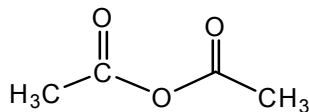


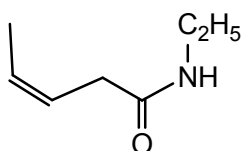
I. Multiple choice questions. (3 points each). Please put your answers on Scantron sheet. Your score will be graded based only on your answers from Scantron sheet.

1. What is the name for the following compound?



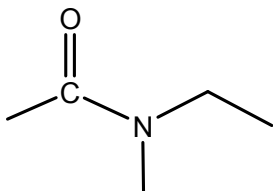
- (a) acetyl acetyl anhydride
- (b) acetic anhydride
- (c) ethanyl anhydride
- (d) ethanoate anhydride
- (e) None of the above

2. What is the name for the following compound?



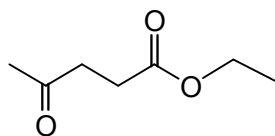
- (a) (*E*)-*N*-ethyl-3-pentenamide
- (b) (*Z*)-*N*-ethyl-3-pentenamide
- (c) (*E*)-*N*-ethyl-4-pentenamide
- (d) (*Z*)-*N*-ethyl-4-pentenamide
- (e) None of the above

3. What is the name for the following compound?



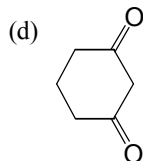
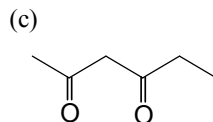
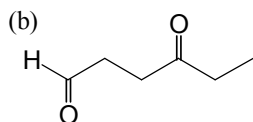
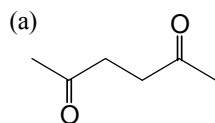
- (a) *N*-ethyl-*N*-methylacetamide
- (b) *N*-isopropylacetamide
- (c) *N*-ethyl-*N*-methylpropanamide
- (d) *N*-ethyl-*N*-methylethylamide
- (e) None of the above

4. What is the name for the following compound?



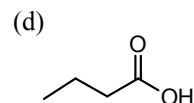
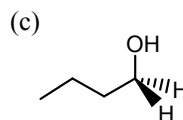
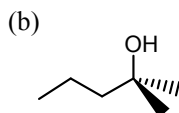
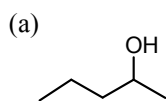
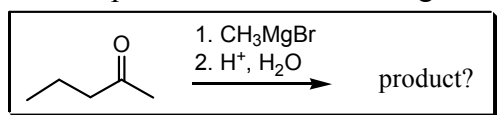
- (a) ethyl 4-oxopentanoate
- (b) ethyl ester methyl ketone
- (c) ethyl 4-ketonepentanoate
- (d) ethyl 4-ketone pentyl ester
- (e) None of the above

5. What is the structure of 2,6-hexanedione?



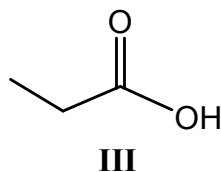
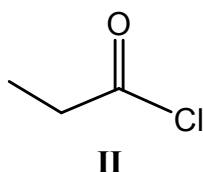
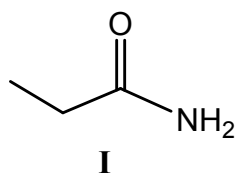
(e) none of the above

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



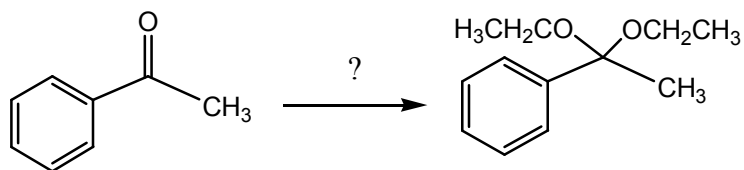
(e) None of the above

7. What is the order of increasing boiling points (from the lowest to highest) for the following compounds?



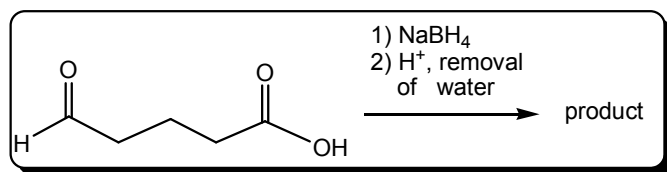
- (a) I, II, III
- (b) II, III, I
- (c) I, III, II
- (d) III, I, II
- (e) None of the above

8. What could be the reagent and reaction condition for the following transformation?



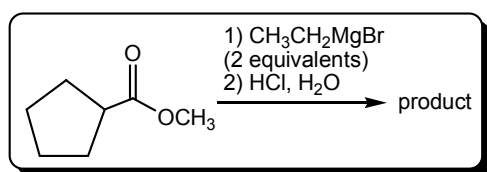
- (a) ethanol, NaOH
- (b) ethanol, H^+
- (c) methanol, NaOH
- (d) methanol, H^+
- (e) None of the above

9. What should be the product from the following reaction?



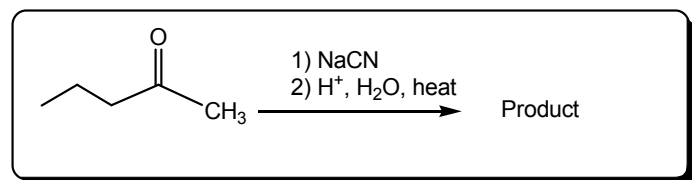
- (a)
- (b)
- (c)
- (d)
- (e) none of the above

10. What could be the product for the following transformation?



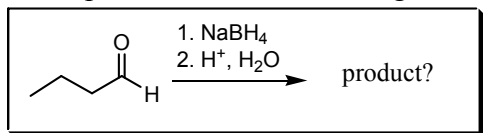
- (a)
- (b)
- (c)
- (d)
- (e) none of the above

11. What should be the product from the following reaction?



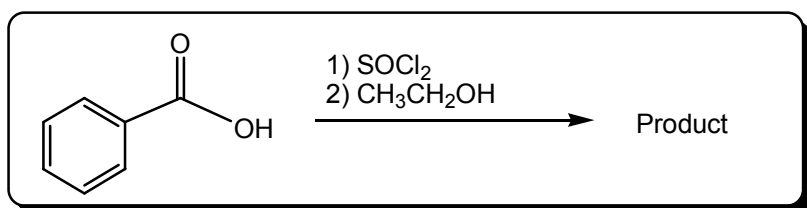
- (a)
- (b)
- (c)
- (d)
- (e) none of the above

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



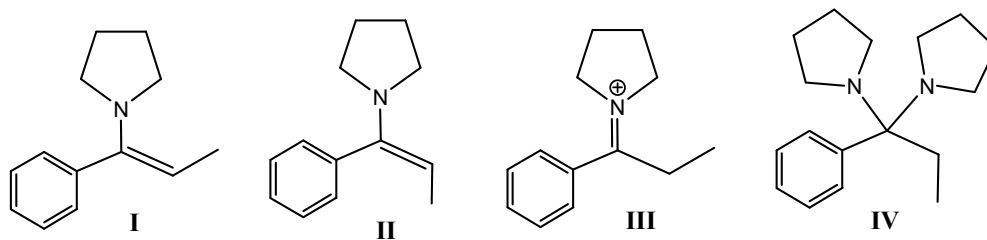
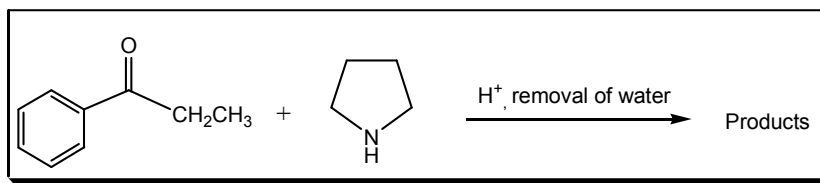
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

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



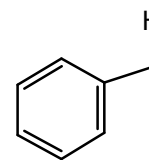
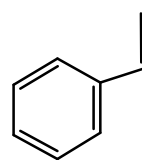
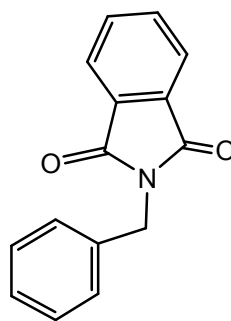
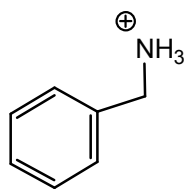
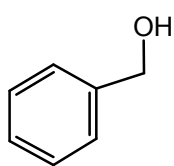
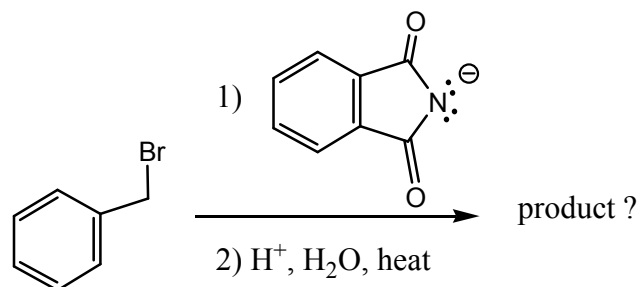
- (a)
- (b)
- (c)
- (d)
- (e) none of the above

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



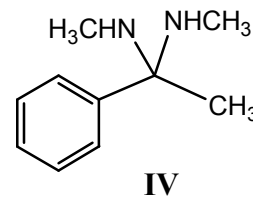
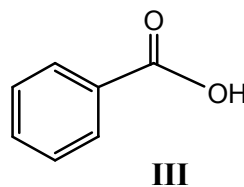
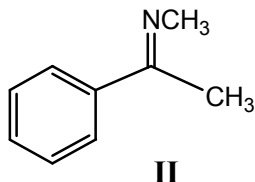
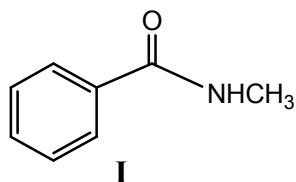
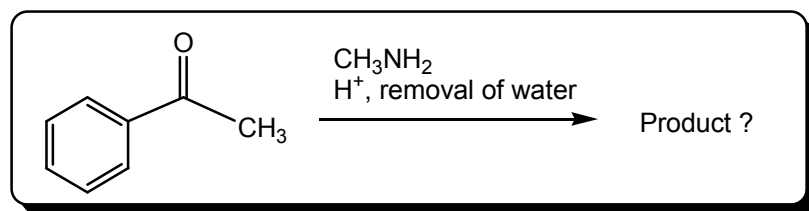
- (a) I, II
(b) I, II, IV
(c) III, IV
(d) II, III
(e) None of the above

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



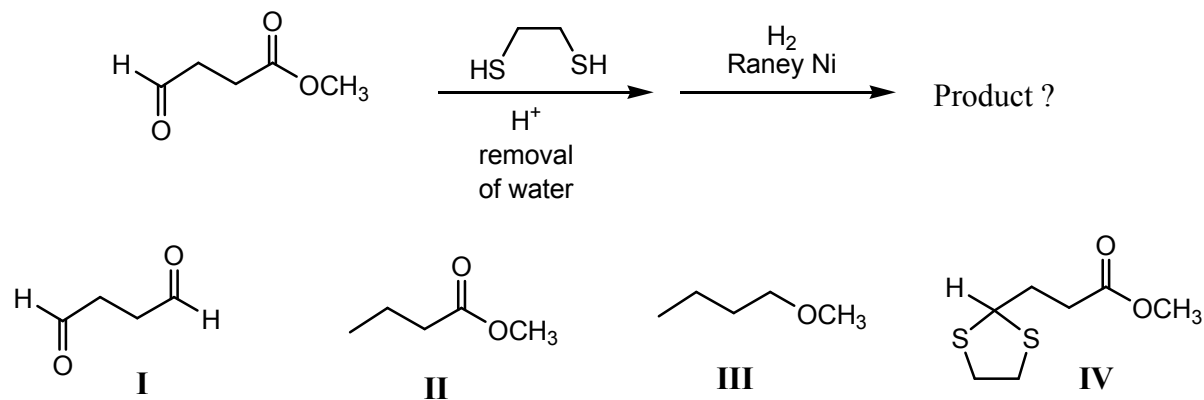
- (a) **I**
- (b) **II**
- (c) **III**
- (d) **IV**
- (e) **V**

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



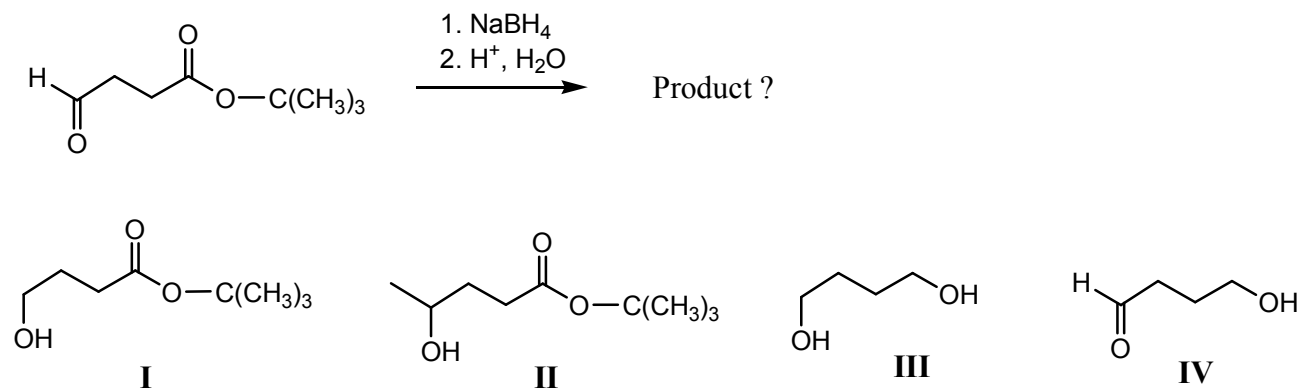
- (a) **I**
- (b) **II**
- (c) **III**
- (d) **IV**
- (e) None of the above

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



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

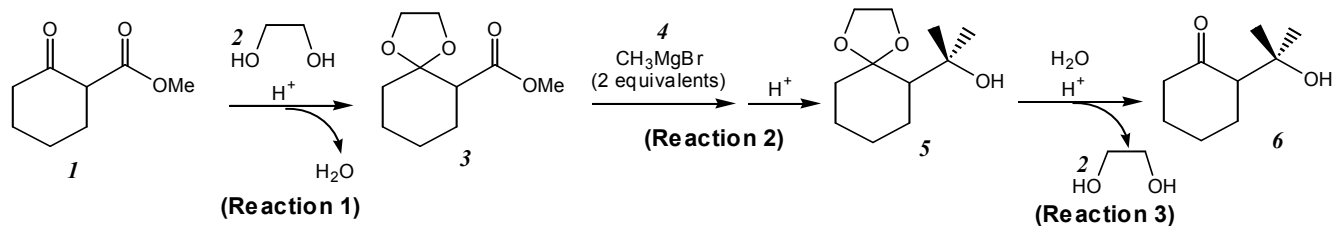
20. What could be the product for the following reaction?



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

Continue to the Next page

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



1. Please provide an electron-pushing mechanism for the formation of compound **3** from compound **1** (reaction 1). (16 points)

Continue to the Next page

2. 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 the following reaction. You have to show how to form the hydrazone intermediate. (20 points)

