QUESTION 1
Grignard Reagents

Give the structure that you would use with the provided Grignard reagent to give the provided product.

A

B

C

D

\[
\begin{align*}
&\text{MgBr} & \quad 1. \, \text{???)} & \quad 2. \, \text{H}_3\text{O}^+ \\
&\text{A} & \quad \text{B} & \quad \text{C} & \quad \text{D}
\end{align*}
\]

\[
\begin{align*}
\text{A} & \quad \text{MgBr} & \quad 1. & \quad 2. \, \text{H}_3\text{O}^+ \\
\text{B} & \quad \text{MgBr} & \quad 1. & \quad 2. \, \text{H}_3\text{O}^+ \\
\text{C} & \quad \text{MgBr} & \quad 1. & \quad 2. \, \text{H}_3\text{O}^+ \\
\text{D} & \quad \text{MgBr} & \quad 1. & \quad 2. \, \text{H}_3\text{O}^+
\end{align*}
\]
QUESTION 2

Give the product of the following reaction sequence with the starting material shown:

1. \( \text{Br}_2 / \text{hv} \)
2. \( \text{Mg.THF} \)
3. \( \text{Ph} \)
4. \( \text{H}_3\text{O}^+ \)

![Reaction Diagram]

A → B → C → D

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QUESTION 3
Grignardsb

Give the structure that you would use with the provided Grignard reagent to give the provided product.

\[
\text{MgBr} \quad \xrightarrow{1. \ ????} \quad \text{OH} \\
\text{A} \quad \xrightarrow{2. \ H_3O^+} \quad \text{B} \quad \xrightarrow{1. \ ????} \quad \text{C} \quad \xrightarrow{2. \ H_3O^+} \quad \text{D}
\]
QUESTION 4
Grignardsc

Give the Grignard reagent you would use to complete the following reaction:

??? \( \xrightarrow{1. \text{H}_3\text{O}^+} \) \( \text{phenyl-MgBr} \) \( \xrightarrow{2. \text{H}_3\text{O}^+} \)

new C-C bonds are indicated in **BOLD**
QUESTION 5
Grignardsd
Give the Grignard reagent you would use to complete the following reaction

\[ ??? \xrightarrow{1. \text{H}_3\text{O}^+} \text{OH} \]

\[ \text{A} \quad \text{B} \quad \text{C} \quad \text{D} \]

new C-C bonds are indicated in **BOLD**

A. 

\[ \text{A} \xrightarrow{1. \text{H}_3\text{O}^+} \text{B} \xrightarrow{2. \text{H}_3\text{O}^+} \text{OH} \]

B. 

\[ \text{B} \xrightarrow{1. \text{H}_3\text{O}^+} \text{C} \xrightarrow{2. \text{H}_3\text{O}^+} \text{OH} \]

C. 

\[ \text{C} \xrightarrow{1. \text{H}_3\text{O}^+} \text{D} \xrightarrow{2. \text{H}_3\text{O}^+} \text{OH} \]
How many of the carbon-carbon bonds in the following structure could have been made in a Grignard reaction with either a carbonyl compound (C=O) or an epoxide?

A 2 bonds
B 3 bonds
C 4 bonds
D 5 bonds

1. MeMgBr
2. $\text{H}_3\text{O}^+$

1. EtMgBr
2. $\text{H}_3\text{O}^+$

1. PrMgBr
2. $\text{H}_3\text{O}^+$

1. EtMgBr
2. $\text{H}_3\text{O}^+$

Can't make this C-C bond in a Grignard reaction.
QUESTION 7
MC29c

Give the product of the following reaction sequence with the starting material shown, (hint, be careful with step #5, remember that Grignards are strong Bronsted bases!)

1. LiAlH₄
2. H₃O⁺
3. PBr₃
4. Mg·THF
5. H₃O⁺
QUESTION 8
MC29b

Give the product of the following reaction sequence with the starting material shown (hint, be careful at step #3, remember that a Grignard reagent will also be a strong Bronsted base!)

1. Excess LiAlH₄
2. H₂O⁺
3. Excess MeMgBr
4. H₂O⁺
5. Na₂Cr₂O₇/H₂SO₄/H₂O

Addition

Elimination

conventional hydrolysis of the O-Mg bond

the Grignard simply deprotonates the alcohol here, the oxygen bonds to the Mg as usual (arrow-pushing not shown)