

# TEST SERIES CSIR-NET/JRF JUNE 2019

BOOKLET SERIES **A**

## ORGANIC CHEMISTRY

Paper Code **01**

Test Type: **TEST SERIES**

### CHEMICAL SCIENCES

Duration: 2:00 Hours

Date: 25-05-2019

Maximum Marks: 180

Read the following instructions carefully:

\* Single Paper Test is divided into **THREE** Parts.

**Part - A:** This part shall carry **10** questions. Each question shall be of **2** marks.

**Part - B:** This part shall carry **20** questions. Each question shall be of **2** marks.

**Part - C:** This part shall contain **30** questions. Each question shall be of **4** marks.

\* Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.

\* There will be negative marking @25% for each wrong answer.

\* The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

\* For rough work, blank sheet is attached at the end of test booklet.



**CAREER ENDEAVOUR**  
Best Institute for IIT-JAM, NET & GATE

**CORPORATE OFFICE :**

33-35, Mall Road, G.T.B. Nagar,  
Opp. G.T.B. Nagar Metro Station  
Gate No. 3, Delhi-110 009  
T : 011-27653355, 27654455

www.careerendeavour.com

**REGISTERED OFFICE :**

28-A/11, Ja Sarai, Near IIT  
Metro Station, Gate No. 3,  
New Delhi-110 016  
T : 011-26851008, 26861009

E : info@careerendeavour.com

**For Online Test**

www.careerendeavouronlinetest.com



DOWNLOAD CAREER ENDEAVOUR APP



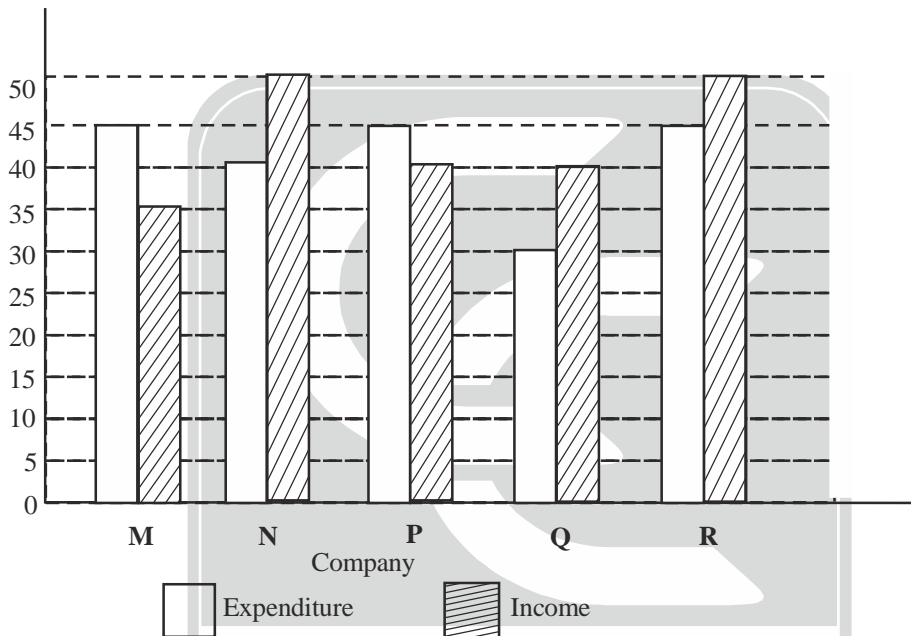
## PART – A

- A and B working separately can do a piece of work in 9 and 12 days respectively. If they work for a day alternately, A beginning, in how many days, the work will be completed ?  
 (a)  $5\frac{1}{4}$  days      (b)  $10\frac{1}{4}$  days      (c)  $15\frac{1}{4}$  days      (d)  $8\frac{1}{4}$  days
- Amlan is travelling on his cycle and has calculated to reach point A at 2 P.M. if he travels at 10 kmph; he will reach there at 12 noon if he travels at 15 kmph. At what speed must he travel to reach A at 1 P.M. ?  
 (a) 8 kmph      (b) 11 kmph      (c) 12 kmph      (d) 14 kmph
- The following bar-graph shows the Income and Expenditures (in million US \$) of five Companies in the year 2011. The percent profit or loss of a Company is given by

$$(\text{Profit/Loss})\% = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

Study the graph and answer the questions that are based on it.

Income and Expenditure (in million US \$) of five Companies in the year 2011



In 2011 what was the approximate percentage of profit/loss of all the five Companies taken together?

- 5 % profit
  - 6.5 % profit
  - 4 % loss
  - 7 % loss
- If B is second to the right of A and third to the left of C in a circular sitting arrangement of 8 persons namely A, B, C, D, E, F, G, H who are seated facing the centre. E and F sits opposite to each other. G sits between C and E. D is not a neighbour of A and B. Who is sitting second to the right of E ?  
 (a) C      (b) H      (c) D      (d) A
- Water flows into a tank  $200\text{ m} \times 150\text{ m}$  through a rectangular pipe  $1.5\text{ m} \times 1.25\text{ m}$  at the rate of 20 kmph. In what time (in minutes) will the water rise by 2 meters ?  
 (a) 80 min.      (b) 90 min.      (c) 96 min.      (d) 100 min.
- What will be the next term in the series in the blank space ?

0	6	20	42	?
---	---	----	----	---

- 70
- 64
- 72
- 80



7. Mr. Nemai is the maternal grandfather of Mr. Shankar's wife's daughter. How is Mr. Nemai's son related to the daughter of Mr. Shankar ?  
 (a) Brother (b) Maternal uncle (c) Nephew (d) Cousin
8. Two cards are drawn together from a pack of well shuffled deck of cards. What is the probability that one is spade and one is diamond ?  
 (a)  $1/26$  (b)  $1/52$  (c)  $2/102$  (d)  $13/102$
9. Sourav's mathematics test had total 75 questions, partly 10 arithmetic, 30 algebra and 35 geometry questions. Although he answered 70 % of the arithmetic, 40 % of the algebra and 60 % of the geometry questions correctly, he couldn't pass the test because he got less than 60 % of the questions right. How many more questions he would have needed to answer correctly to get 60 % passing grade ?  
 (a) 8 (b) 6 (c) 4 (d) 5
10. **Directions:** In each question below are few statements followed by the conclusions numbered accordingly. You have to take the given statements to be true even if they seem to be at variance from commonly known facts and then decide which of the given conclusions logically follows from the statements disregarding commonly known facts.

**Statements:**

- All people are bachelor I.
- Some bachelors are educators
- Some educators are saint

(a) Only I follows

(b) Only II follows

**Conclusions:**

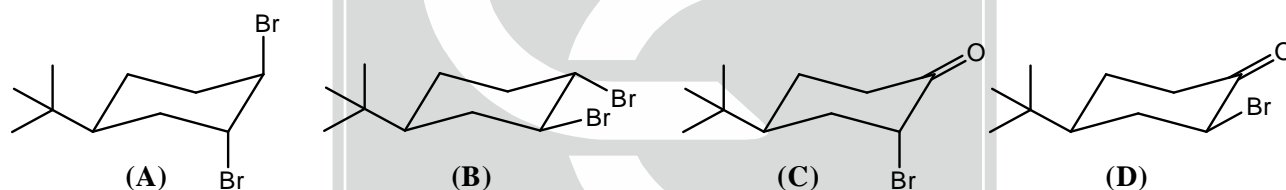
- All people are saint
- Some people are saint
- All educators are saint

(c) Only III follows

(d) None follows

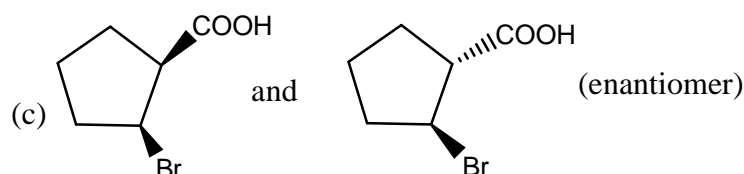
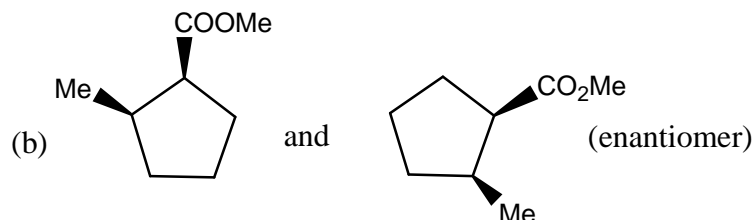
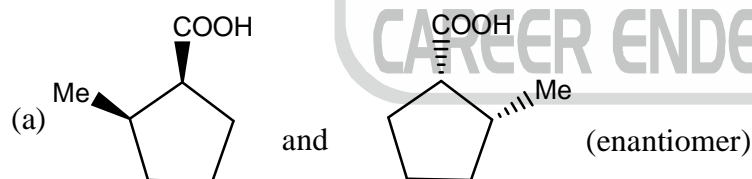
**PART – B**

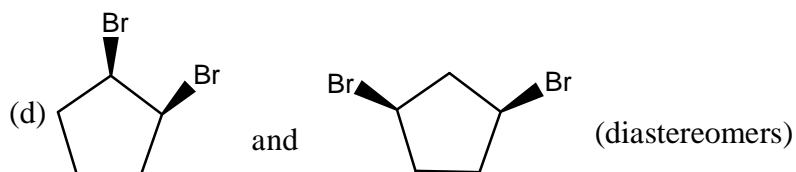
11. The correct order of dipole moments of compound A  $\rightarrow$  D is



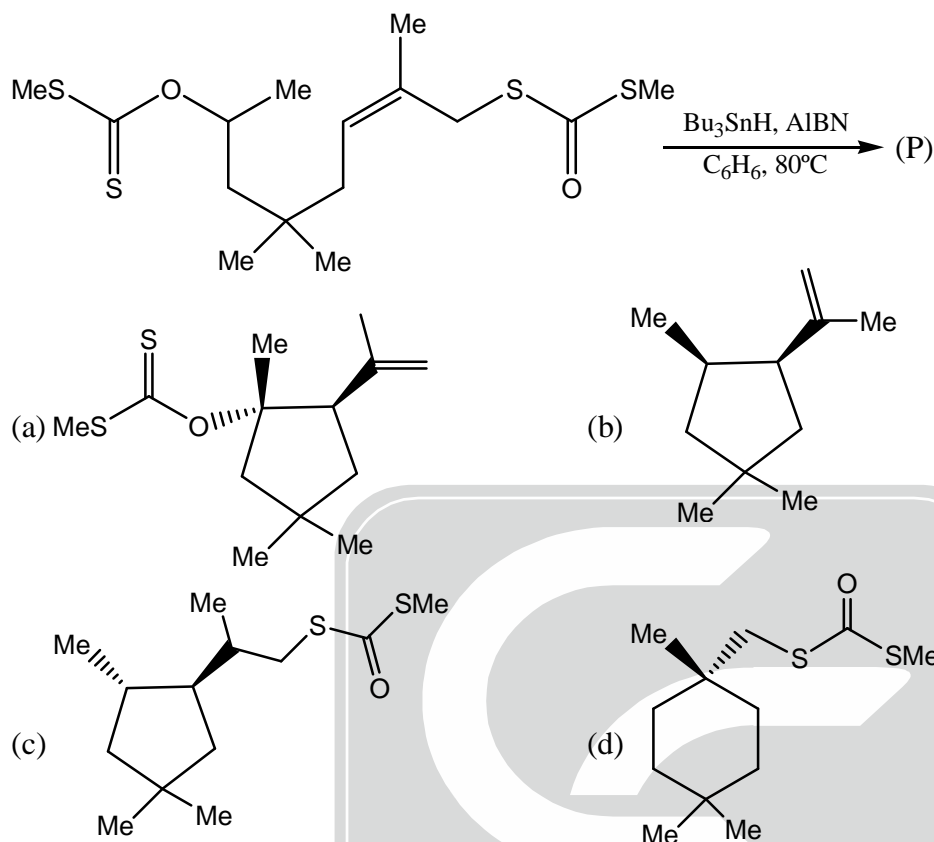
- (a)  $A > B$  and  $C = D$  (b)  $C > D$  and  $A < B$  (c)  $A = B$  and  $C = D$  (d)  $B > A$  and  $D > C$

12. Identify the correct stereochemical relationship between the compound given below

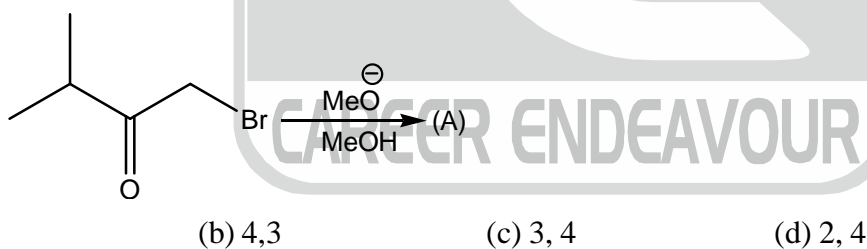




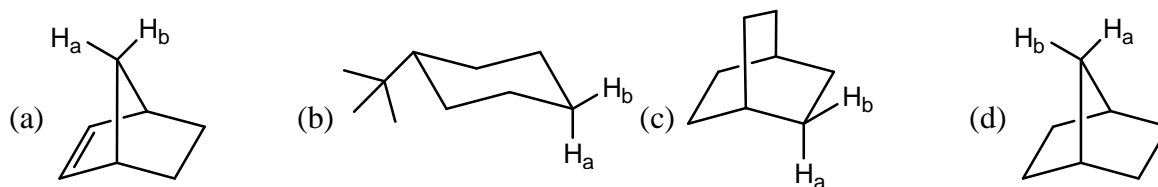
13. The major product (P) formed in the following reaction is



14. The number of  $^1\text{H}$  NMR and  $^{13}\text{C}$  NMR signals exhibited by the compound (A) obtained in the following reaction are, respectively



15. Which of the following compound having homotopic  $\text{H}_a$  and  $\text{H}_b$  ligands.

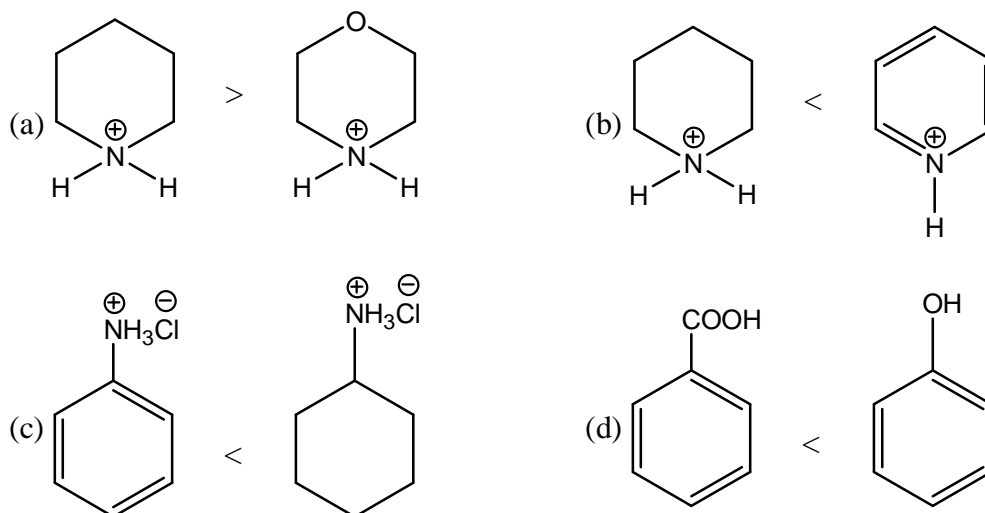


16. Arrange the rate of acetolysis of  $p\text{-Z C}_6\text{H}_4\text{CH}_2\text{CH}_2\text{OTs}$  at  $90^\circ\text{C}$

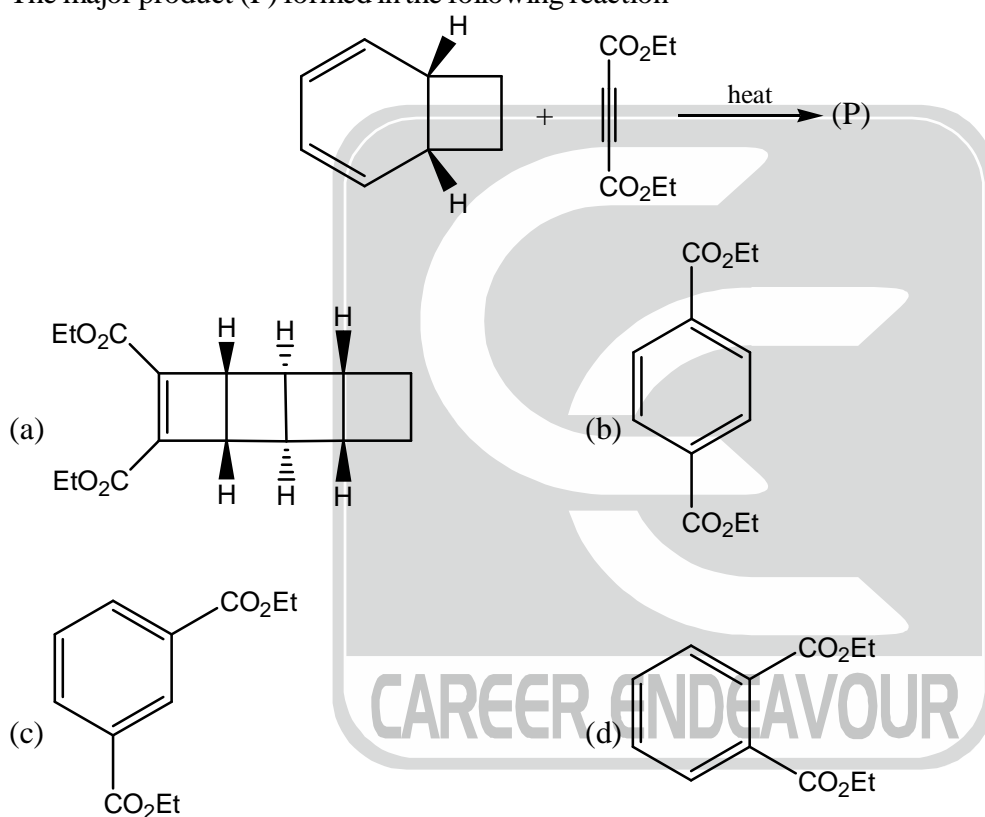
$\text{Z} = -\text{OMe}, -\text{Me}, \text{H}$  and  $\text{Cl}$

- (a)  $-\text{OMe} > -\text{Me} > \text{Cl} > -\text{H}$       (b)  $-\text{H} > -\text{Cl} > -\text{Me} > -\text{OMe}$   
 (c)  $-\text{OMe} > -\text{Me} > -\text{H} > -\text{Cl}$       (d)  $-\text{Cl} > -\text{H} > -\text{Me} > -\text{OMe}$

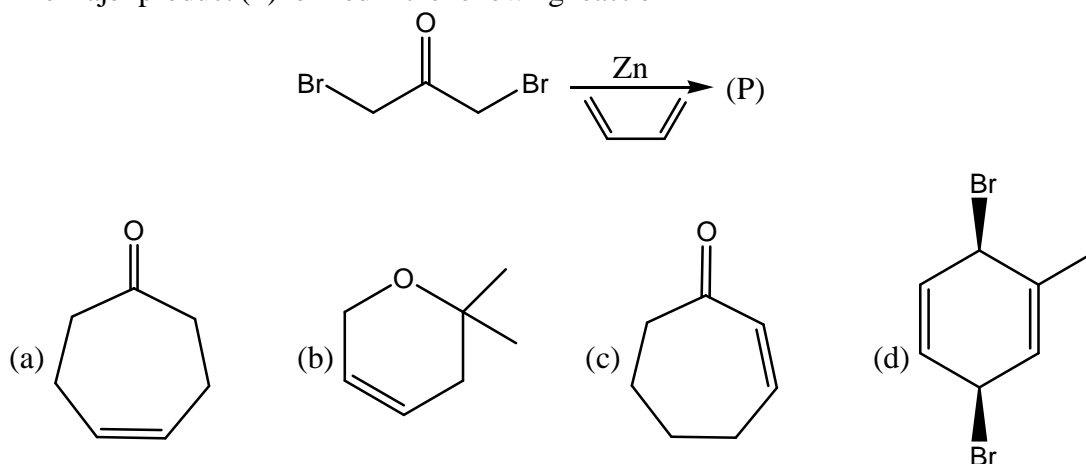
17. Identify the correct order of acidity



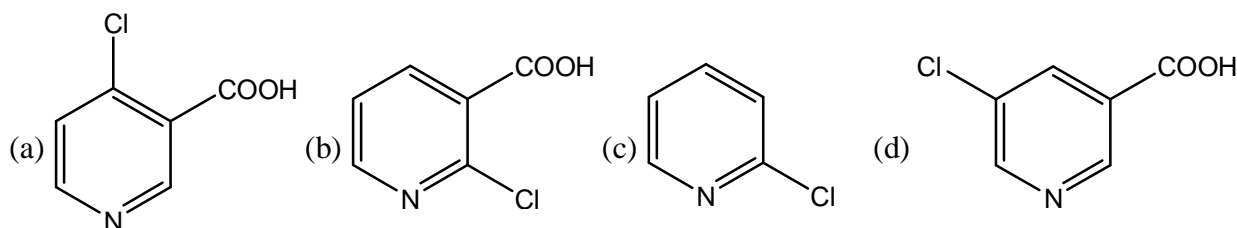
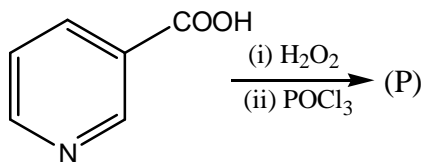
18. The major product (P) formed in the following reaction



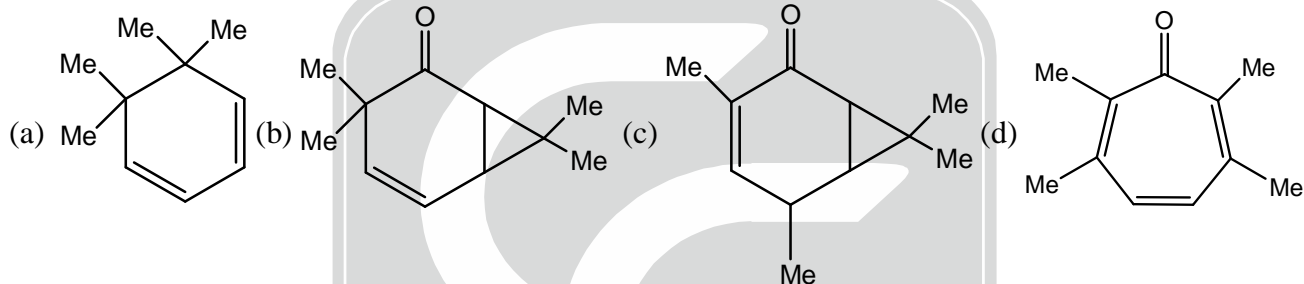
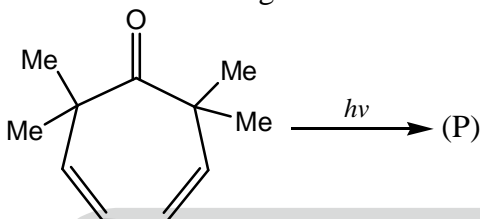
19. The major product (P) formed in the following reaction



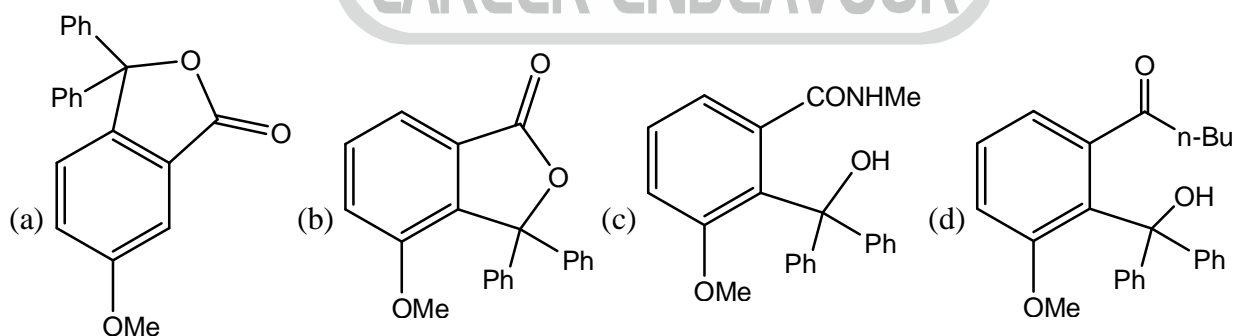
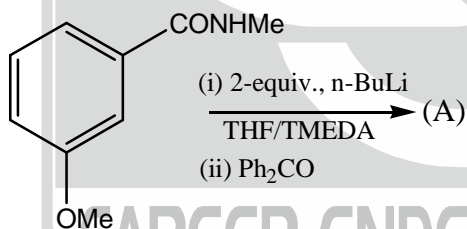
20. The major product (P) formed in the following reaction



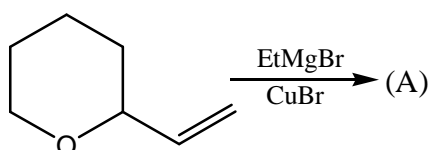
21. The major product (P) formed in the following reaction is

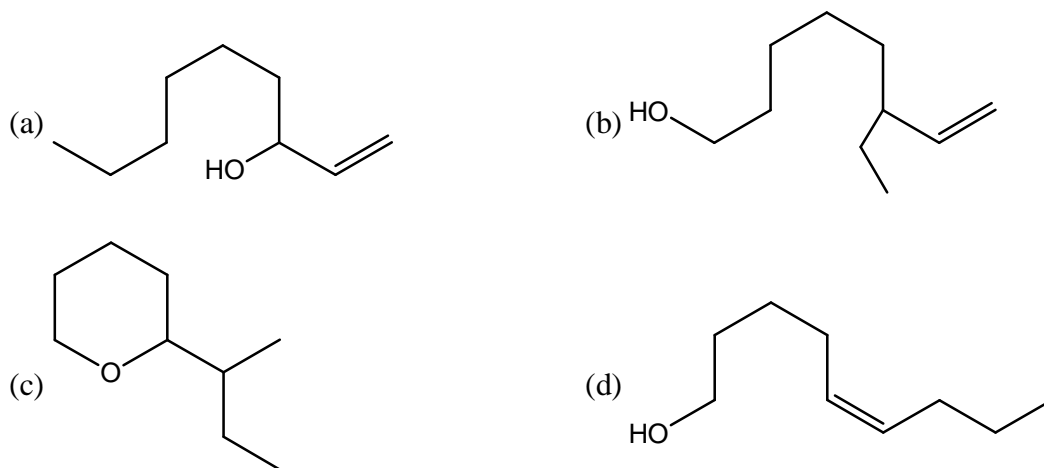


22. The major product (A) formed in the following reaction sequence is

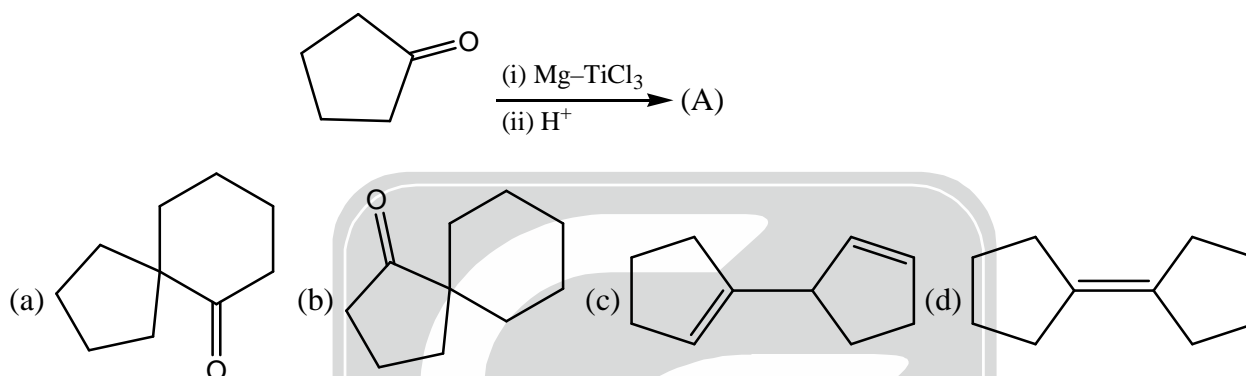


23. The major product (A) formed in the following reaction is

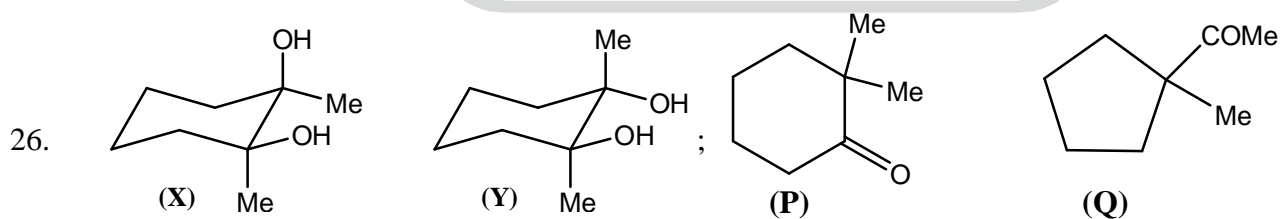
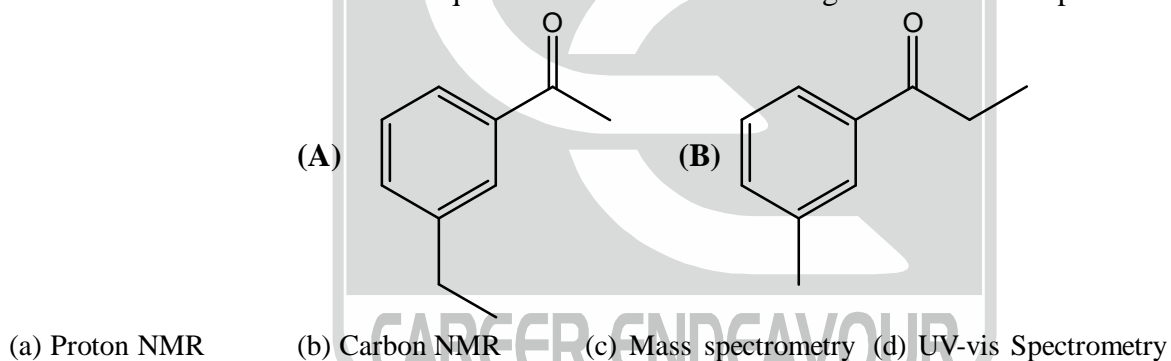




24. The major product (A) formed in the following reaction sequence is



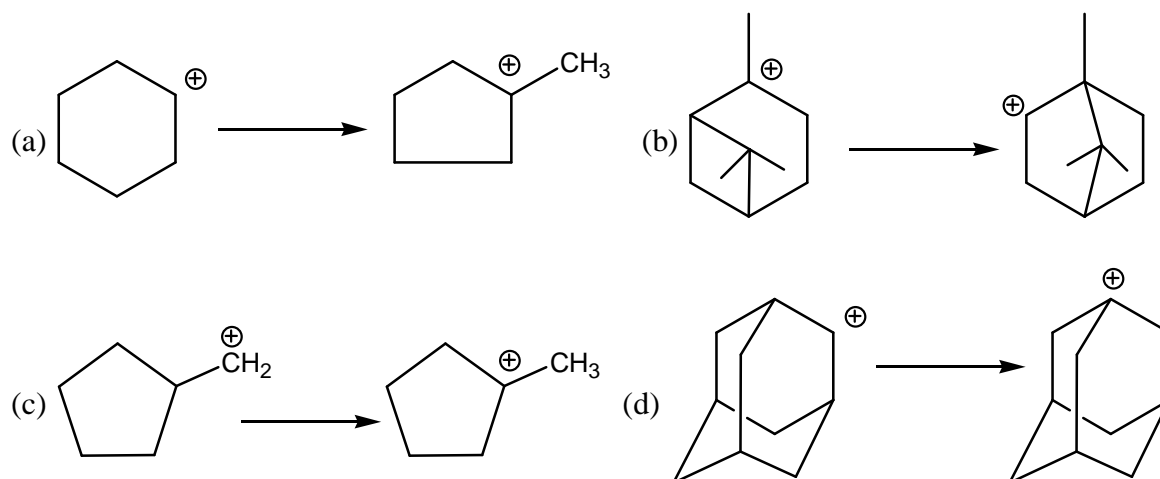
25. Which of the characterization technique can be used to differentiate given isomeric compounds A and B.



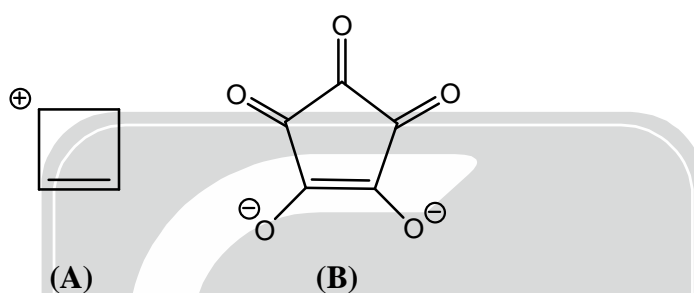
Which of the following statement is TRUE.

- (a) (X) gives (Q) upon treatment with  $H^+$   
 (b) (Y) gives (P) upon treatment with  $H^+$   
 (c) (X) gives (P) upon treatment with  $H^+$   
 (d) Both (X) and (Y) give (Q) upon treatment with  $H^+$

27. Among the following which rearrangement of carbocation is not possible

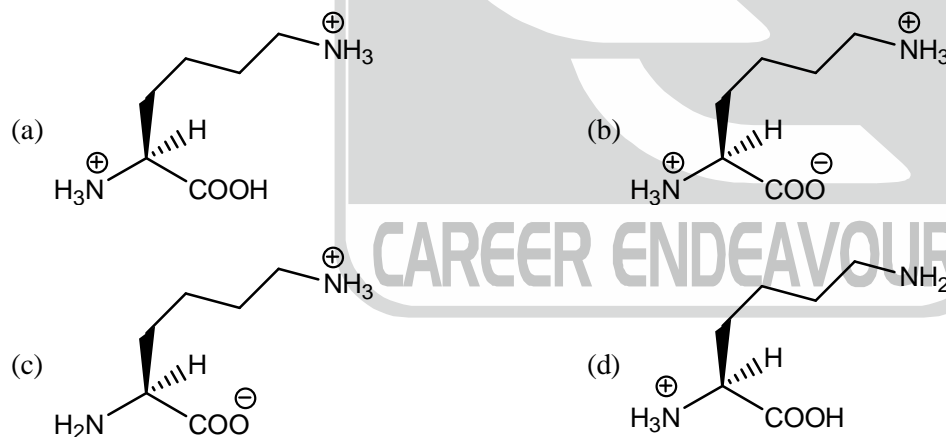


28. The correct statement about the following species is



- (a) A and B both are non-aromatic  
 (b) A is homoaromatic and B is aromatic  
 (c) A is anti-aromatic and B is aromatic  
 (d) A and B both are anti-aromatic

29. At pH = 5, structure of Lysine will be



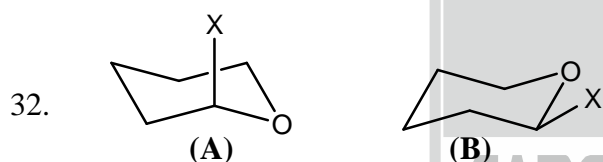
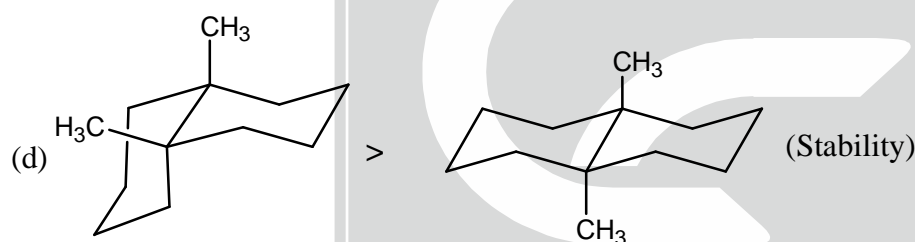
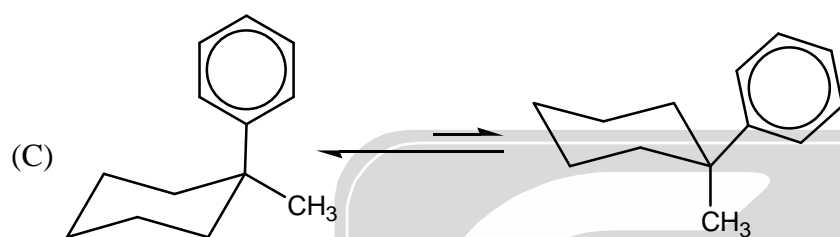
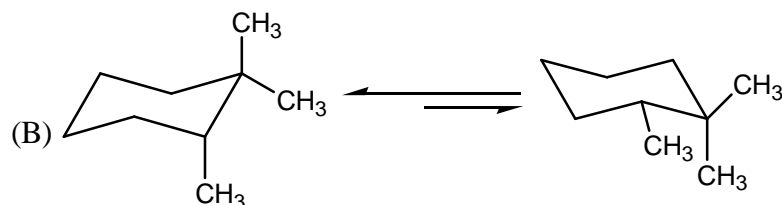
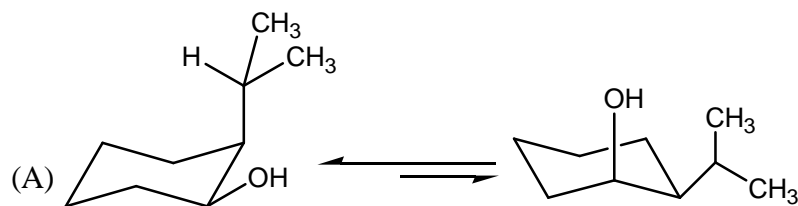
30. Rifampin is

- (a) An antibacterial drug  
 (b) An anticancer drug  
 (c) Antituberculosis drug  
 (d) none of the above



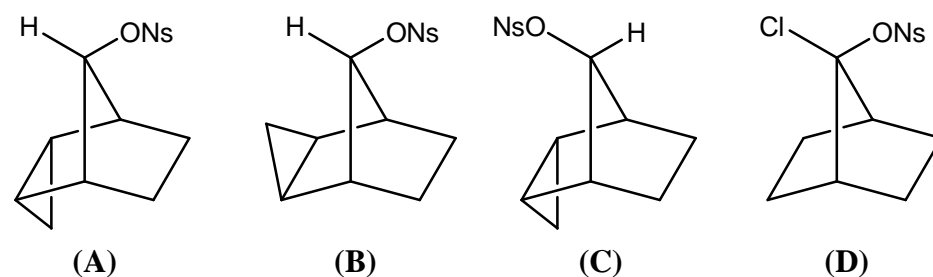
## PART – C

31. Among the following, identify the correct conformational equilibrium.

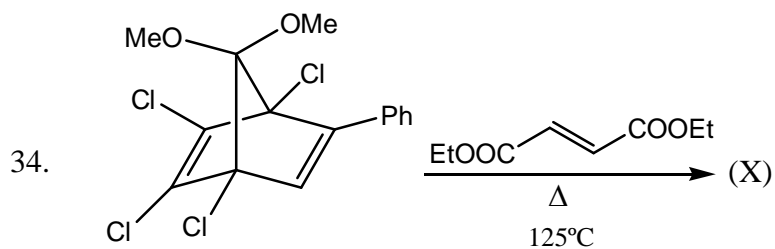


The compound (B) is favoured when the value the substituent (X) is  
 (a) -OMe (b) -OCOMe (c) Cl (d) Me

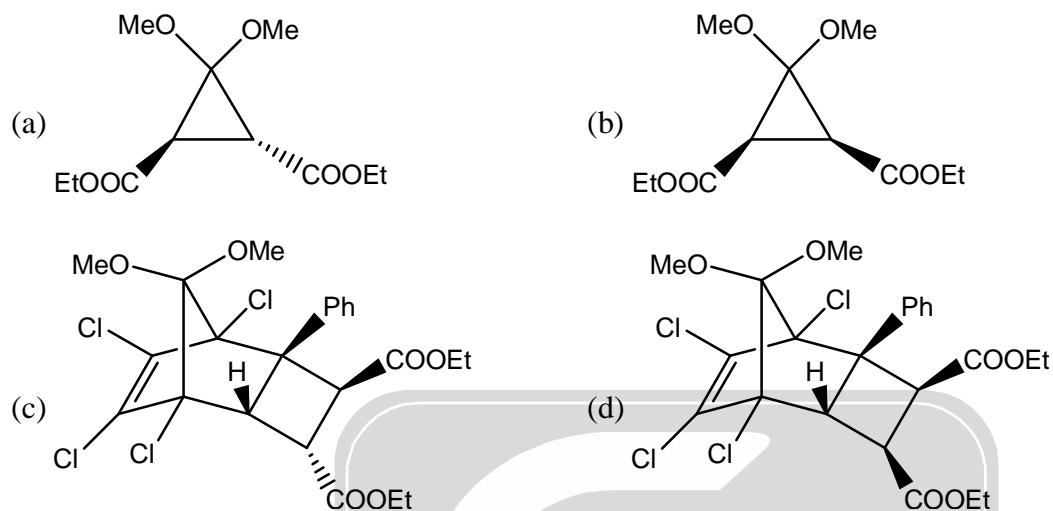
33. Arrange the relative rate of solvolysis of the following compounds



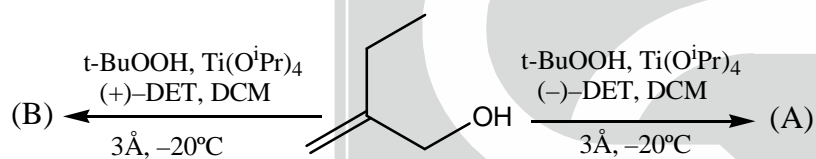
(a) A > C > D > B (b) C > D > B > A (c) A > B > C > D (d) D > C > B > A



The major product (X) in the above reaction is

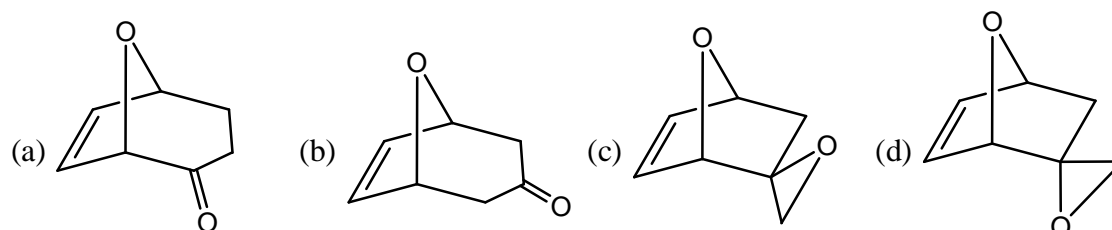
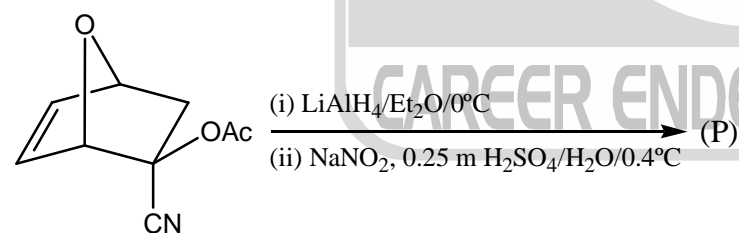


35. Correct relationship among the compound (A) and (B) is

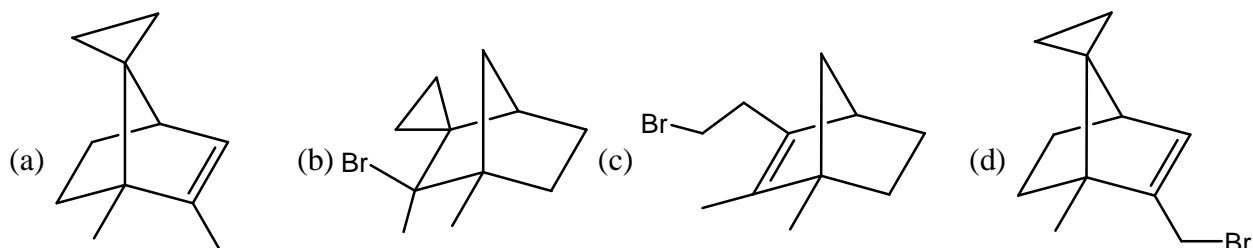
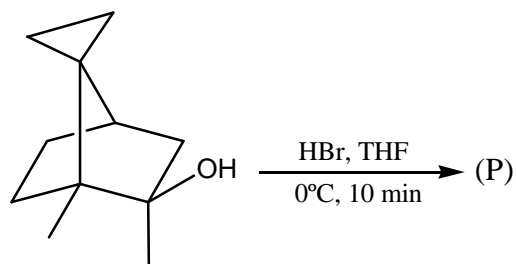


- (a) Diastereoisomer (b) Enantiomers  
(c) Constitutional isomers (d) Homomers

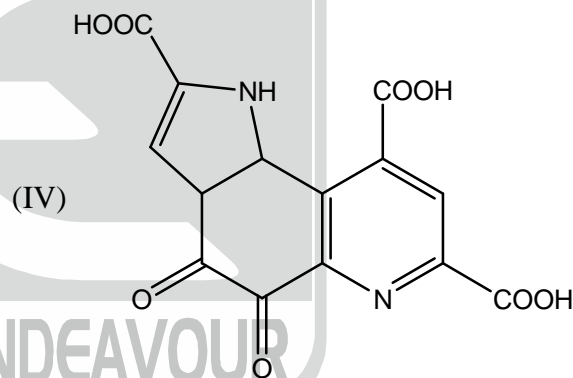
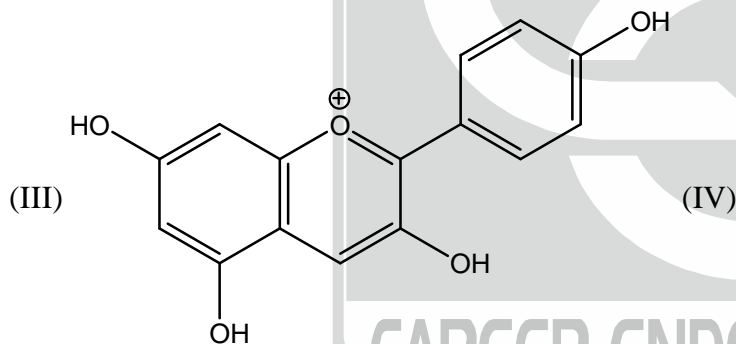
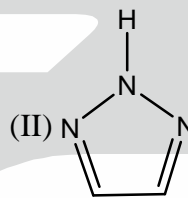
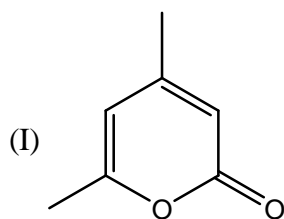
36. The major product (P) formed in the following reaction sequence is



37. The major product (P) formed in the following reaction is

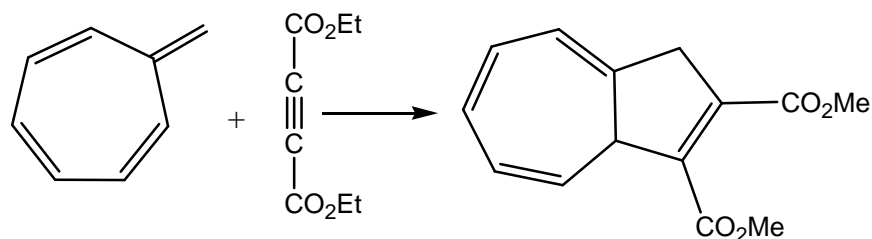


38. NOT aromatic compound among the following is



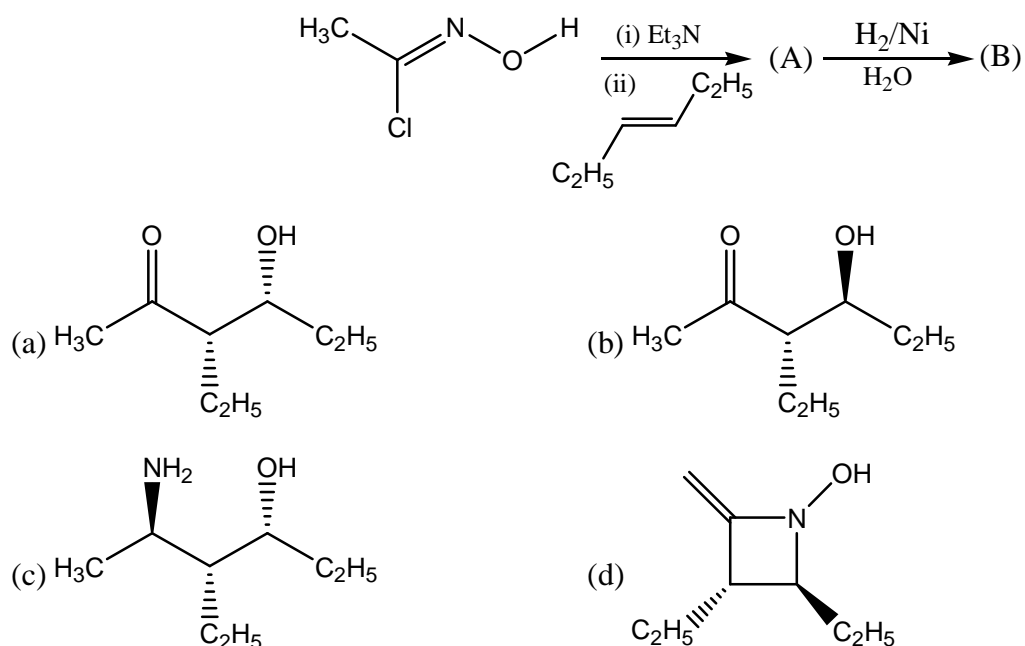
- (a) I and IV      (b) II and III      (c) I and III      (d) IV only

39. Most appropriate reaction condition in the following is

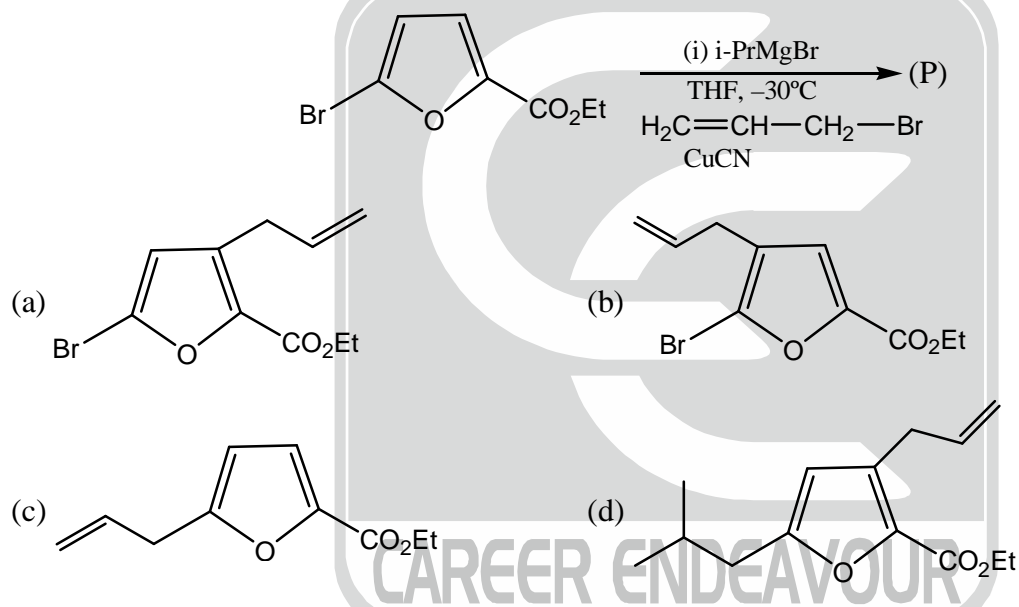


- (a) (4+2) cycloaddition,  $\Delta$       (b) (2+2) cycloaddition,  $h\nu$   
 (c) (8+2) cycloaddition,  $\Delta$       (d) (8+2) cycloaddition,  $h\nu$

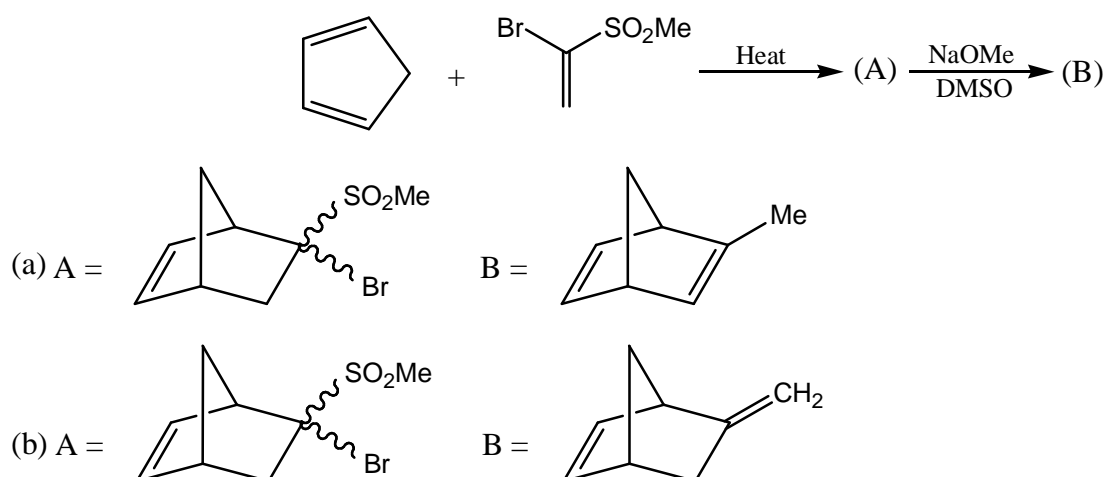
40. The major product (B) formed in the following reaction sequence is

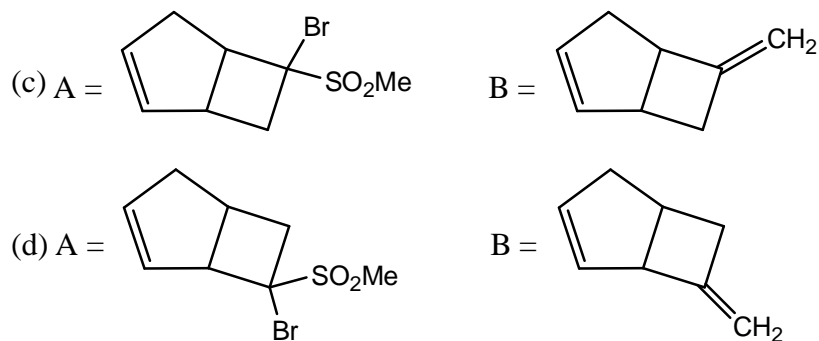


41. The major product (P) formed in the following reaction sequence is

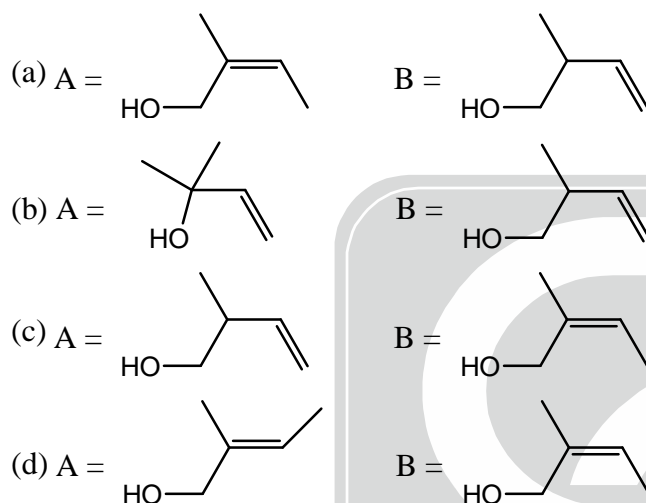
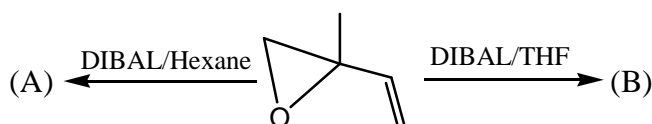


42. The major products (A) and (B) formed in the following reaction is

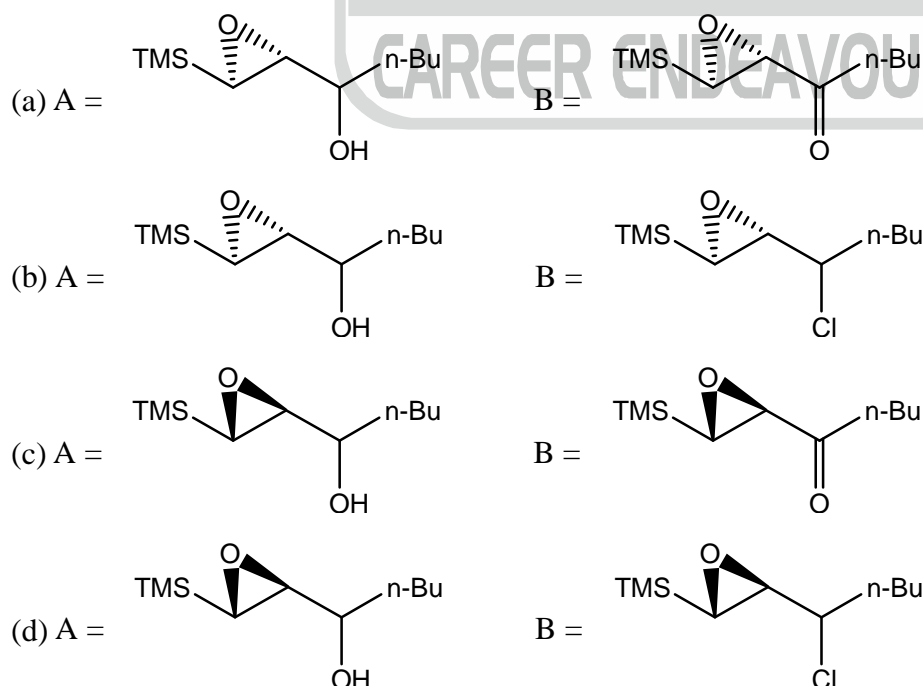
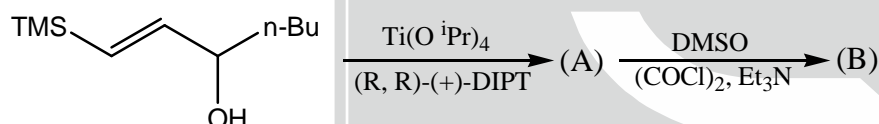




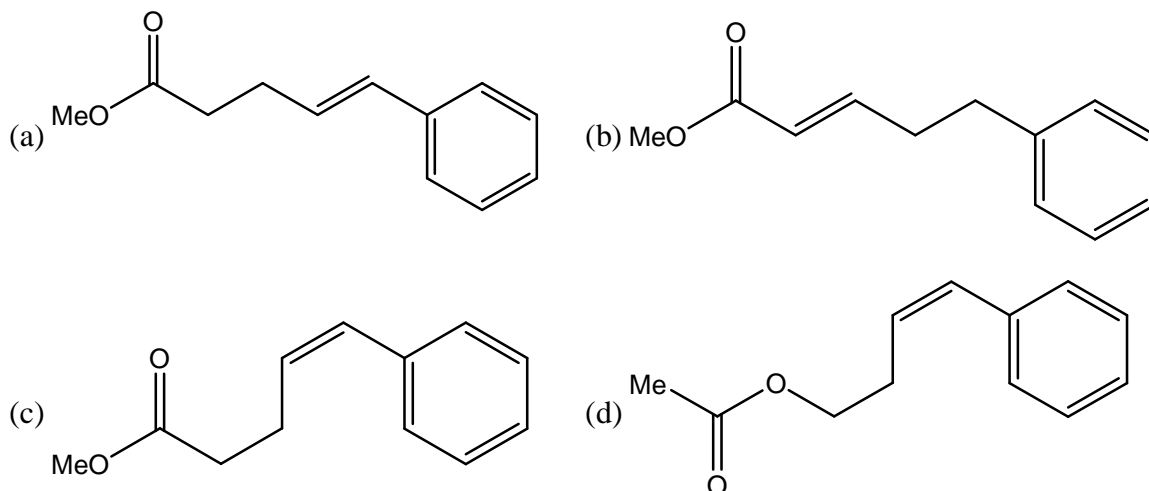
43. The major products (A) and (B) formed in the following reactions are



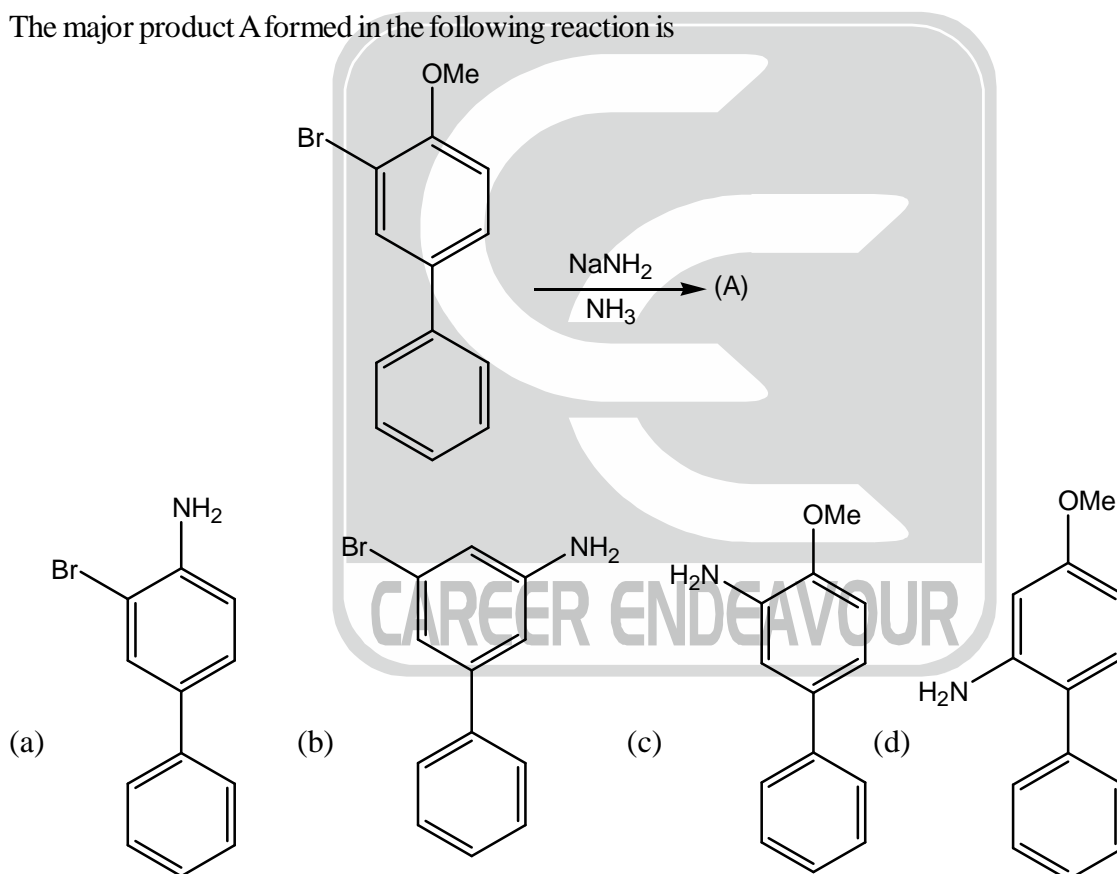
44. The major products (A) and (B) formed in the following reaction sequence are



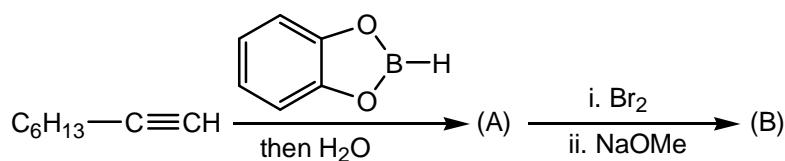
45. An organic compound exhibited the following  $^1\text{H NMR}$  spectral data:  
 $^1\text{H NMR}$  (400 MHz,  $\text{CDCl}_3$ ):  $\delta = 7.33\text{--}7.27$  (m, 2 H),  $7.24\text{--}7.15$  (m, 3 H),  $7.00$  (dt,  $J = 15.6, 6.8$  Hz, 1 H),  $5.84$  (dt,  $J = 15.6, 1.6$  Hz, 1 H),  $3.72$  (s, 3 H),  $2.77$  (t,  $J = 8.0$  Hz, 2 H),  $2.54\text{--}2.49$  (m, 2 H).  
 Structure of the compound is

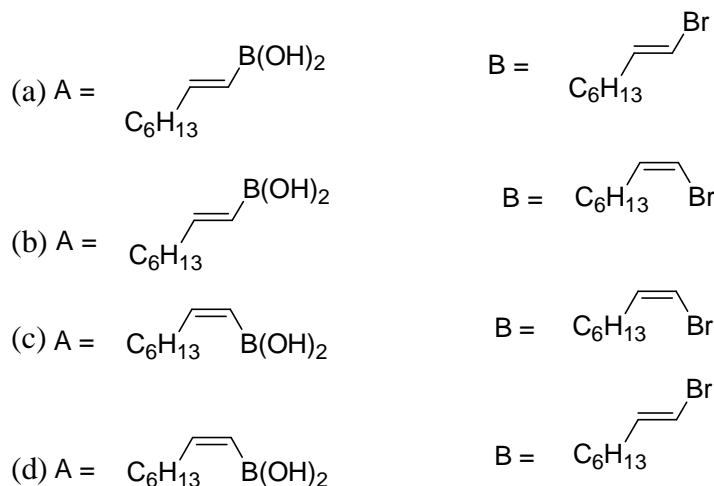


46. The major product A formed in the following reaction is



47. The major products (A) and (B) formed in the following reaction sequence are

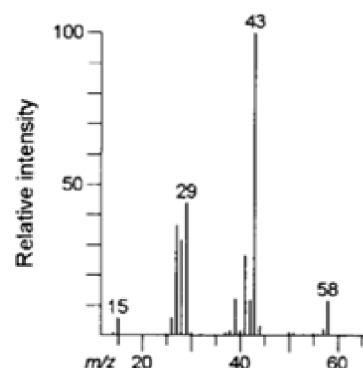




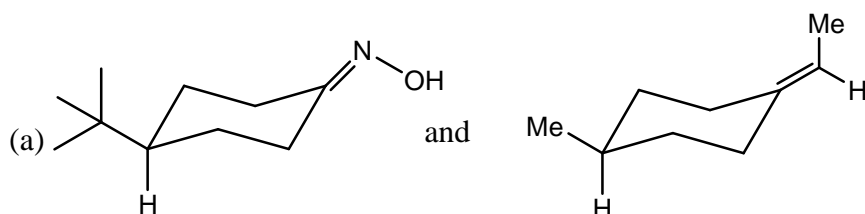
48. A solution composed of 41% w/w dioxane and 59% w/w benzene gives two singlet signals in proton NMR at 3.9 and 7.3 ppm respectively. What will be the area ratio of singlet signals?  
 (a) Dioxane : Benzene :: 1 : 1 (b) Dioxane : Benzene :: 4 : 6  
 (c) Dioxane : Benzene :: 2 : 3 (d) Dioxane : Benzene :: 1 : 2
49. An organic molecule gives quartet signal at 4.0 ppm with 12 Hz coupling constant at 400MHz operating frequency. What will be the correct line position for the quartet signal in the unit of ppm.  
 (a) 4.060, 4.030, 3.970, 3.940 (b) 4.045, 4.015, 3.985, 3.955  
 (c) 4.030, 4.015, 3.985, 3.970 (d) 4.200, 4.100, 3.900, 3.800
50. Which is the incorrect statement about the mass spectrum given below

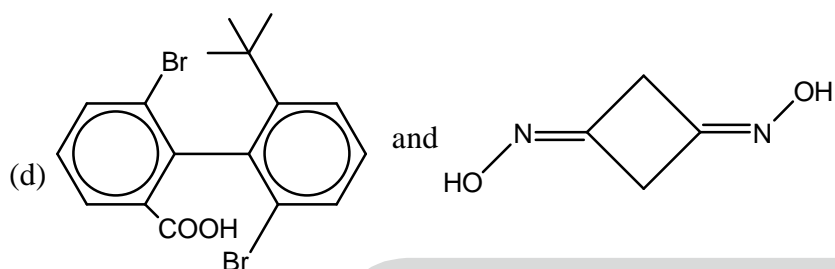
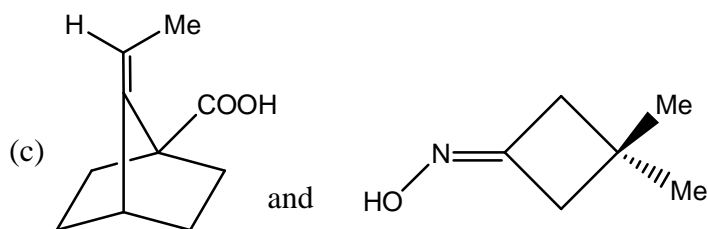
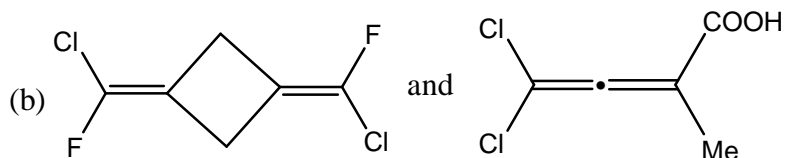
m/z	Int.
12	0.1
13	0.3
14	1.0
15	5.3
25	0.5
25.5	0.4
26	6.1
26.5	0.1
27	37.
27.5	0.1
28	32.
29	44.
30	1.0
36	0.1
37	1.0
38	1.8
39	12.

m/z	Int.
40	1.6
41	27.
42	12.
43	100.
44	3.3
48	0.1
49	0.4
50	1.2
51	1.0
52	0.3
53	0.7
54	0.2
55	0.9
56	0.7
57	2.4
58	12.
59	0.5

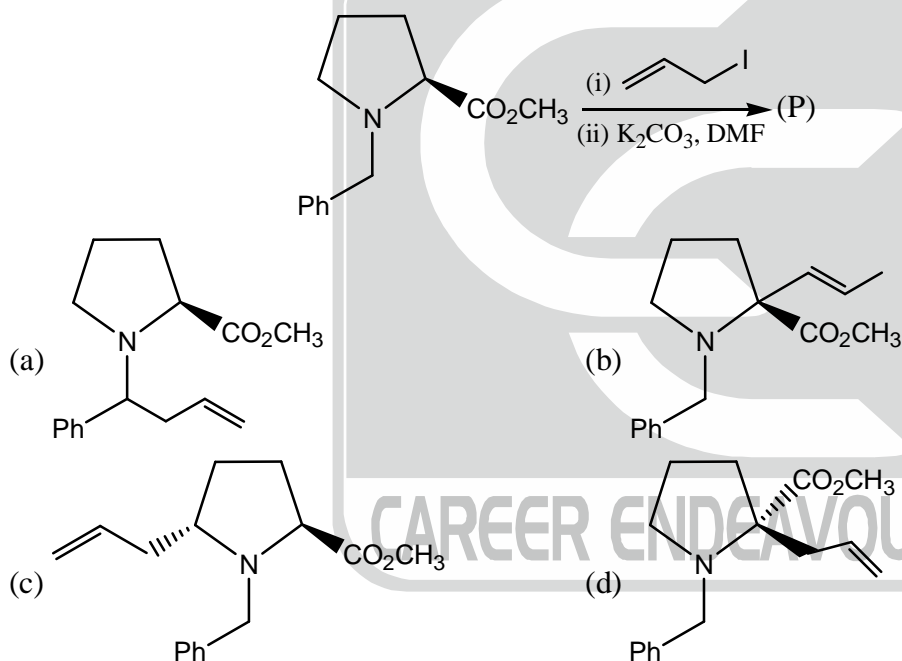


- (a) m/z 43 is base signal of propyl cation (b) m/z 58 is molecular ion  
 (c) This is mass spectrum of acetone (d) This is mass spectrum of n-butane
51. Among the following pair, identify the chiral pair

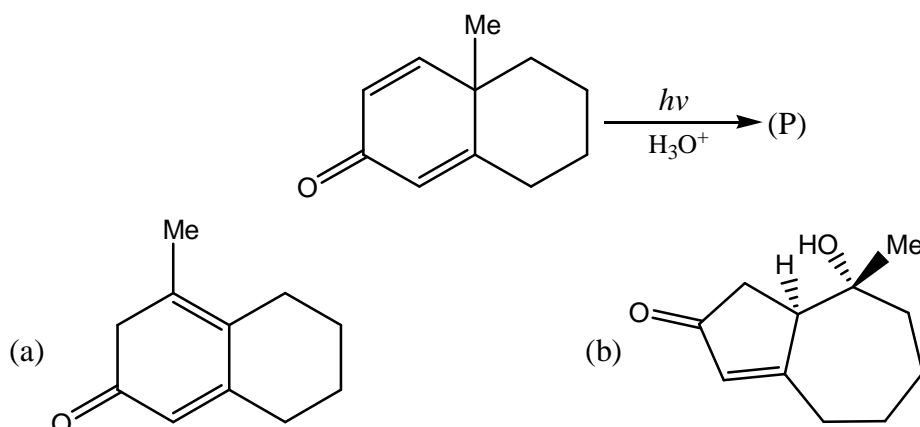




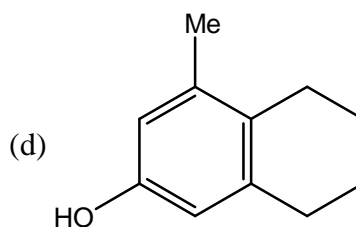
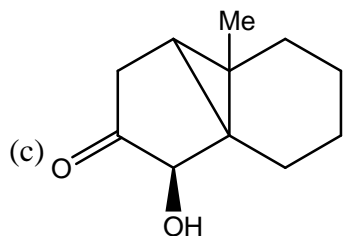
52. The major product (P) formed in the following reaction sequence is



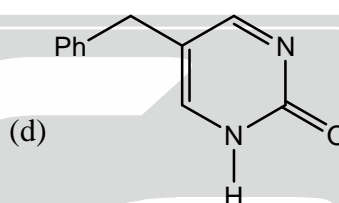
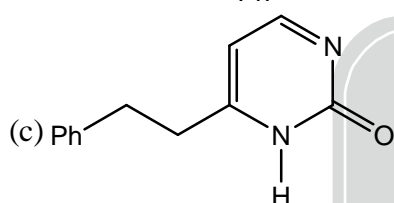
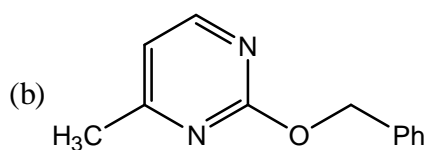
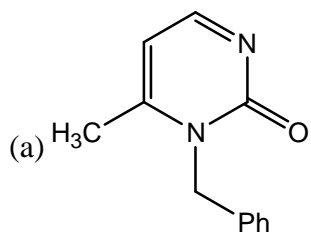
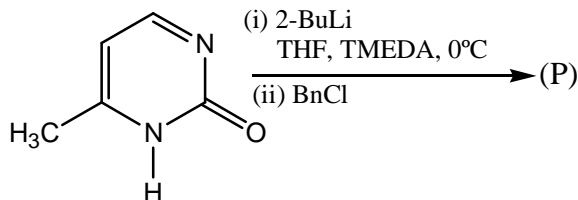
53. The major product (P) formed in the following reaction sequence is



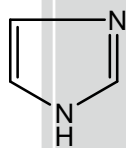




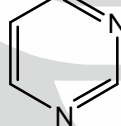
54. The major product (P) formed in the following reaction sequence is



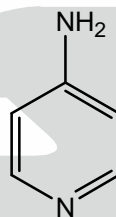
55. The correct order of basicity of the following is



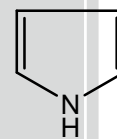
(I)



(II)



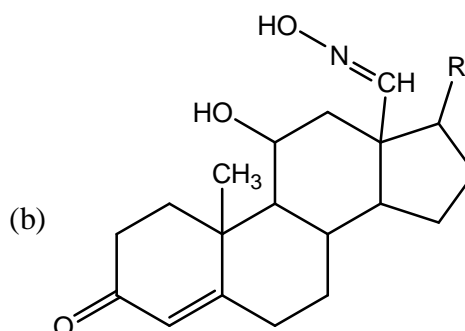
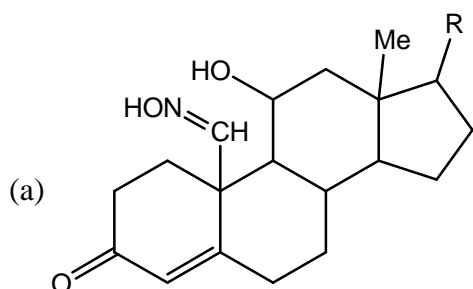
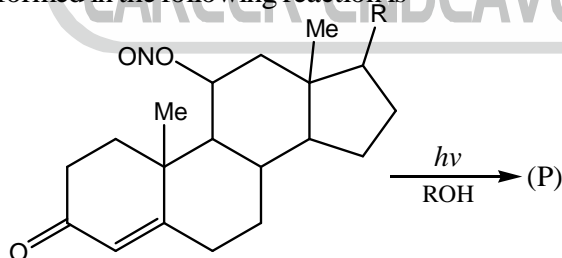
(III)

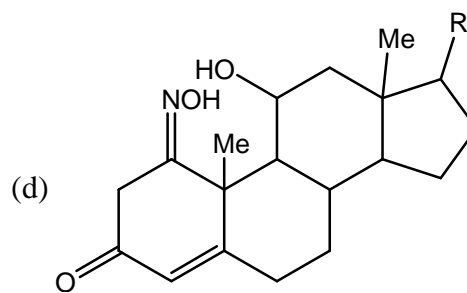
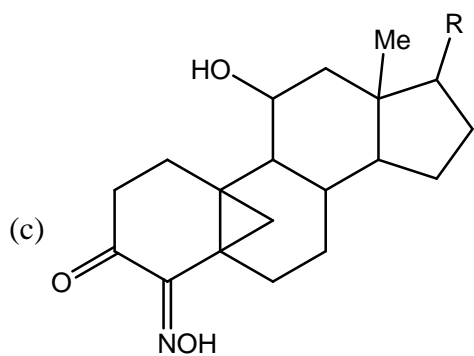


(IV)

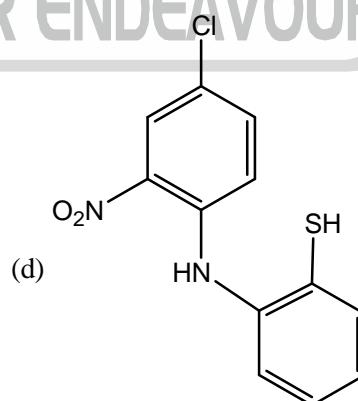
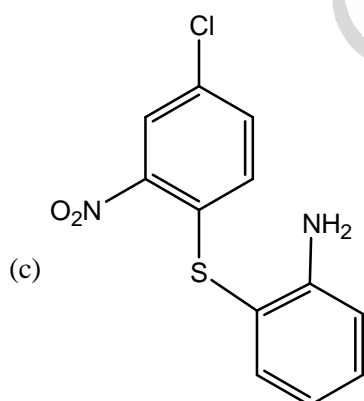
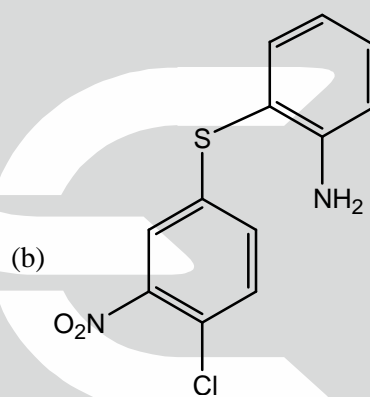
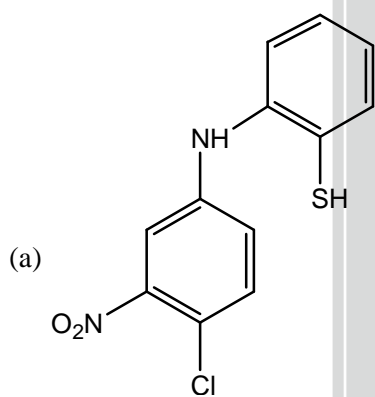
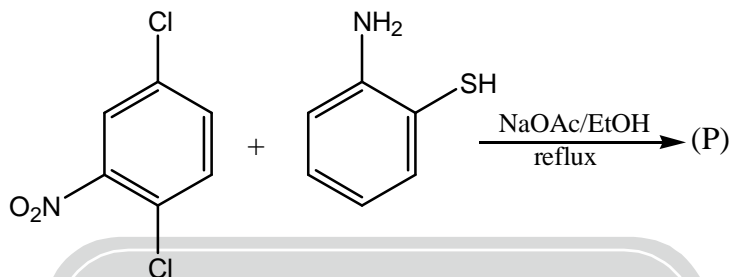
(a) I > III > II > IV    (b) III > I > II > IV    (c) II > I > III > IV    (d) IV > II > I > III

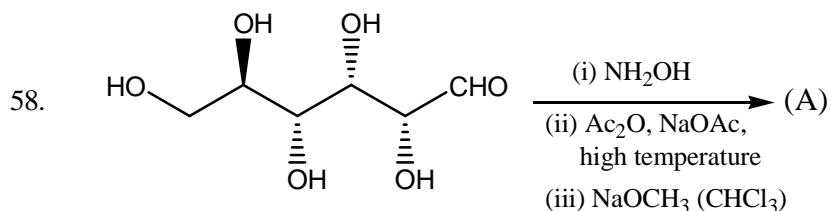
56. The major product (P) formed in the following reaction is



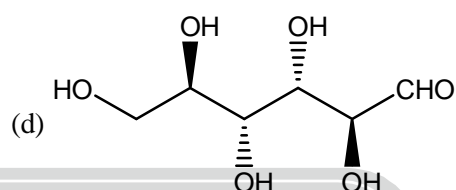
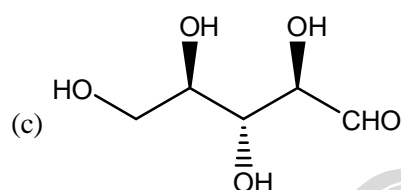
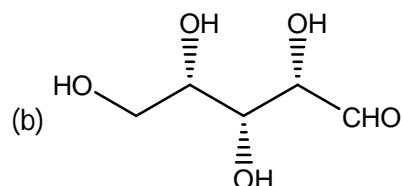
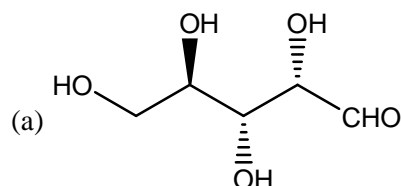


57. The major product (P) formed in the following reaction is



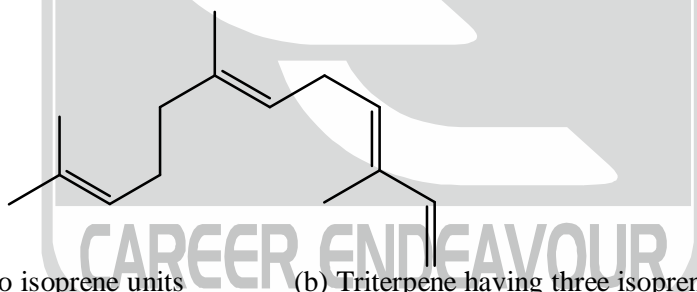


Product (A) in the reaction is



59. The incorrect statements among the following are  
 (I) All enzymes are proteins, but all proteins are not necessarily enzymes  
 (II) The nucleobase pairs are aligned perpendicular to the helical axis in DNA  
 (III) Both trehalose and maltose are non-reducing sugar.  
 (IV) Naturally occurring DNA has  $\beta$ -configuration  
 (a) I and III only      (b) II, III and IV only      (c) III only      (d) II and IV only

60.  $\alpha$ -farnesene shown below is



- (a) Diterpene having two isoprene units      (b) Triterpene having three isoprene units  
 (c) Triterpene having four isoprene units      (d) Sesquiterpene having three isoprene units.

Space for rough work





## ANSWER KEY [ORGANIC CHEMISTRY]

### PART-A

- |        |        |         |        |        |        |        |
|--------|--------|---------|--------|--------|--------|--------|
| 1. (b) | 2. (c) | 3. (a)  | 4. (b) | 5. (c) | 6. (c) | 7. (b) |
| 8. (d) | 9. (d) | 10. (d) |        |        |        |        |

### PART-B

- |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|
| 11. (d) | 12. (b) | 13. (b) | 14. (d) | 15. (d) | 16. (c) | 17. (b) |
| 18. (d) | 19. (a) | 20. (b) | 21. (b) | 22. (b) | 23. (d) | 24. (a) |
| 25. (c) | 26. (c) | 27. (d) | 28. (b) | 29. (b) | 30. (a) |         |

### PART-C

- |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|
| 31. (c) | 32. (d) | 33. (a) | 34. (a) | 35. (b) | 36. (a) | 37. (c) |
| 38. (d) | 39. (c) | 40. (b) | 41. (c) | 42. (b) | 43. (a) | 44. (c) |
| 45. (b) | 46. (d) | 47. (b) | 48. (a) | 49. (b) | 50. (c) | 51. (a) |
| 52. (d) | 53. (b) | 54. (c) | 55. (b) | 56. (c) | 57. (c) | 58. (a) |
| 59. (c) | 60. (d) |         |         |         |         |         |

