **2.** 2 **3.** 7 **4.** 4 **5.** 5

MADELLA