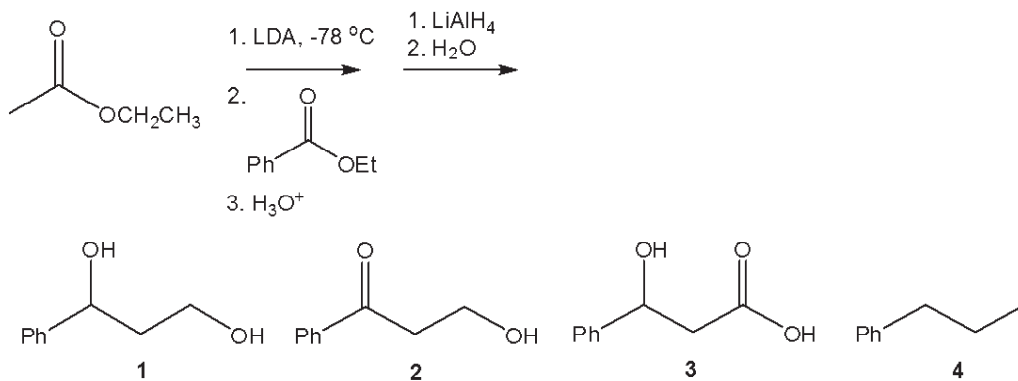


CHEM 2425. Chapter 22. Carbonyl Alpha-Substitution Reactions (quiz) SE50**Multiple Choice**

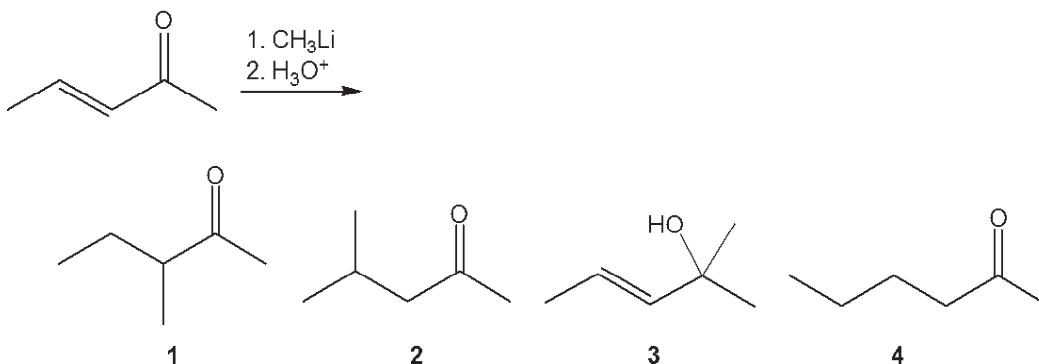
Identify the choice that best completes the statement or answers the question.

- _____ 1. What is the major organic product obtained from the following sequence of reactions?



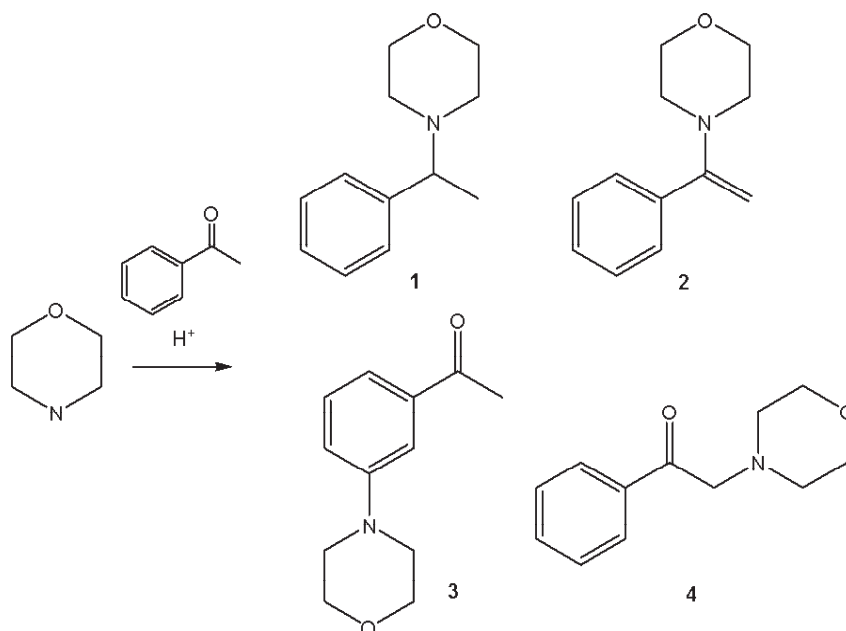
- a. 1
b. 2
c. 3
d. 4

- _____ 2. What is the major organic product obtained from the following reaction?



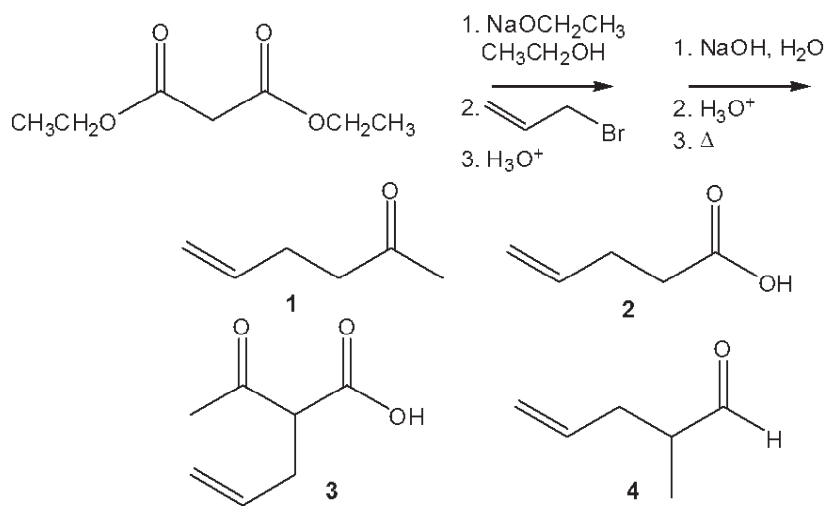
- a. 1
b. 2
c. 3
d. 4

3. What is the major organic product obtained from the following reaction?



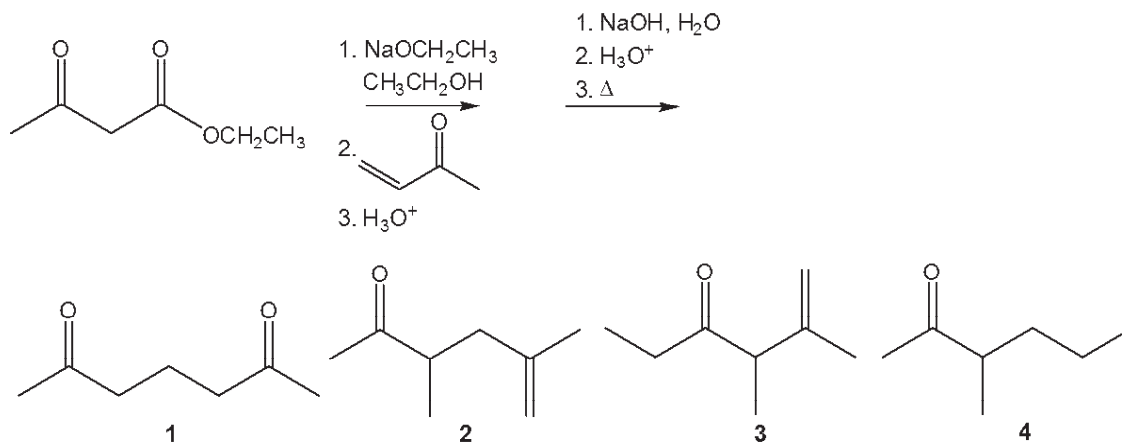
- a. **1**
- b. **2**
- c. **3**
- d. **4**

4. What is the major organic product obtained from the following sequence of reactions?



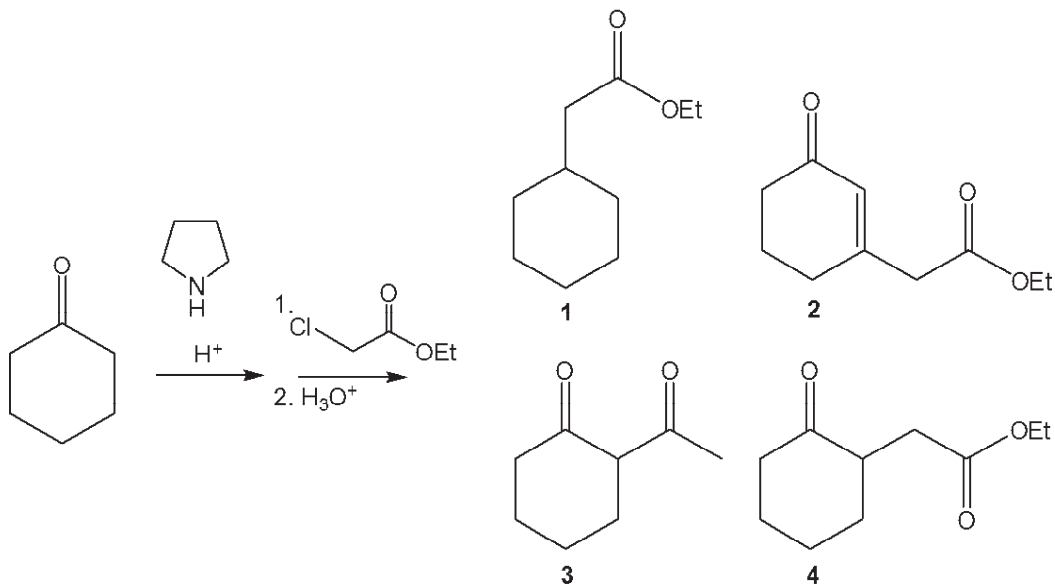
- a. **1**
- b. **2**
- c. **3**
- d. **4**

5. What is the major organic product obtained from the following sequence of reactions?



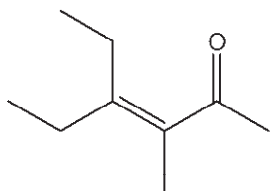
- a. 1
 b. 2
 c. 3
 d. 4

6. What is the major organic product obtained from the following sequence of reactions?

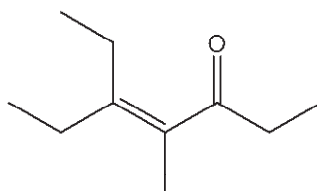


- a. 1
 b. 2
 c. 3
 d. 4

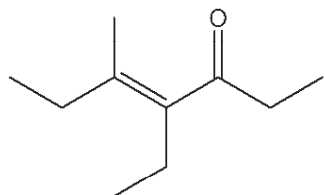
7. Which of the following compounds can be prepared by an aldol condensation by treating a single carbonyl compound with base?



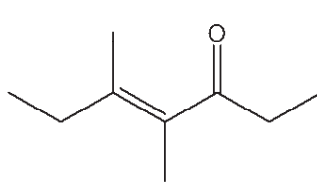
1



2



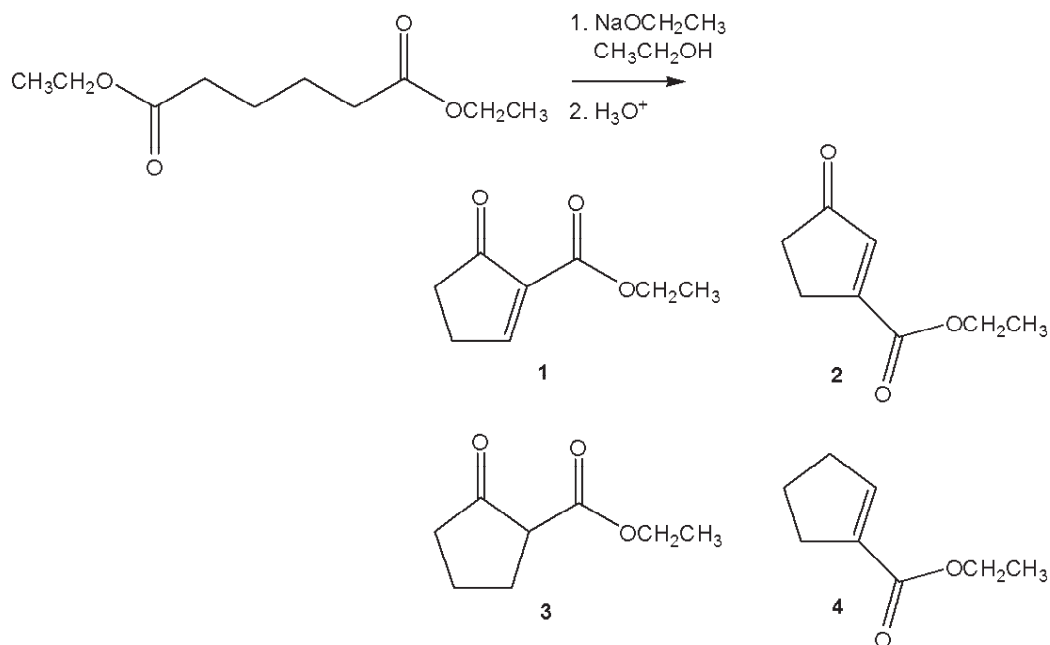
3



4

- a. 1
b. 2
c. 3
d. 4

8. What is the major organic product obtained from the following reaction?



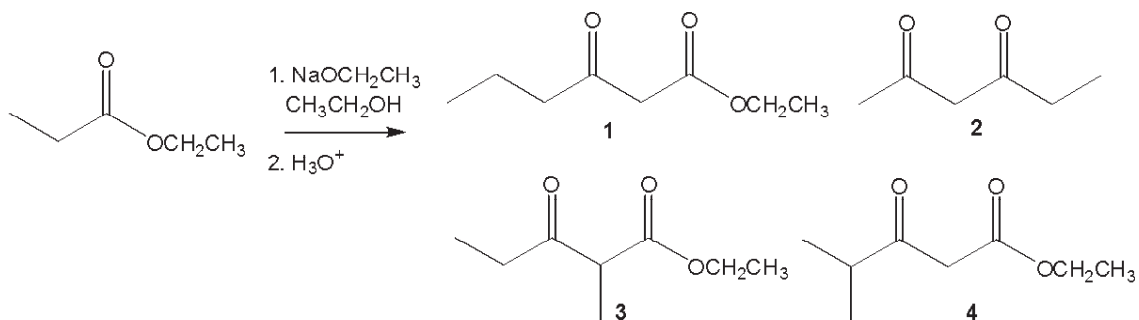
- a. 1
b. 2
c. 3
d. 4

9. Which of the following are intermediates in the base catalyzed aldol reaction of propanal to form 2-methyl-2-pentenal?

1. enol
2. enolate
3. tetrahedral carbonyl intermediate
4. aldol

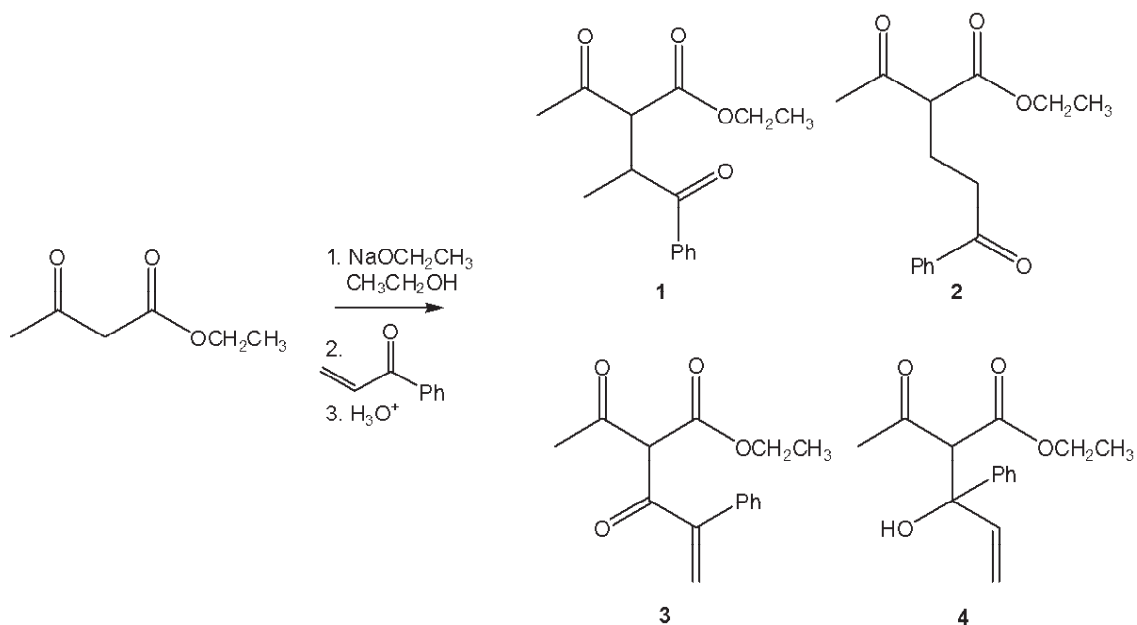
- a. only 1 and 2
- b. only 1, 3 and 4
- c. only 2, 3 and 4
- d. 1, 2, 3 and 4

10. What is the major organic product obtained from the following reaction?



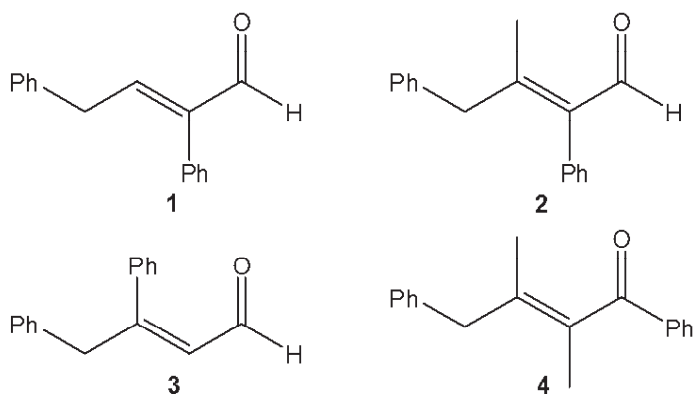
- a. 1
- b. 2
- c. 3
- d. 4

11. What is the major organic product obtained from the following reaction?



- a. **1**
 b. **2**
 c. **3**
 d. **4**

12. Which of the following compounds can be prepared by an aldol condensation by treating a single carbonyl compound with base?

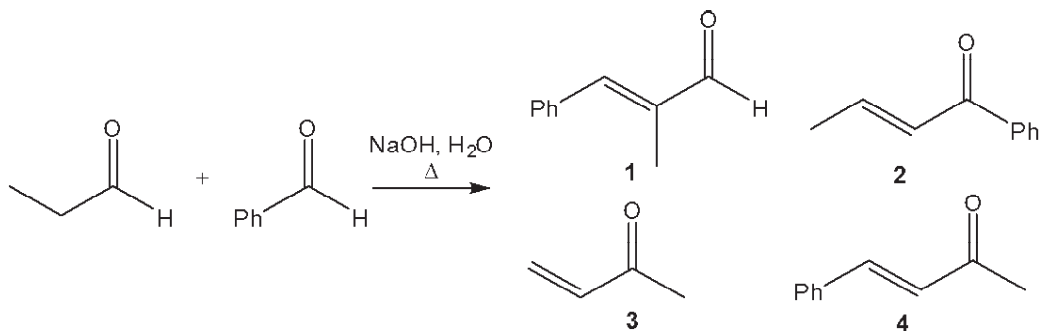


- a. **1**
 b. **2**
 c. **3**
 d. **4**

13. How many different β -hydroxyaldehydes and β -hydroxyketones, including constitutional isomers and stereoisomers, are formed upon treatment of a mixture of acetone and benzaldehyde with base?

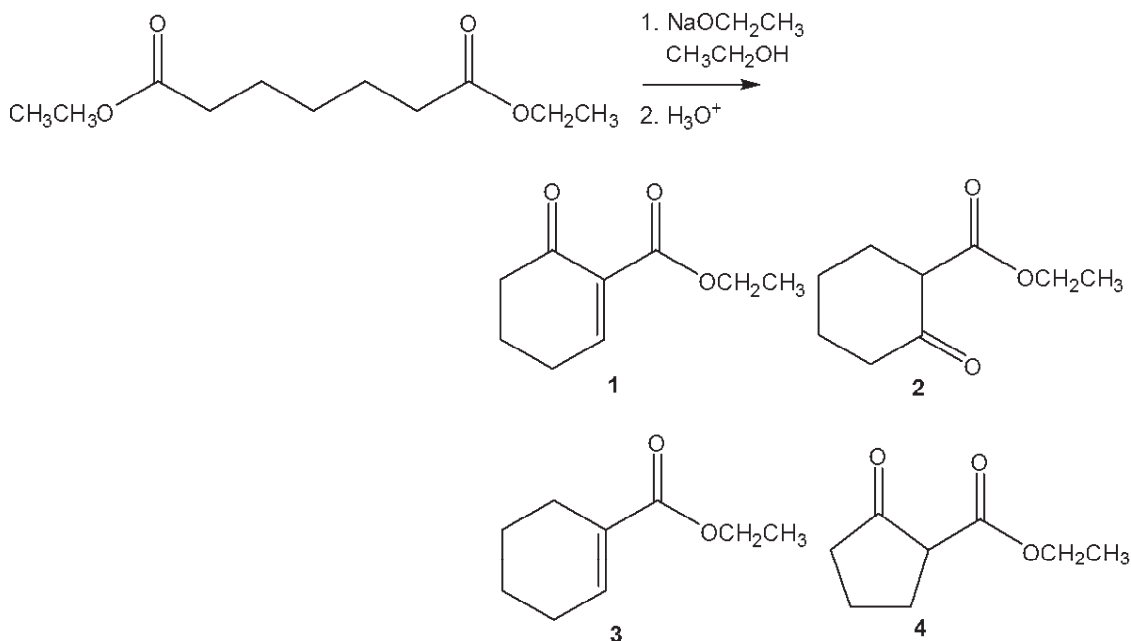
- a. 1
b. 2
c. 3
d. 4

14. What is the major organic product obtained from the following reaction?



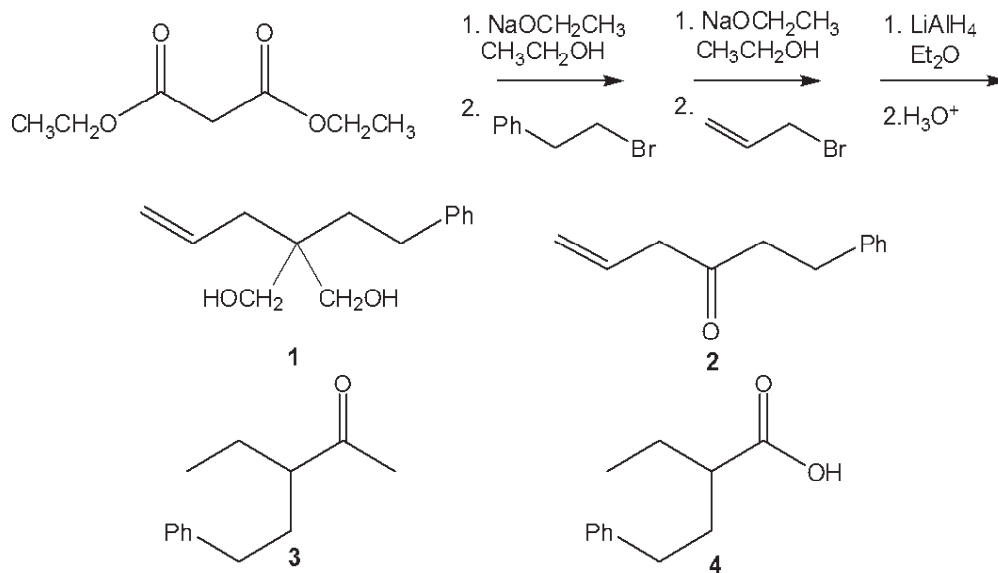
- a. 1
b. 2
c. 3
d. 4

15. What is the major organic product obtained from the following reaction?



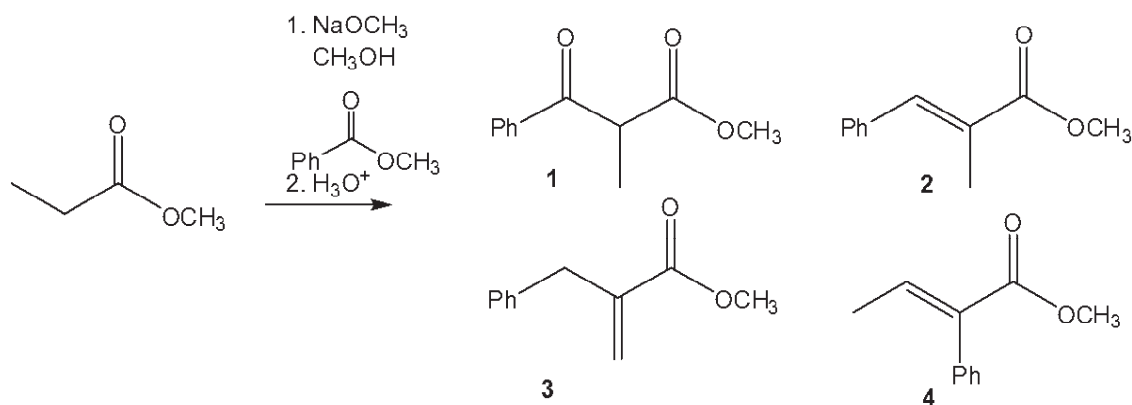
- a. 1
b. 2
c. 3
d. 4

16. What is the major organic product obtained from the following sequence of reactions?



- a. **1**
 b. **2**
 c. **3**
 d. **4**

17. What is the major organic product obtained from the following reaction?

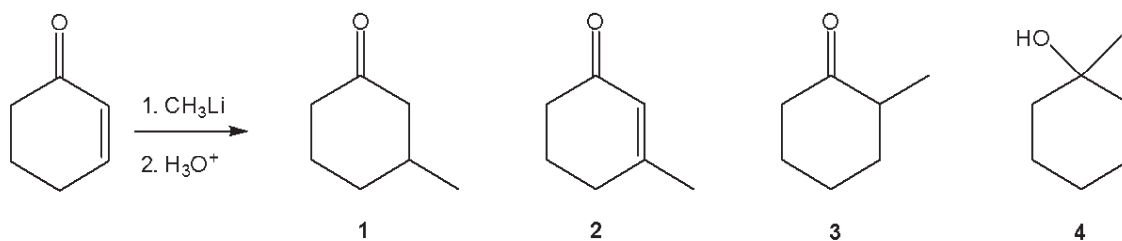


- a. **1**
 b. **2**
 c. **3**
 d. **4**

18. How many different aldols (β -hydroxyaldehydes), including constitutional isomers and stereoisomers, are formed upon treatment of butanal with base?

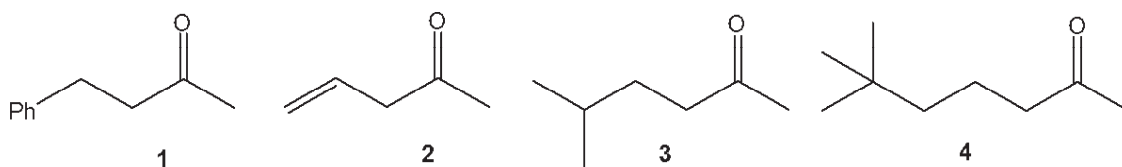
- a. **1**
 b. **2**
 c. **3**
 d. **4**

___ 19. What is the major organic product obtained from the following reaction?



- a. 1
b. 2
c. 3
d. 4

___ 20. Which one of the following ketones *cannot* be made via an acetoacetate ester synthesis?

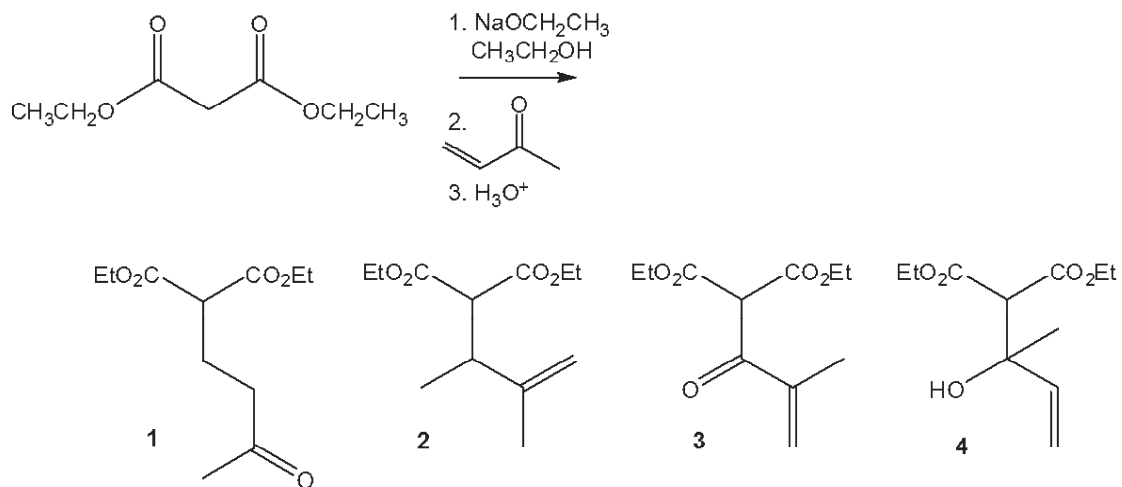


- a. 1
b. 2
c. 3
d. 4

___ 21. How many different β -hydroxyaldehydes and β -hydroxyketones, including constitutional isomers and stereoisomers, are formed upon treatment of a mixture of butanal and acetone with base?

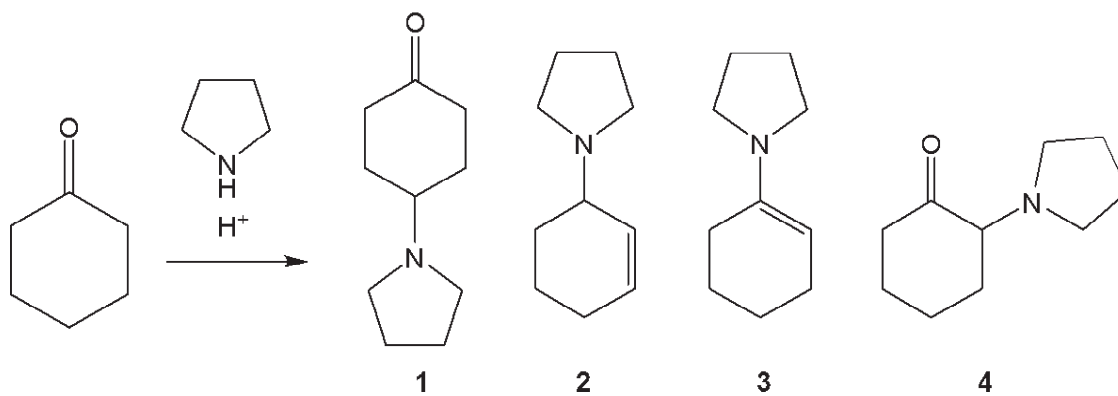
- a. 6
b. 12
c. 9
d. 4

22. What is the major organic product obtained from the following reaction?



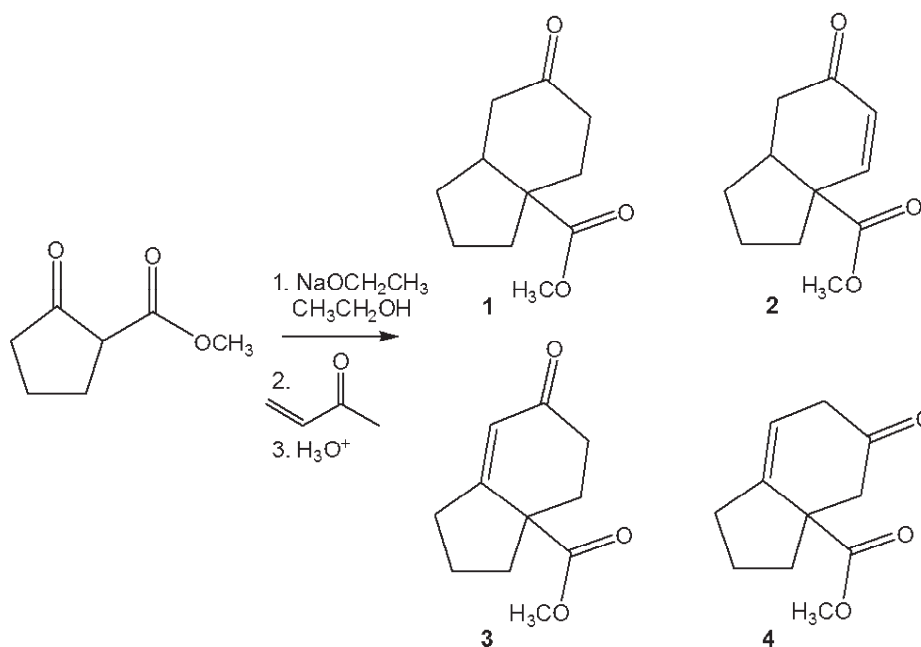
- a. 1
 b. 2
 c. 3
 d. 4

23. What is the major organic product obtained from the following reaction?



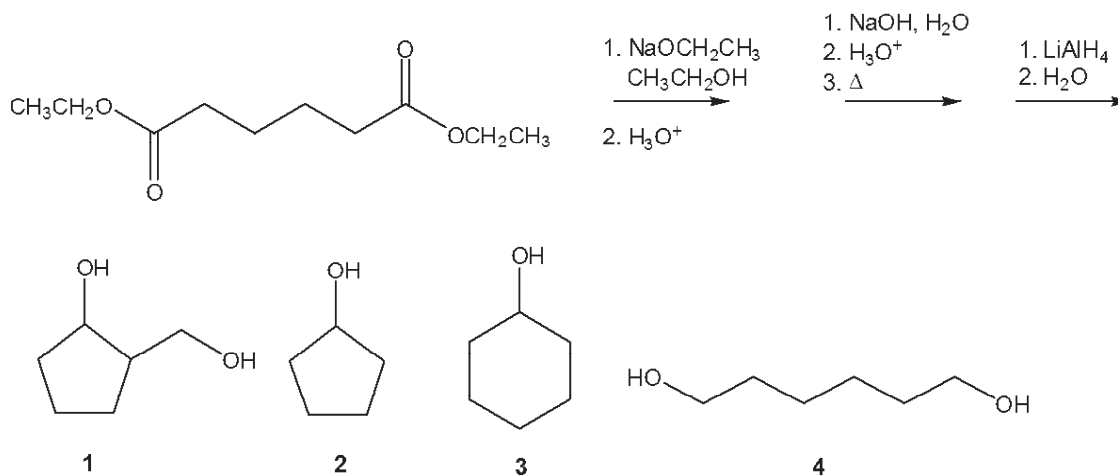
- a. 1
 b. 2
 c. 3
 d. 4

24. What is the major organic product obtained from the following reaction?



- a. **1**
b. **2**
c. **3**
d. **4**

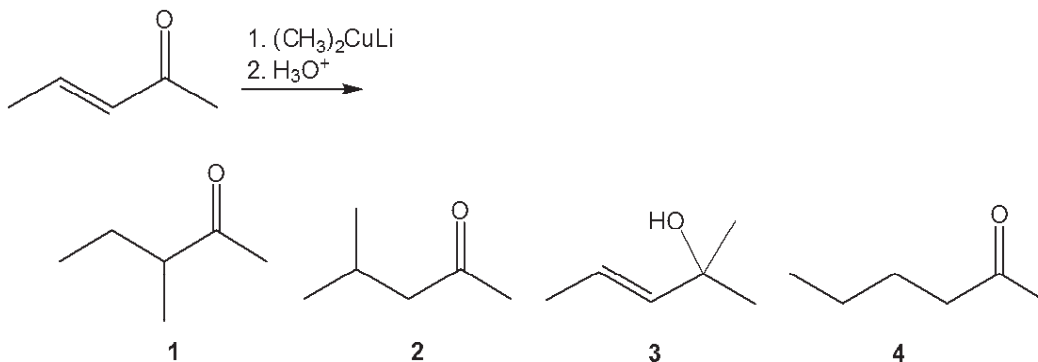
25. What is the major organic product obtained from the following sequence of reactions?



- a. **1**
b. **2**
c. **3**
d. **4**

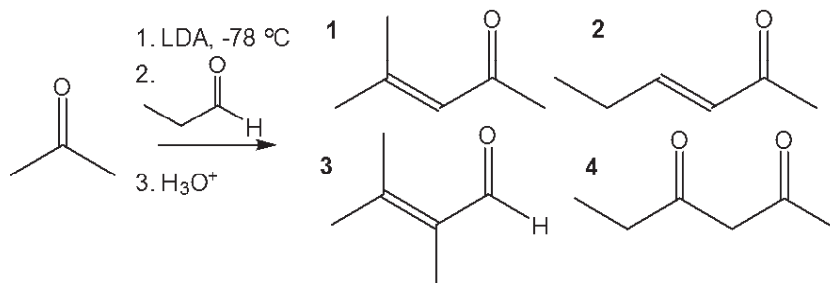
- _____ 26. How many β -hydroxyketones, including constitutional isomers and stereoisomers, are formed upon treatment of acetone with base?
- 1
 - 2
 - 3
 - 4

- _____ 27. What is the major organic product obtained from the following reaction?



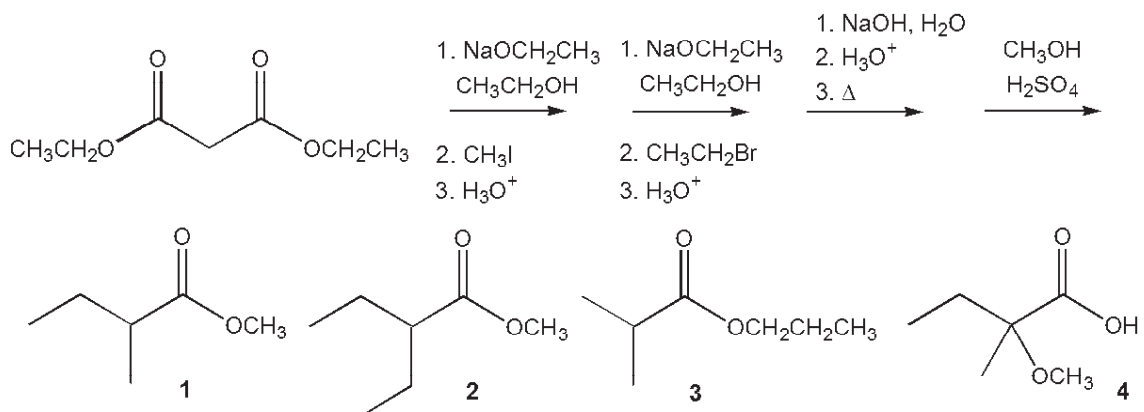
- 1
- 2
- 3
- 4

- _____ 28. What is the major organic product obtained from the following reaction?



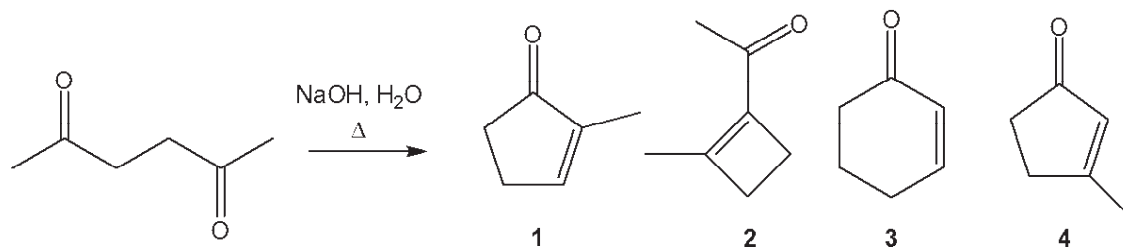
- 1
- 2
- 3
- 4

29. What is the major organic product obtained from the following sequence of reactions?



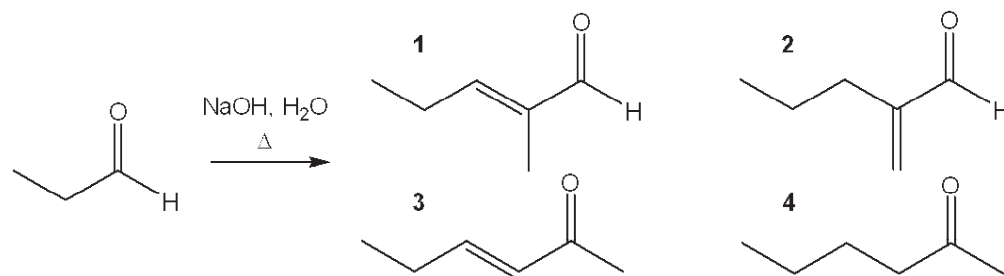
- a. **1**
 b. **2**
 c. **3**
 d. **4**

30. What is the major organic product obtained from the following reaction?



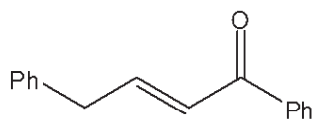
- a. **1**
 b. **2**
 c. **3**
 d. **4**

31. What is the major organic product obtained from the following reaction?

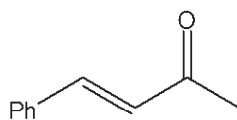


- a. **1**
 b. **2**
 c. **3**
 d. **4**

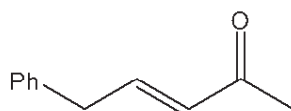
32. Which of the following compounds can be prepared by a mixed aldol condensation by treatment of a mixture of two carbonyl compounds and NaOH?



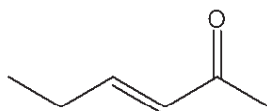
1



2



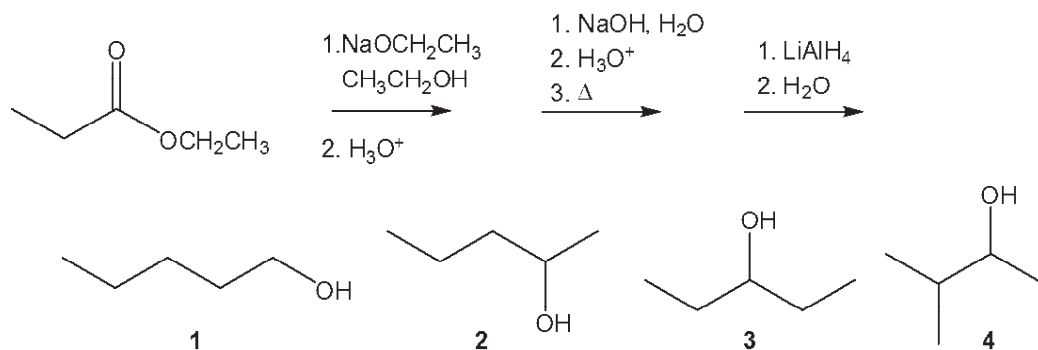
3



4

- a. 1
b. 2
c. 3
d. 4

33. What is the major organic product obtained from the following sequence of reactions?



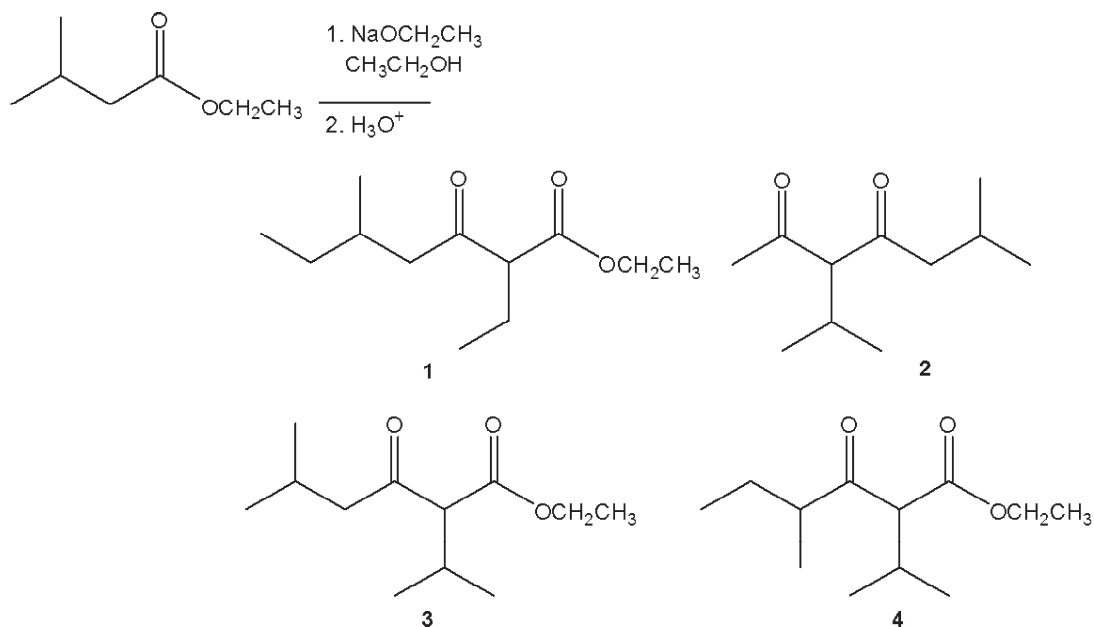
- a. 1
b. 2
c. 3
d. 4

34. Which of the following are intermediates in the acid catalyzed aldol reaction of propanal to form 2-methyl-2-pentenal?

1. enol
2. enolate
3. tetrahedral carbonyl intermediate
4. aldol

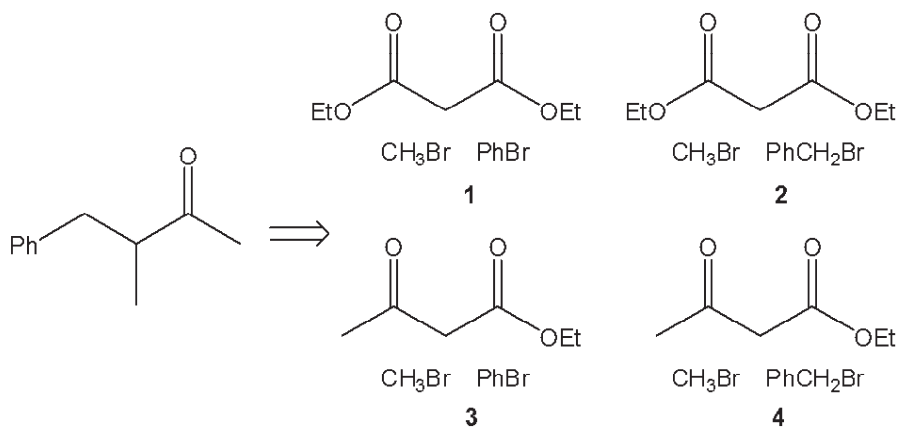
- a. only 1 and 2
b. only 1, 3 and 4
c. only 2, 3 and 4
d. 1, 2, 3 and 4

35. What is the major organic product obtained from the following reaction?



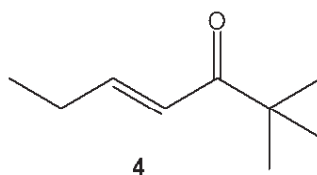
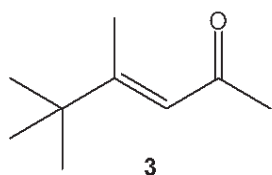
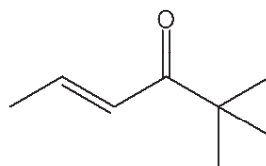
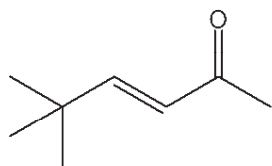
- a. **1**
 b. **2**
 c. **3**
 d. **4**

36. Which combination of organic bromide(s) and dicarbonyl compound can be used to prepare the following product (in a multistep synthesis)?



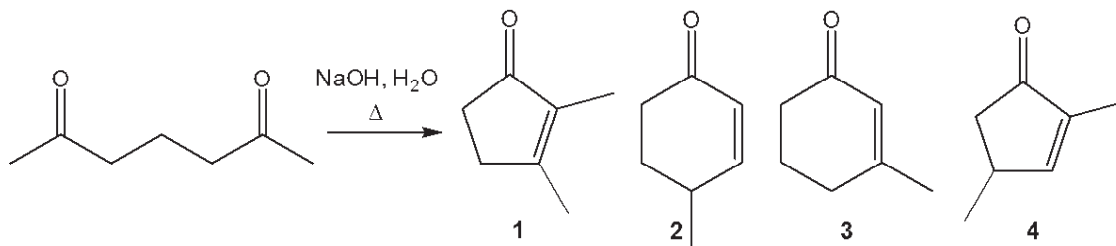
- a. **1**
 b. **2**
 c. **3**
 d. **4**

- _____ 37. Which of the following compounds can be prepared by a mixed aldol condensation by treatment of a mixture of two carbonyl compounds and NaOH?



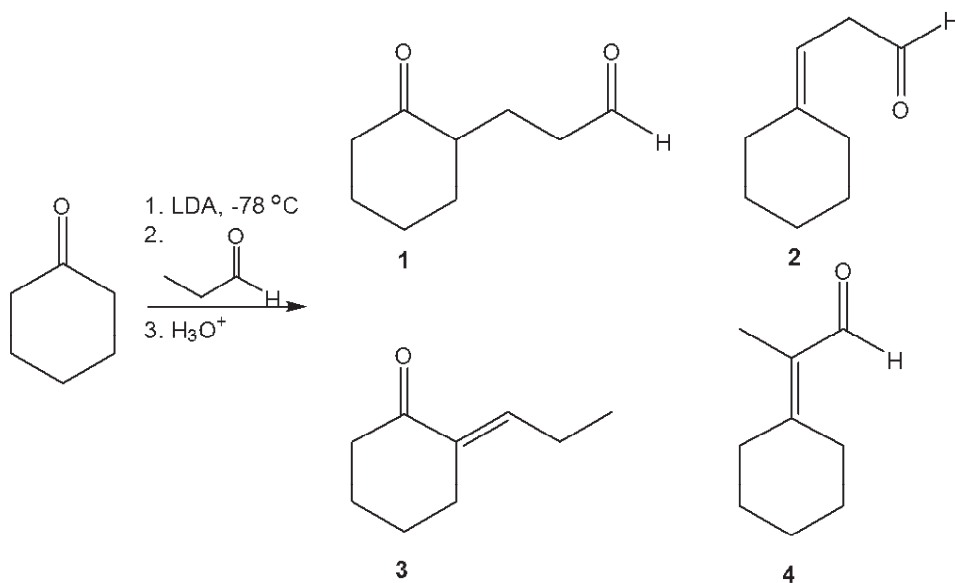
- a. 1
b. 2
c. 3
d. 4

- _____ 38. What is the major organic product obtained from the following reaction?



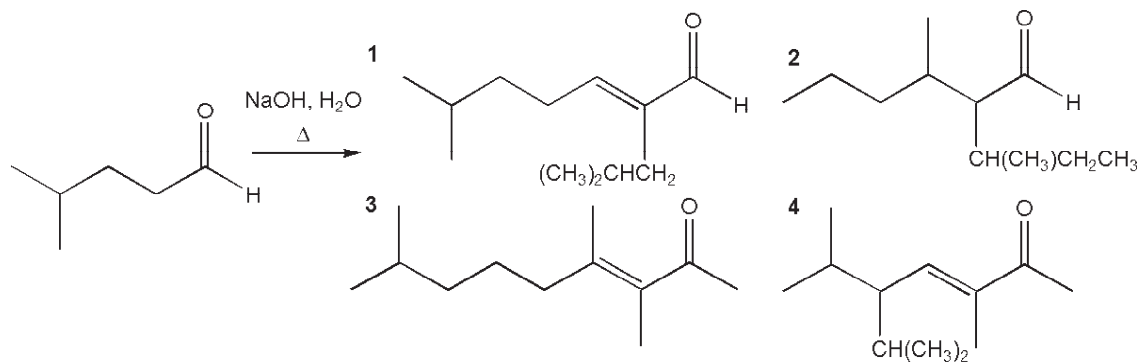
- a. 1
b. 2
c. 3
d. 4

39. What is the major organic product obtained from the following reaction?



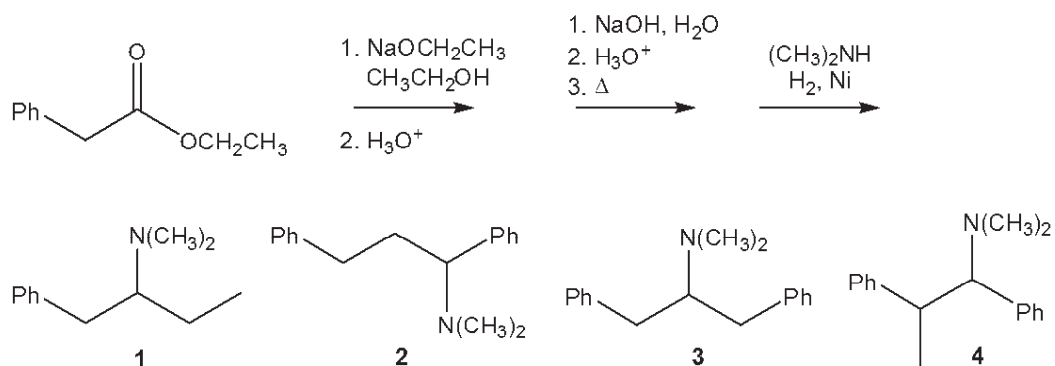
- a. **1**
- b. **2**
- c. **3**
- d. **4**

40. What is the major organic product obtained from the following reaction?



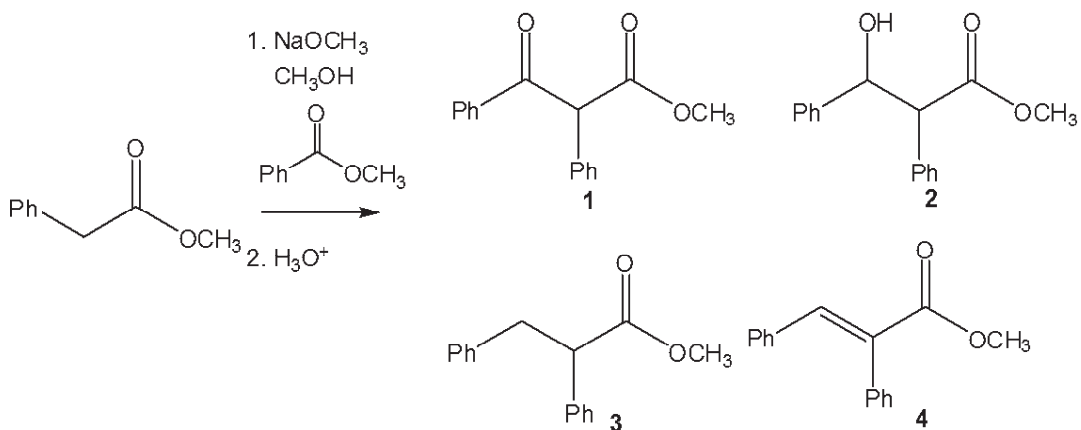
- a. **1**
- b. **2**
- c. **3**
- d. **4**

___ 41. What is the major organic product obtained from the following sequence of reactions?



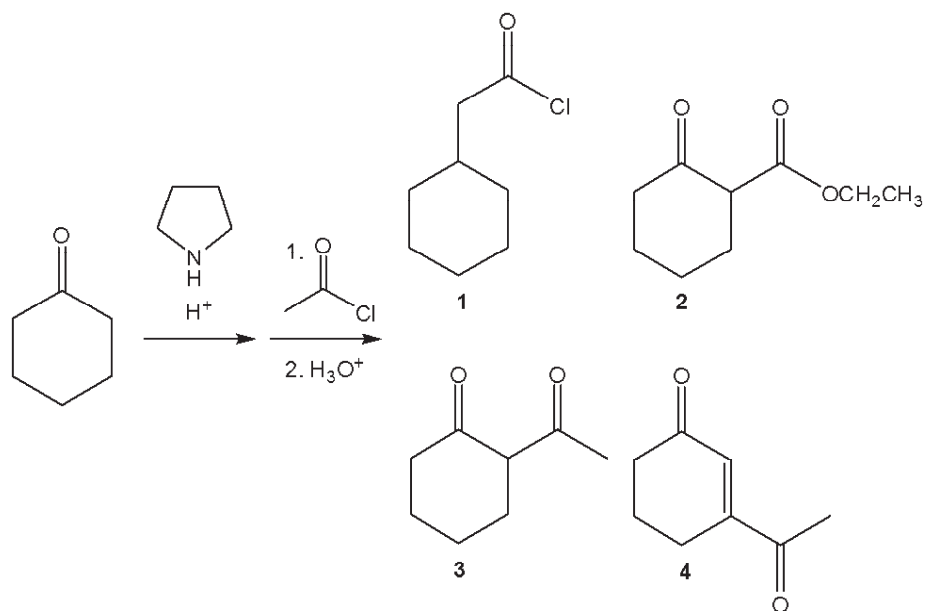
- a. 1
b. 2
c. 3
d. 4

___ 42. What is the major organic product obtained from the following reaction?



- a. 1
b. 2
c. 3
d. 4

_____ 43. What is the major organic product obtained from the following sequence of reactions?

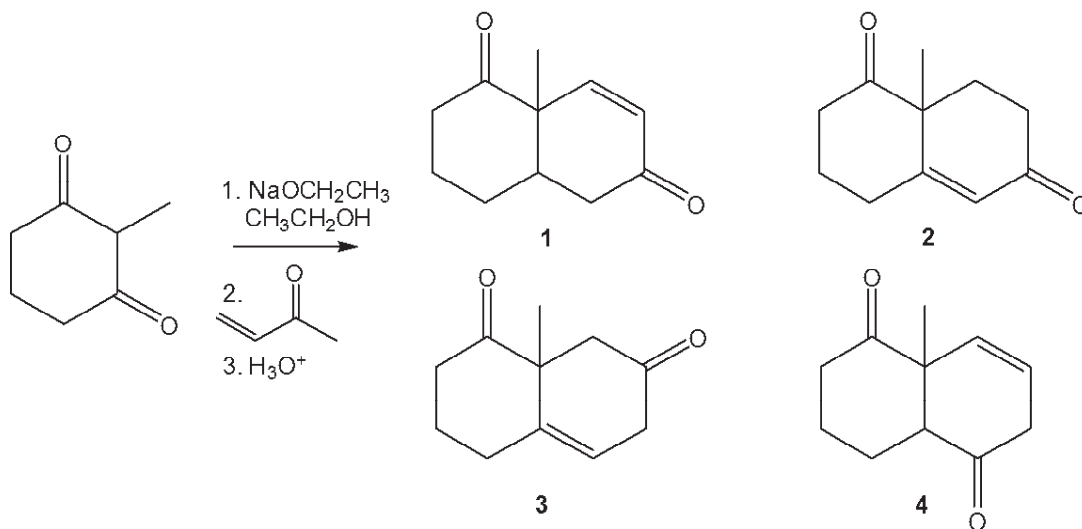


- a. **1**
- b. **2**
- c. **3**
- d. **4**

_____ 44. How many different β -hydroxyaldehydes and β -hydroxyketones, including constitutional isomers and stereoisomers, are formed upon treatment of a mixture of acetone and acetophenone with base?

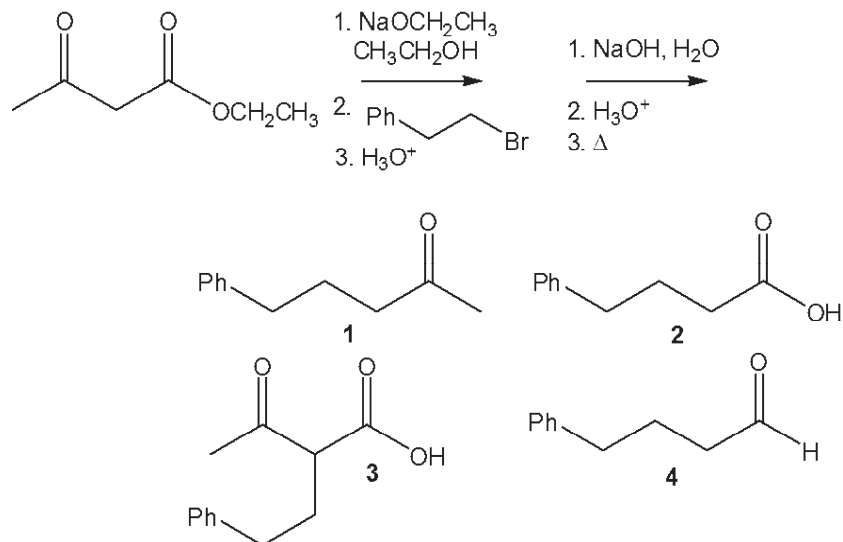
- a. 6
- b. 4
- c. 12
- d. 9

___ 45. What is the major organic product obtained from the following reaction?



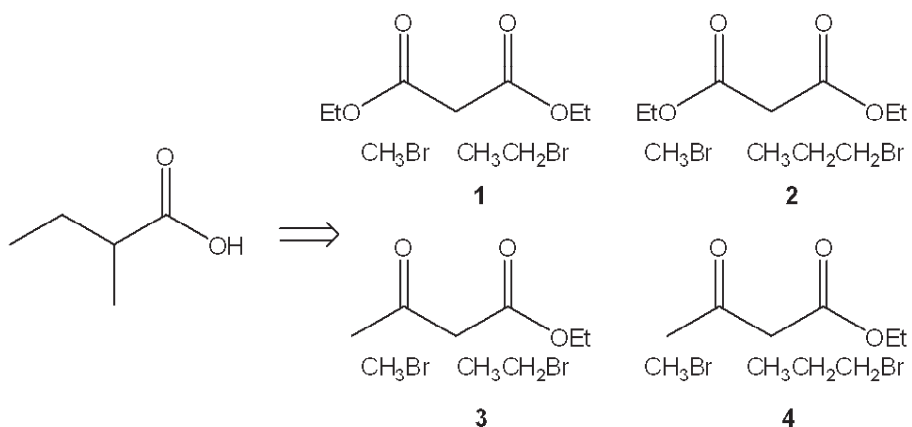
- a. **1**
 b. **2**
 c. **3**
 d. **4**

___ 46. What is the major organic product obtained from the following sequence of reactions?



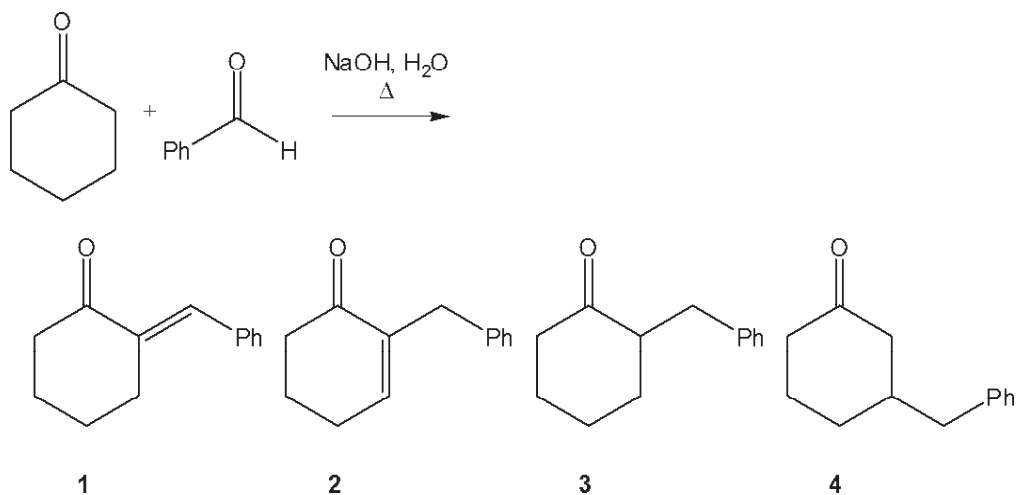
- a. **1**
 b. **2**
 c. **3**
 d. **4**

47. Which combination of organic bromide(s) and dicarbonyl compound can be used to prepare the following product (in a multistep synthesis)?



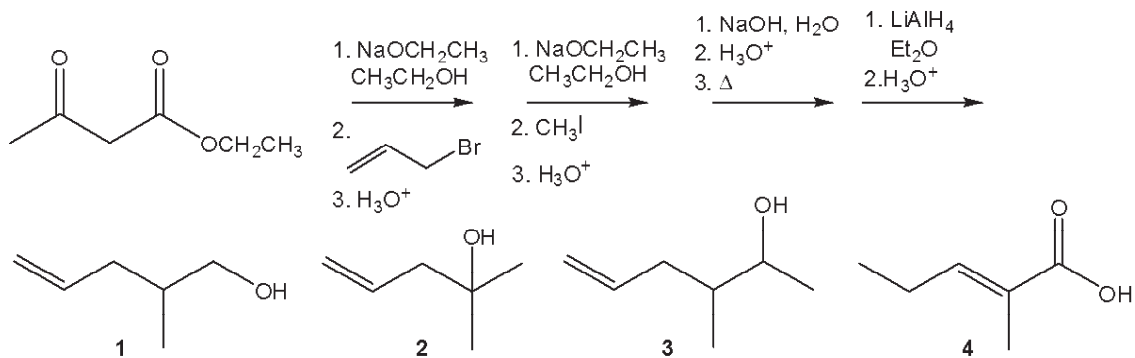
- a. 1
b. 2
c. 3
d. 4

48. What is the major organic product obtained from the following reaction?



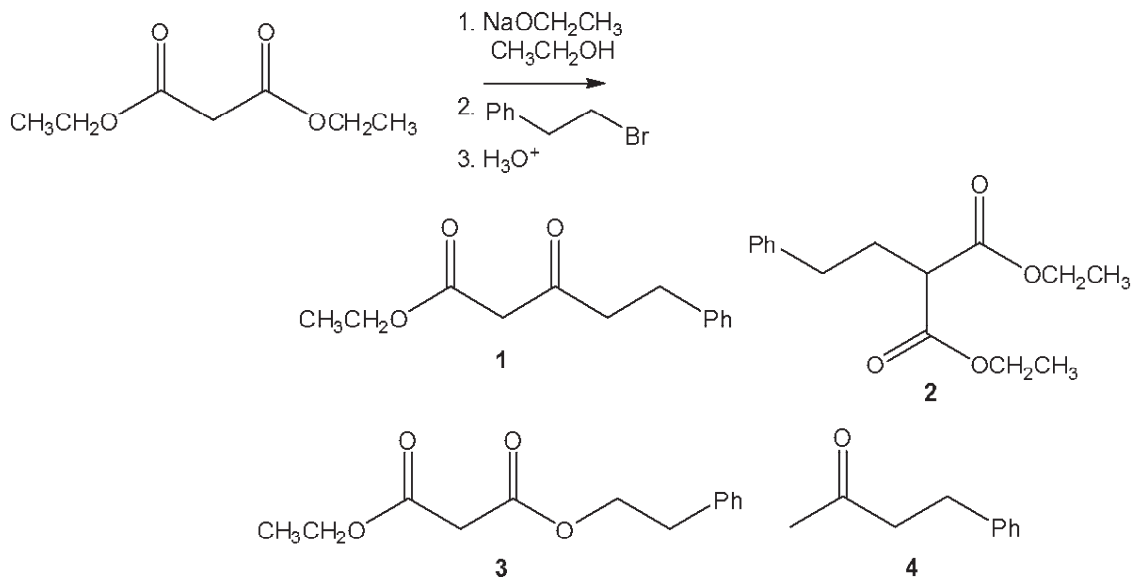
- a. 1
b. 2
c. 3
d. 4

49. What is the major organic product obtained from the following sequence of reactions?



- a. 1
 b. 2
 c. 3
 d. 4

50. What is the major organic product obtained from the following reaction?



- a. 1
 b. 2
 c. 3
 d. 4