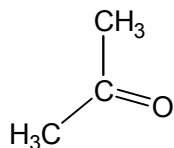


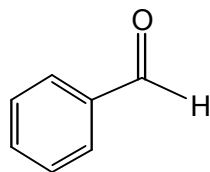
I. Multiple choice questions. (3 points each). Please put your answers on Scantron sheet. Your score will be graded based only on your answers from Scantron sheet.

1. What is **not** the name for the following compound?



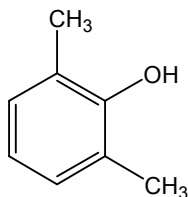
- (a) acetone
- (b) dimethyl ketone
- (c) 2-oxoketone
- (d) propanone
- (e) None of the above

2. What is the name for the following compound?



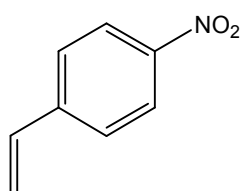
- (a) benzylcarbonyl
- (b) benzaldehyde
- (c) phenylaldehyde
- (d) phenylketone
- (e) None of the above

3. What is the name for the following compound?



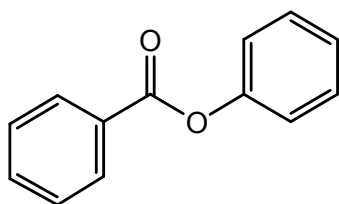
- (a) 2,6-dimethylphenol
- (b) 1,5-dimethylphenol
- (c) 2,6-dimethylanisole
- (d) 1,5-dimethylanisole
- (e) None of the above

4. What is the name for the following compound?



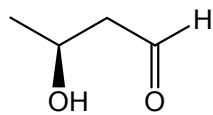
- (a) *p*-aminotoluene
- (b) *p*-nitrotoluene
- (c) *p*-nitrostyrene
- (d) 3-aminostyrene
- (e) None of the above

5. What is the name for the following compound?



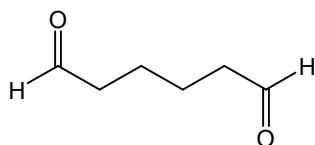
- (a) benzyl phenoate
- (b) phenyl benzoate
- (c) benzyl benzoate
- (d) phenyl phenoate
- (e) None of the above

6. What is the name for the following compound?



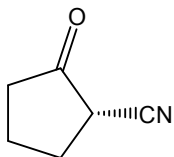
- (a) (*R*)-3-hydroxybutanal
- (b) (*S*)-3-hydroxybutanal
- (c) (*R*)-3-hydroxybutanol
- (d) (*S*)-3-hydroxybutanol
- (e) None of the above

7. What is the name for the following compound?



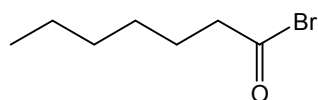
- (a) hexanediol
- (b) hexanedial
- (c) hexyldiol
- (d) hexyldial
- (e) None of the above

8. What is the name for the following compound?



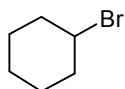
- (a) (*R*)-2-cyanocyclopentanone
- (b) (*S*)-2-cyanocyclopentanone
- (c) (*R*)-2-nitrilecyclopentanone
- (d) (*S*)-2-nitrilecyclopentanone
- (e) None of the above

9. What is the name for the following compound?

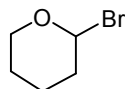


- (a) heptyl bromide
- (b) heptaneacyl bromide
- (c) heptanoyl bromide
- (d) heptane bromide
- (e) None of the above

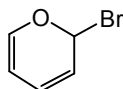
10. Which of the following compounds undergo S_N1 reaction most rapidly?



I



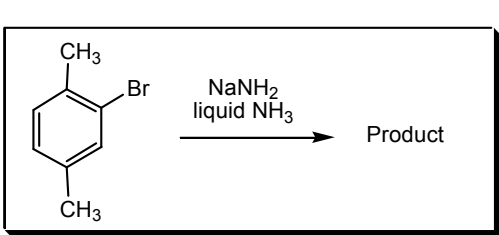
II



III

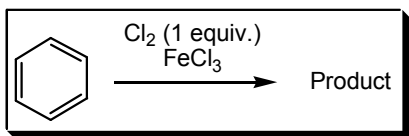
- (a) **I**
- (b) **II**
- (c) **III**
- (d) **II** and **III** have the same rate of reaction.
- (e) None of the above

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



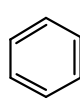
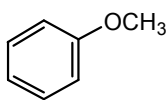
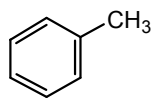
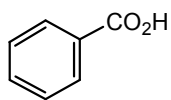
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

12. What is the expected product for the following reaction?



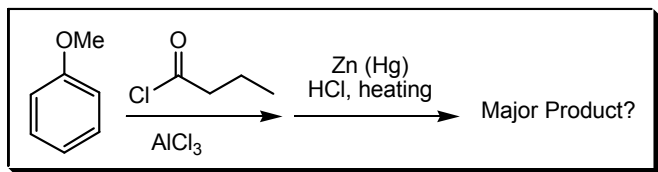
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

13. What is the correct order of decreasing reactivity (fastest to slowest) toward the electrophilic aromatic substitution for the following compounds?



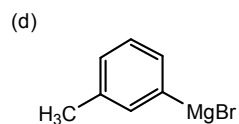
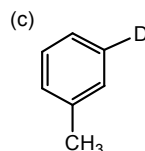
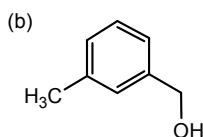
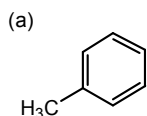
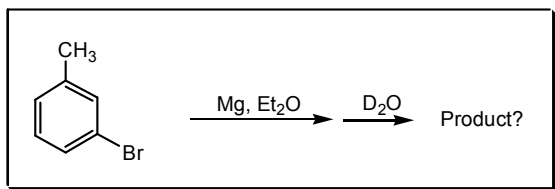
- (a) III>II>IV>I
 (b) II>I>IV>III
 (c) I>II>III>IV
 (d) IV>III>II>I
 (e) None of the above

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



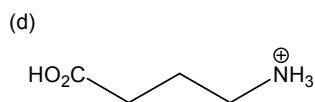
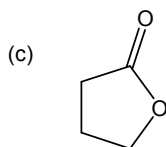
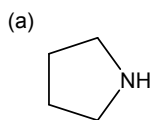
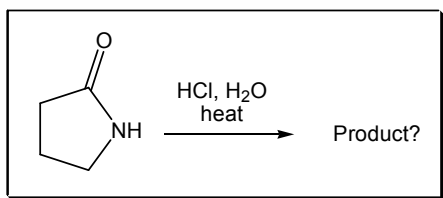
- (a)
- (b)
- (c)
- (d)
- (e) None of the above

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



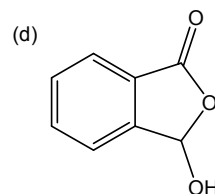
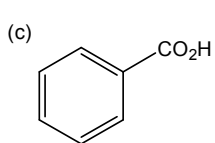
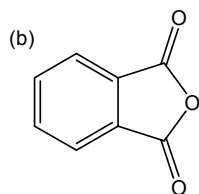
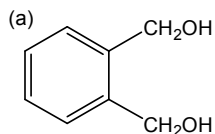
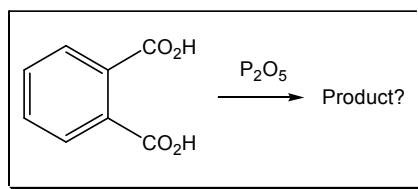
(e) None of the above

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



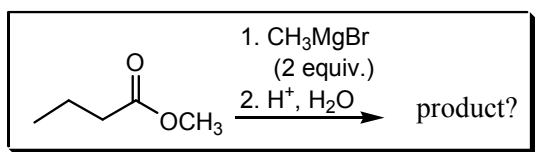
(e) None of the above

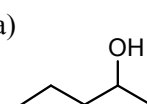
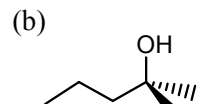
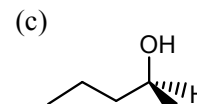
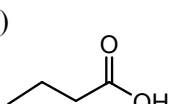
17. What could be the product for the following reaction?



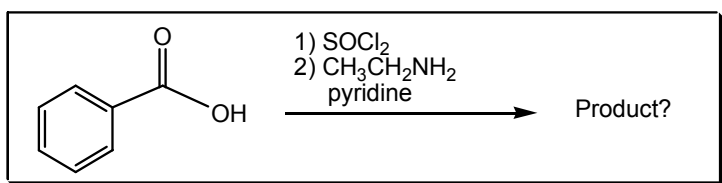
(e) None of the above

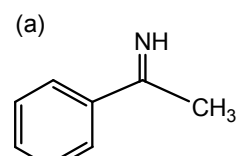
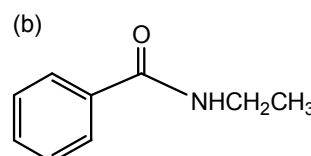
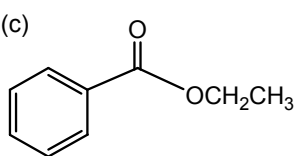
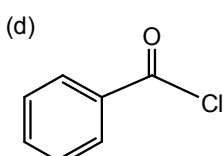
18. What could be the product for the following reaction?



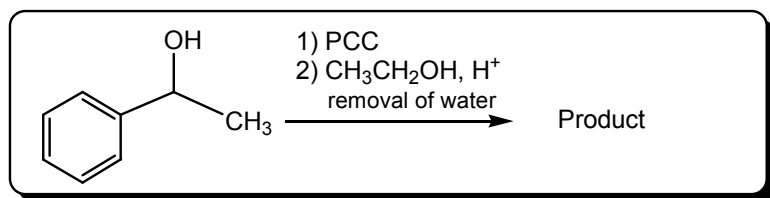
- (a)  (b)  (c)  (d) 
- (e) None of the above

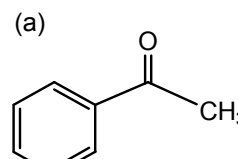
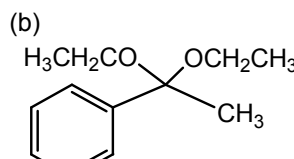
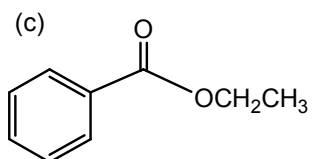
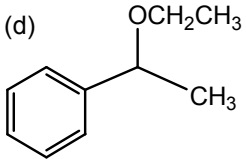
19. What could be the product for the following reaction?



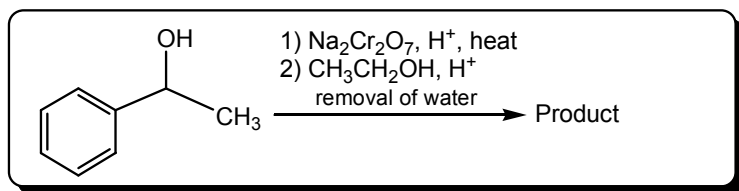
- (a)  (b)  (c)  (d) 
- (e) none of the above

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

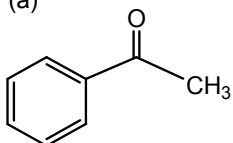


- (a)  (b)  (c)  (d) 
- (e) none of the above

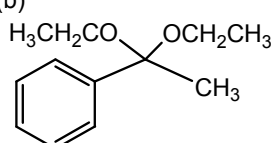
21. What could be the product for the following reaction?



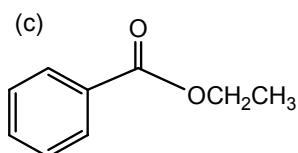
(a)



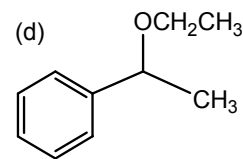
(b)



(c)

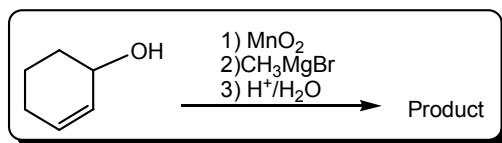


(d)

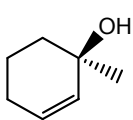


(e) none of the above

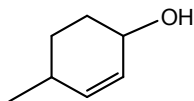
22. What could be the product for the following reaction?



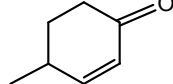
(a)



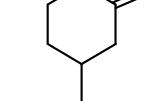
(b)



(c)

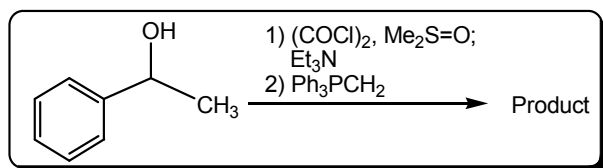


(d)

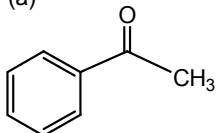


(e) none of the above

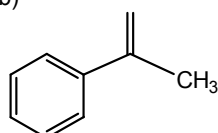
23. What could be the product for the following reaction?



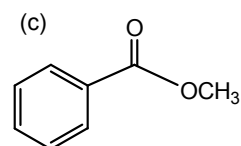
(a)



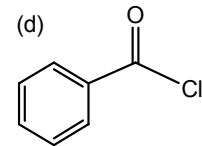
(b)



(c)

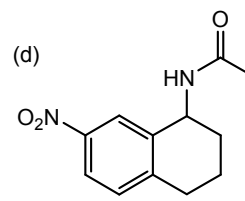
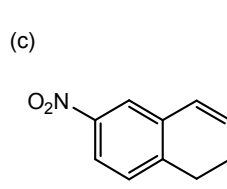
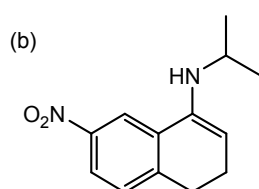
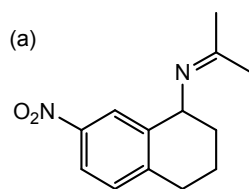
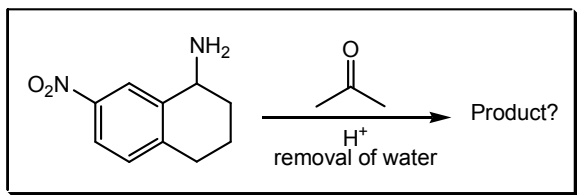


(d)



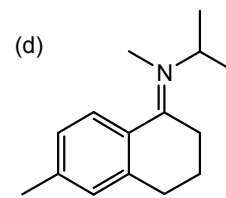
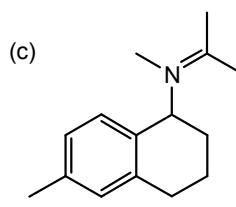
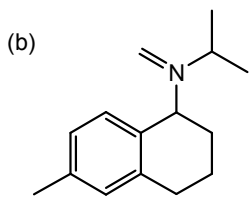
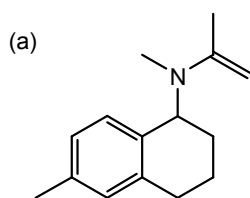
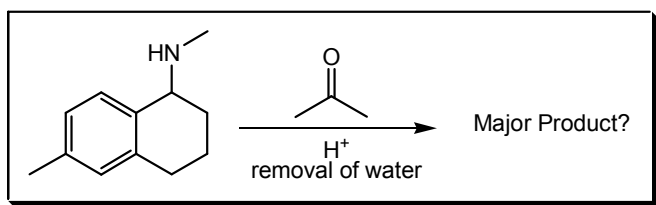
(e) none of the above

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



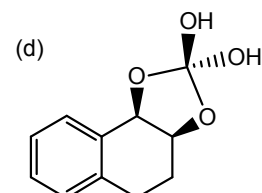
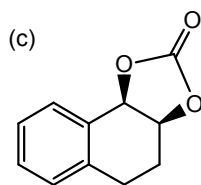
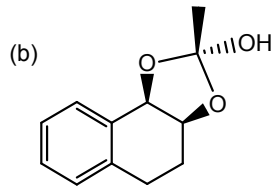
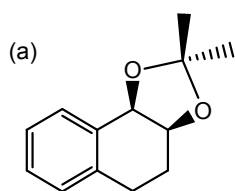
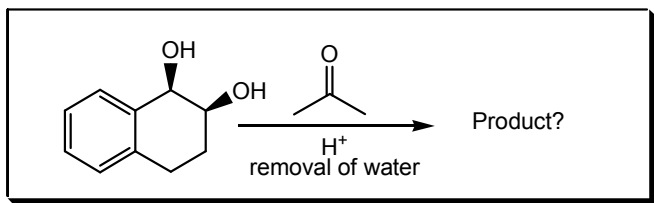
(e) None of the above

25. What could be the **major** product for the following reaction?



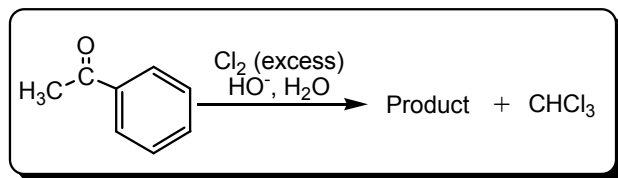
(e) None of the above

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



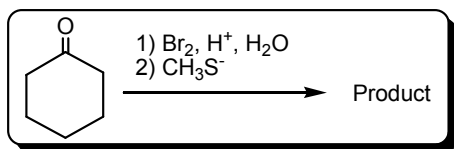
(e) None of the above

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



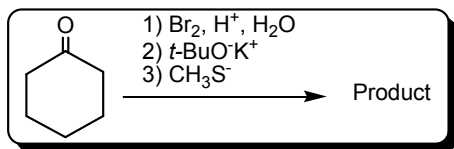
- (a) O=C(O)c1ccc(Cl)cc1 (p) O=C(O)c1ccccc1 (b)
- (c) O=C(Cl)c1ccccc1 (q) [O-]C(=O)c1ccccc1 (d)
- (e) None of the above

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



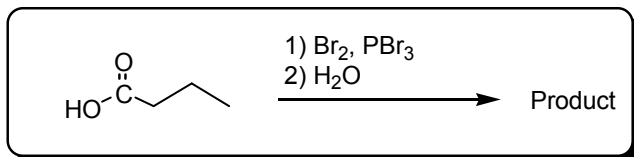
- (a) O=C1CCCC(S)C1 (p) O=C1CCCC(S)CC1 (b) (q) OC1(CS)CCCC1 (c) (r) O=C1C=CCCC1 (d)
- (e) none of the above

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



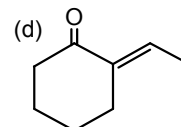
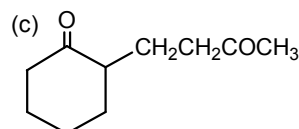
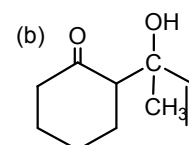
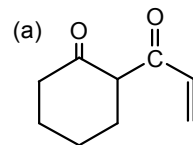
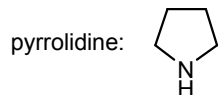
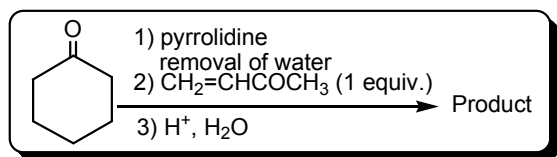
- (a) O=C1CCCC(S)C1 (p) (q) O=C1CCCC(S)CC1 (b) (r) OC1(CS)CCCC1 (c) (s) O=C1C=CCCC1 (d)
- (e) none of the above

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



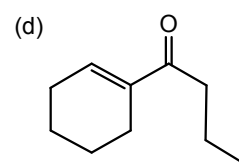
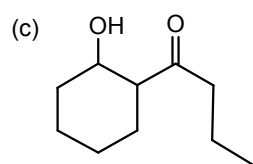
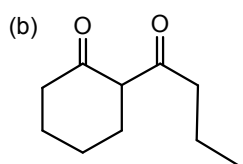
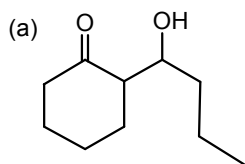
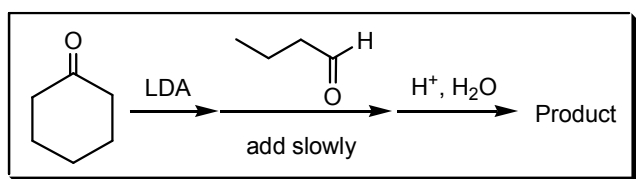
- (a) CCCC(=O)Br (p) (q) CCC(Br)C(=O)Br (b) (r) CCC(Br)C(=O)O (c) (s) CCC=C(=O)O (d)

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



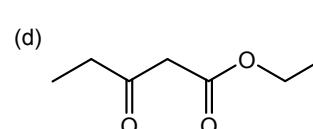
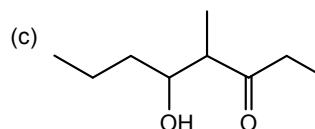
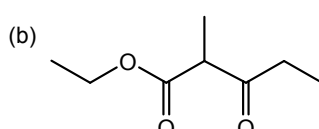
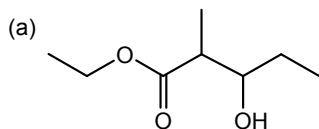
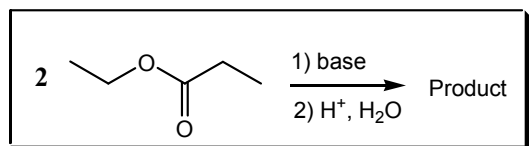
(e) None of the above

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



(e) None of the above

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

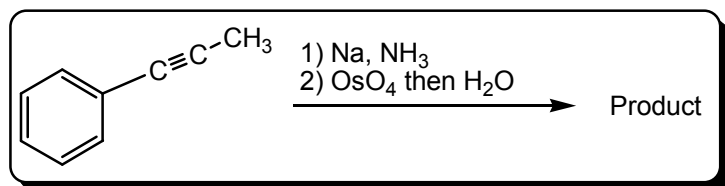


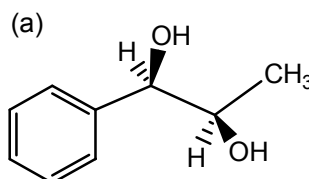
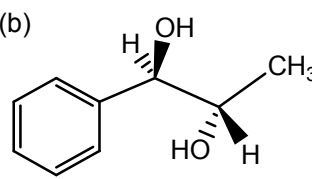
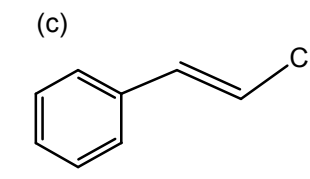
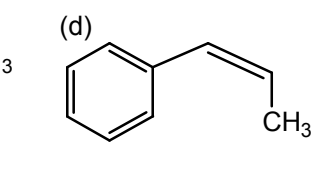
(e) None of the above

34. What could be the best base to be used for the first reaction in Q. 33?

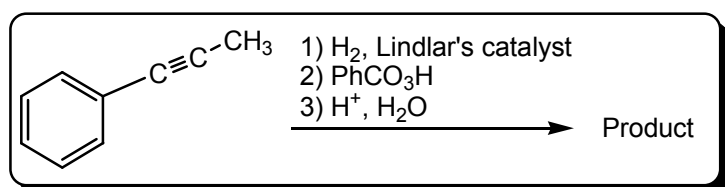
- (a) HO^-
- (b) CH_3O^-
- (c) $\text{CH}_3\text{CH}_2\text{O}^-$
- (d) pyridine
- (e) None of the above

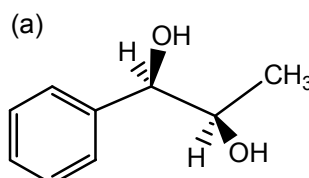
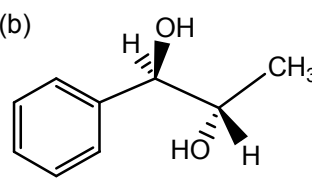
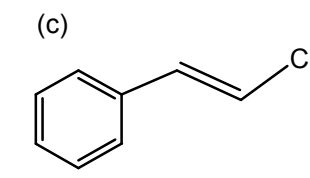
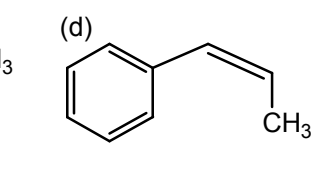
35. What could be the product for the following reaction?



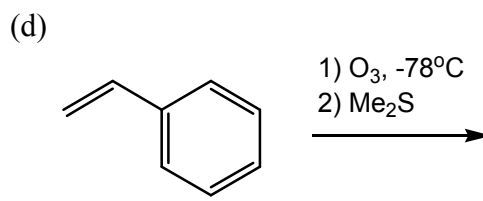
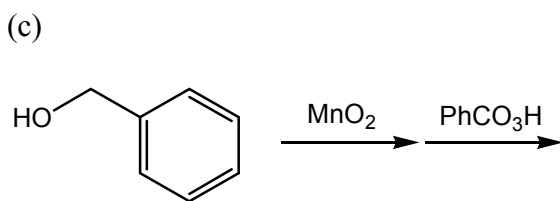
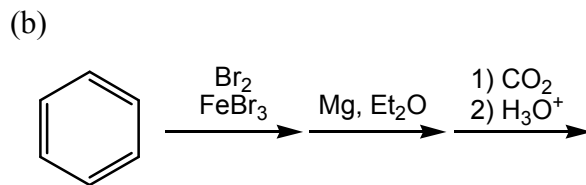
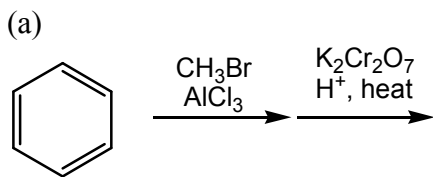
- (a)  (b)  (c)  (d) 
- (e) None of the above

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



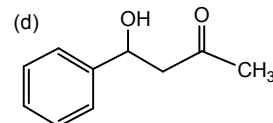
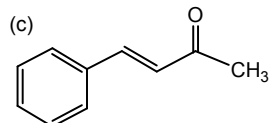
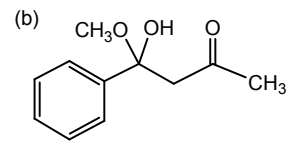
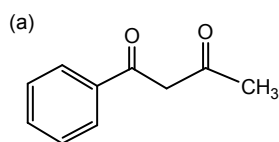
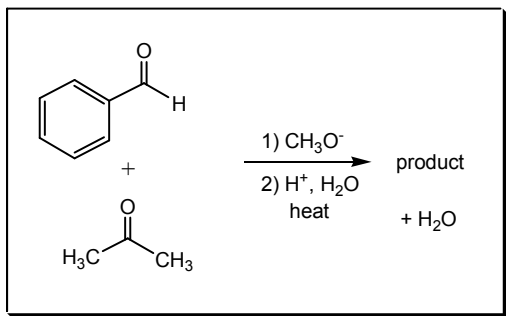
- (a)  (b)  (c)  (d) 
- (e) None of the above

37. Which of the following synthesis **cannot** provide benzoic acid as the final product?



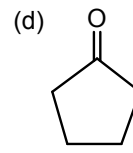
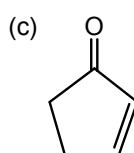
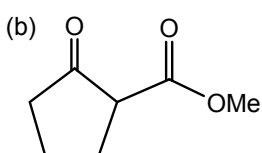
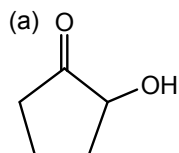
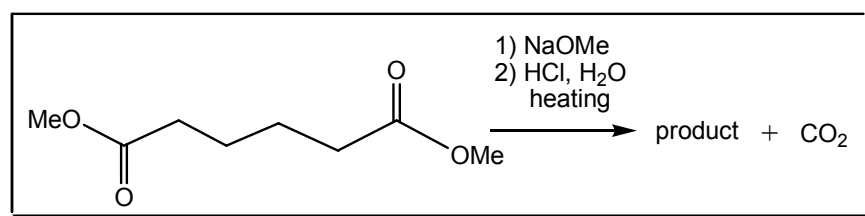
- (e) None of the above

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



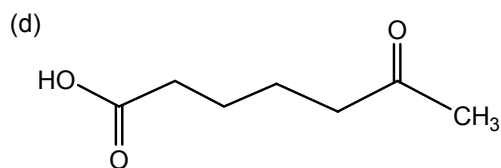
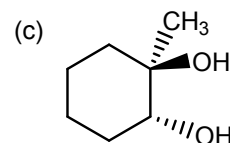
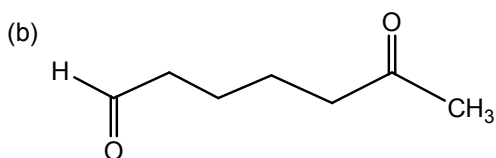
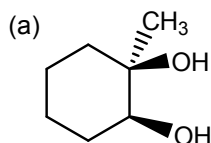
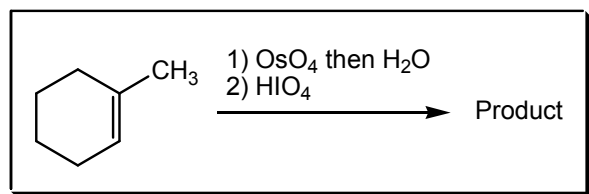
(e) None of the above

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



(e) None of the above

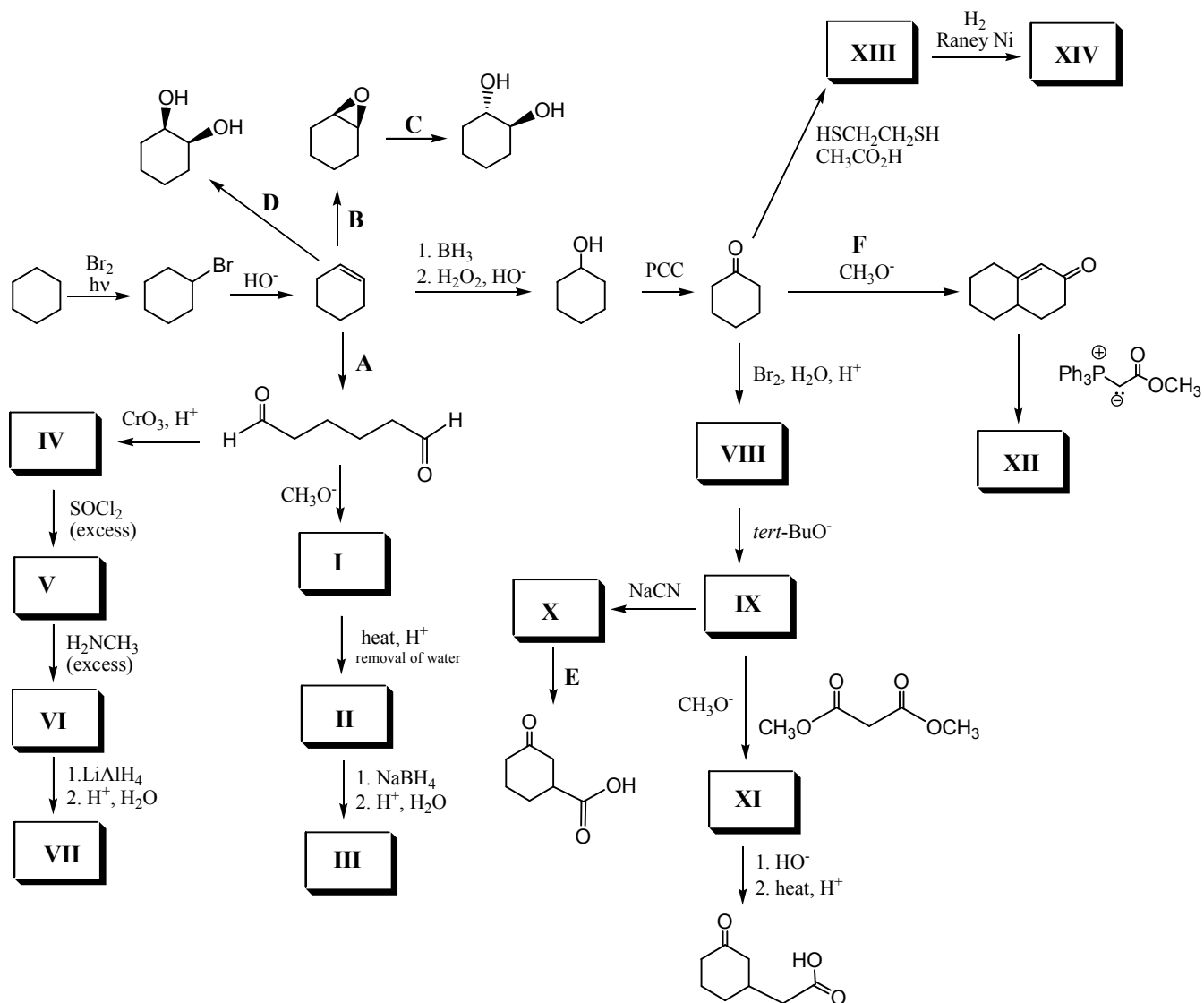
40. What could be the product for the following reaction?



(e) None of the above

Continue to the next page

II. Use the provided table and fill in compound structures and reagents for the following synthesis. Make sure your answer is correctly put in the designated box of the given table. **No partial point will be given for the misplaced answer.** (40 points)

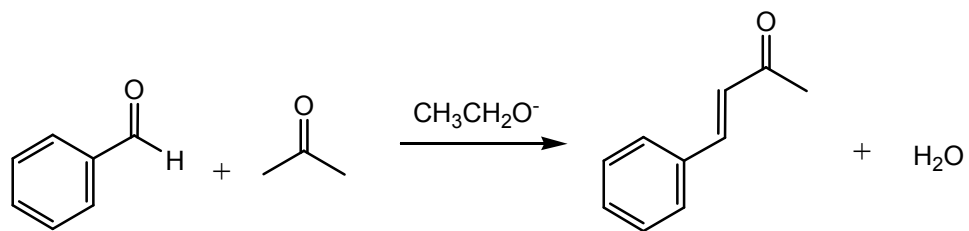


Continue to the next page

A:	B:	C:
D:	E:	F:
I:	II:	III:
IV:	V:	VI:
VII:	VIII:	IX:
X:	XI:	XII:
XIII:	XIV:	

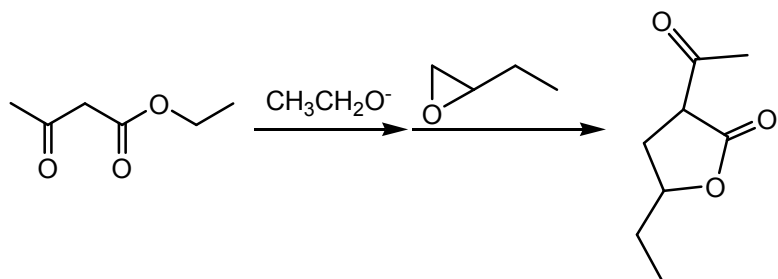
Continue to the next page

III. Propose an electron-pushing mechanism for the following reaction. (10 points)



Continue to the next page

IV. Propose an electron-pushing mechanism for the following reaction. (10 points)



Continue to the next page

V. Propose a synthesis for ketoprofen, an anti-inflammatory drug from the provided starting materials. You can use any reagents, acids, or bases you have learned but you can **only** use the provided starting materials. (10 points)

