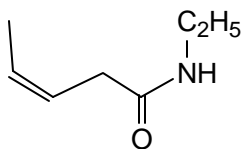


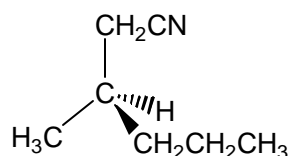


2. What is the name for the following compound?



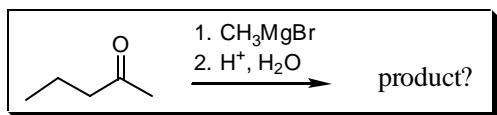
- (a) (*E*)-*N*-ethyl-3-pentenamide
- (b) (*Z*)-1-ethyl-3-pentenamide
- (c) (*E*)-*N*-ethyl-4-pentenamide
- (d) (*Z*)-1-ethyl-4-pentenamide
- (e) None of the above

3. What is the name for the following compound?



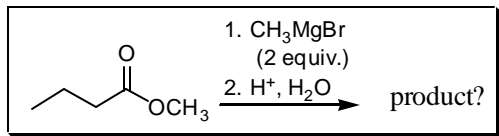
- (a) (*R*)-3-methylhexaneamine
- (b) (*S*)-3-methylhexaneamine
- (c) (*R*)-3-methylhexanenitrile
- (d) (*S*)-3-methylhexanenitrile
- (e) None of the above

4. What could be the product for the following reaction?



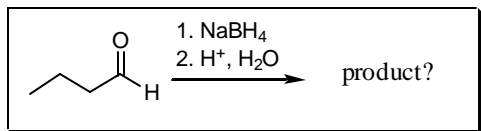
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

5. What could be the product for the following reaction?



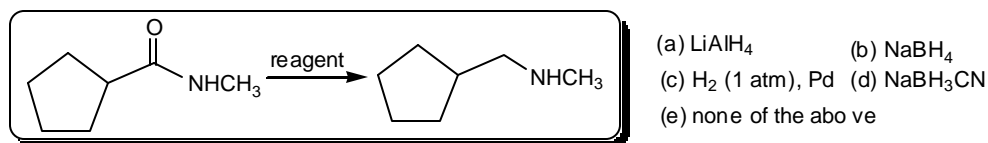
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

6. What could be the product for the following reaction?

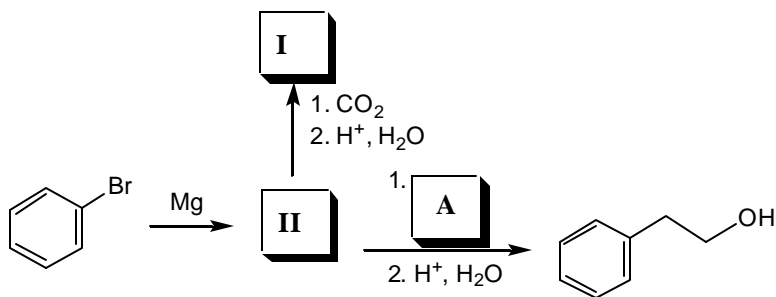


- (a)
- (b)
- (c)
- (d)
- (e) None of the above

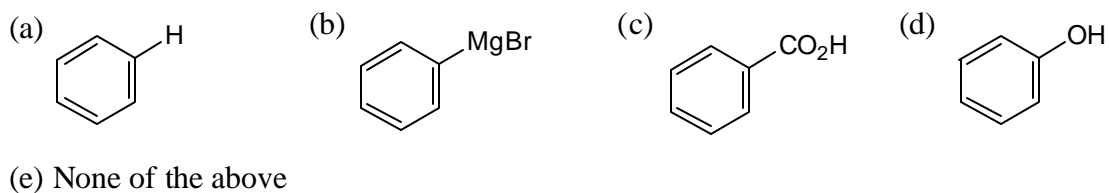
7. What could be the reagent for the following reaction?



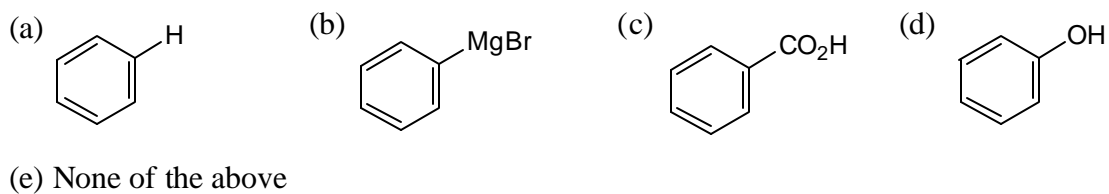
Answer Q.8 to Q.10 according to the following synthetic scheme:



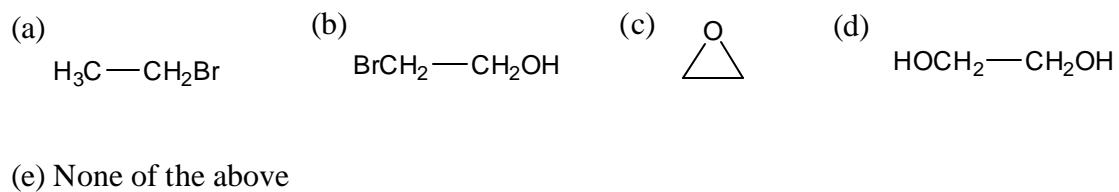
8. What could be the structure of compound **I**?



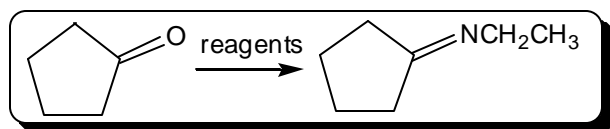
9. What could be the structure of compound **II**?



10. What could be the structure of reagent **A**?

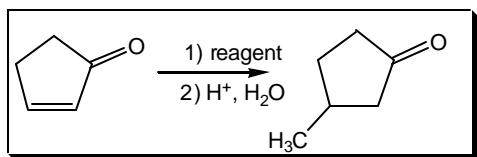


11. What could be the best reagents for the following reaction?



- (a)  $\text{H}_2\text{NEt}$  and  $\text{CH}_3\text{CO}_2\text{H}$  (b)  $\text{H}_2\text{NEt}$  and  $\text{HCl}$   
 (c)  $\text{H}_2\text{NEt}$  and  $\text{NaOH}$  (d)  $\text{H}_2\text{NEt}$  and  $\text{Na}^+\text{OCH}_3$   
 (e) None of the above

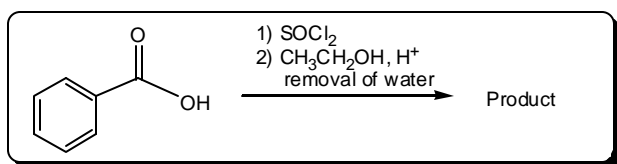
12. What could be the reagent for the following reaction?



- (a)  $\text{CH}_3\text{MgBr}$  (b)  $(\text{CH}_3)_2\text{CuLi}$   
 (c)  $\text{Ph}_3\text{P}^{\oplus}-\text{CH}_2^{\ominus}$  (d)  $\text{CH}_3\text{Br}$   
 (e) none of the above

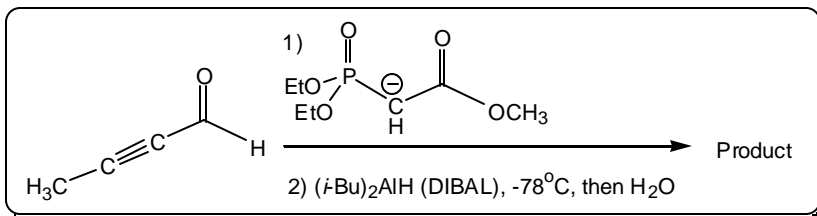
Ph =  $\text{C}_6\text{H}_5$

13. What could be the product for the following reaction?



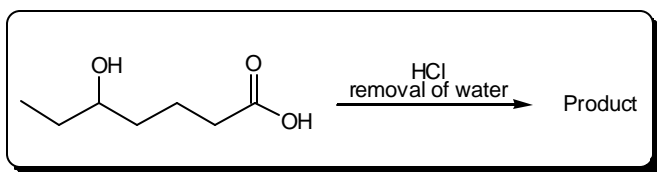
- (a) (b) (c) (d)   
 (e) none of the above

14. What could be the product for the following reaction?



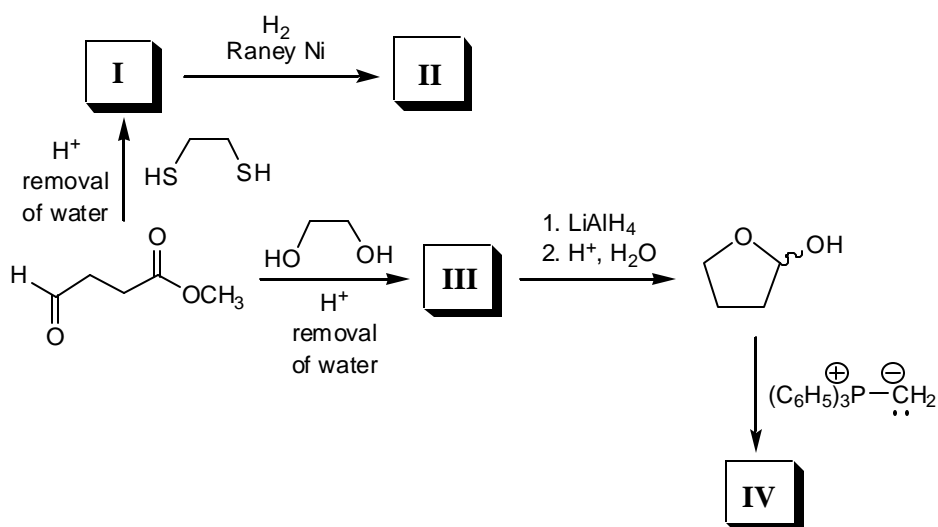
- (a) (b) (c)   
 (d) (e) none of the above

15. What could be the product for the following reaction?



- (a)
- (b)
- (c)
- (d)
- (e) none of the above

Answer Q.16 to Q.20 according to the following synthetic scheme:



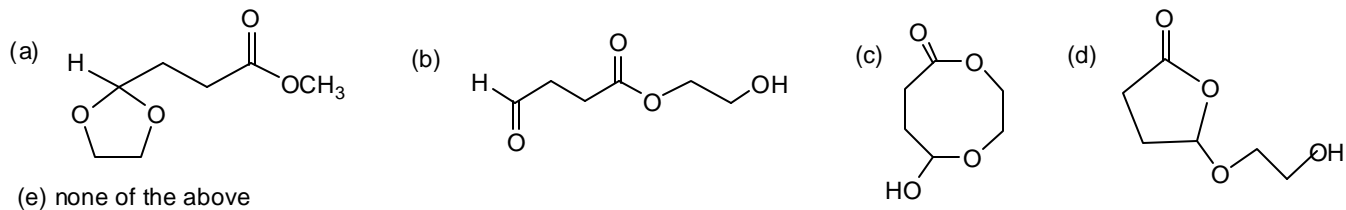
16. What is the structure of compound **I**?

- (a)
- (b)
- (c)
- (d)
- (e) none of the above

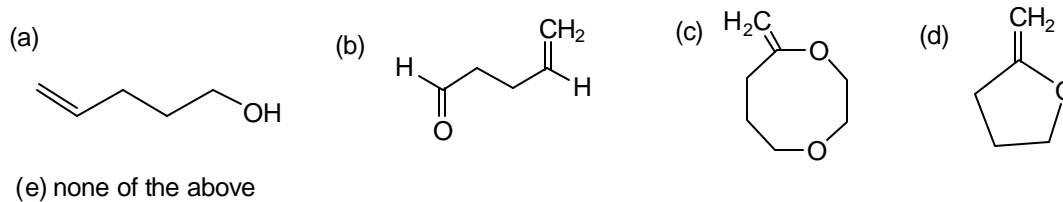
17. What is the structure of compound **II**?

- (a)
- (b)
- (c)
- (d)
- (e) none of the above

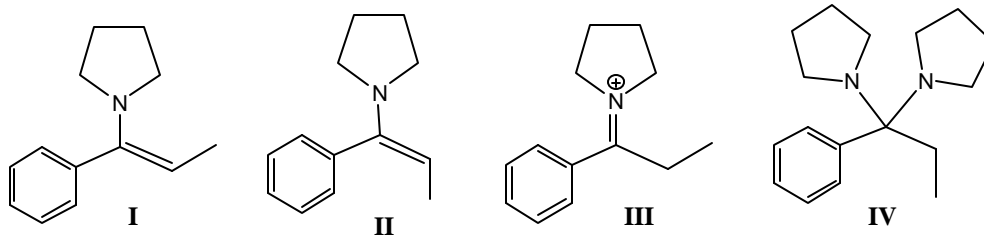
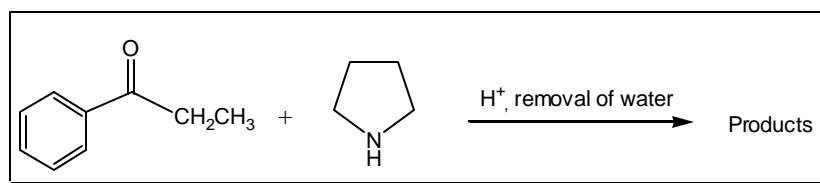
18. What is the structure of compound **III**?



19. What is the structure of compound **IV**?



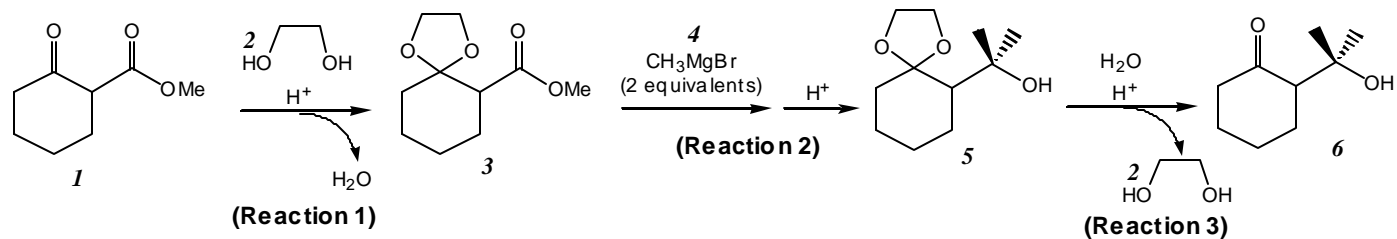
20. What could be the products for the following reaction?



- (a) I, II  
(b) I, II, IV  
(c) III, IV  
(d) II, III  
(e) None of the above

**Continue to the Next page**

II. A synthesis for the preparation of compound **6** is proposed as below:

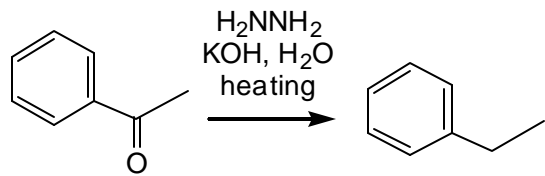


II. Please provide an electron-pushing mechanism for the formation of compound **3** from compound **1** (reaction 1). (10 points)

III. The proposed synthesis involves protection (reaction 1), nucleophilic addition (reaction 2), and deprotection (reaction 3). Will you expect to obtain the same final product, compound **6**, if compound **1** is treated with the Grignard reagent, **4**, (reaction 2) without going through the protection (reaction 1) first? Explain briefly your reason. (4 points)

**Continue to the Next page**

III. Propose an electron pushing mechanism for each of the following reaction. (12 points)



**Continue to the Next page**

IV. Show how ibuprofen can be prepared from benzene. You can use any reactants with four or less carbons. (12 points)

