TEST SERIES CSIR-NET/JRF DEC. 2018

BOOKLET SERIES B

ORGANIC CHEMISTRY

Paper Code 01 **Test Type: TEST SERIES**

CHEMICAL SCIENCES

Duration: 2:00 Hours **Date: 21-11-2018**

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.

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PART – A

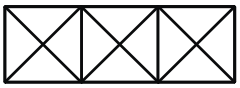
1. What should come in place of question mark ?

2	6
1	2

4	?
3	12

(a) 16 (b) 20 (c) 12 (d) 15

2. Count the total number of triangles in the figure :



(a) 25 (b) 28 (c) 32 (d) 30

3. Find unit digit : $(48269)^{4403} - (26528)^{202}$

(a) 6 (b) 5 (c) 8 (d) 4

4. What is 12^{th} term of a arithmetic progression if 3^{rd} term is 6 and 9^{th} term is 18.

(a) 24 (b) 20 (c) 30 (d) 28

5. Pointing to a photograph of a man Rishika said, "He is the brother of the daughter of the wife of my husband". How is the man related to Rishika ?

(a) Cousin (b) Brother (c) Son (d) Uncle

6. Kamlesh moved a distance of 50 feet towards north from his starting point. He then turned to left side and continued to walk for 25 feet more, again he turned left and walked 40 metres. Finally he turned to his right. In which direction is he facing now ?

(a) West (b) East (c) North (d) South

7. A bacteria in a pot doubles itself in a day, if the number of bacteria in first day was 2, and in second day was 4 and so on and the pot was completely filled in 30^{th} day, then when was the pot half filled.

(a) 15 days (b) 20 days (c) 29 days (d) 25 days

8. What is a equivalent single discount if a successive discount of 30%, 20% and 25% is given to a customer.

(a) 55% (b) 58% (c) 70% (d) 68%

9. If height of a equilateral triangle is $4\sqrt{3}$ cm, then what is the area of the triangle in square centimeter?

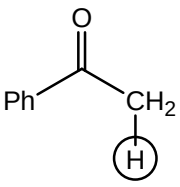
(a) $12\sqrt{3}$ (b) $16\sqrt{3}$ (c) 18 (d) $15\sqrt{3}$

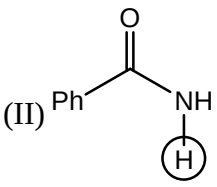
10. A train crosses a pole in 15 seconds and a platform of 125 m in 20 seconds. What is the length of the train?

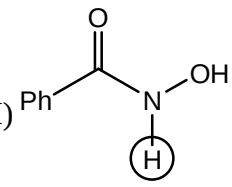
(a) 375 m (b) 400 m (c) 300 m (d) 350 m

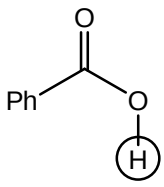
PART – B

11. The correct order of acidity of the circled hydrogens in the following compounds is

(I) 

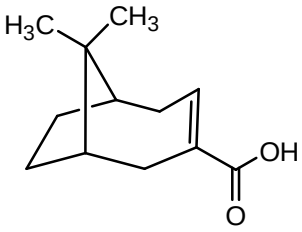
(II) 

(III) 

(IV) 

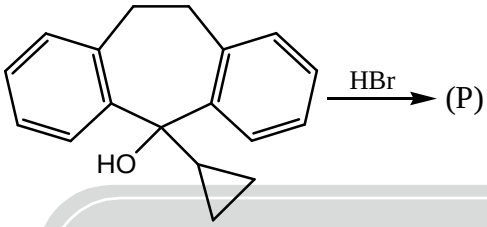
(a) IV > II > III > I (b) IV > III > II > I (c) III > IV > I > II (d) III > IV > II > I

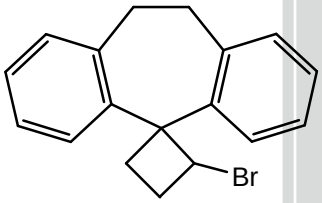
12. The IUPAC name of the given compound is

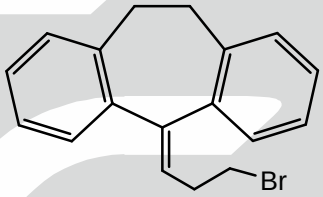


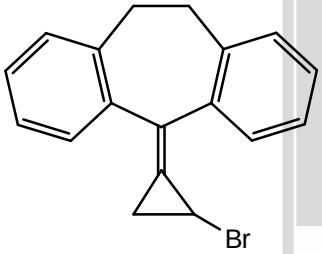
(a) 9, 9-dimethyltricyclo[4.2.1] non-3-ene-3-carboxylic acid
(b) 9, 9-dimethylbicyclo[4.2.1] non-3-ene-3-carboxylic acid
(c) 9, 9-dimethylbicyclo[1.2.4] non-1-ene-1-carboxylic acid
(d) 9, 9-dimethylbicyclo[2.1.4] non-3-ene-3-carboxylic acid

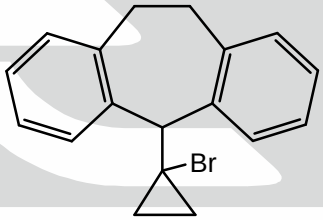
13. Give the major product (P)



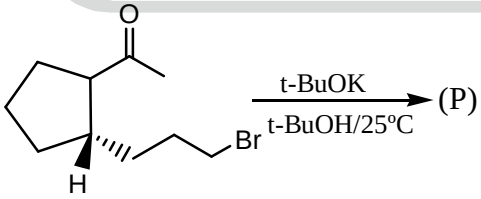
(a) 

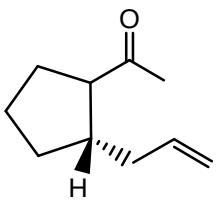
(b) 

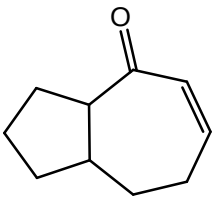
(c) 

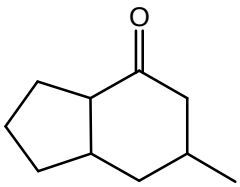
(d) 

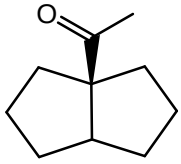
14. The major product in the given reaction is



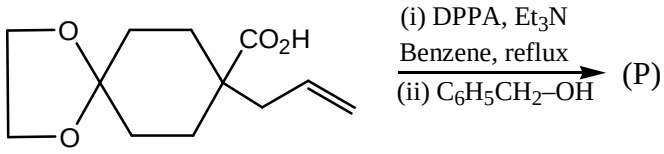
(a) 

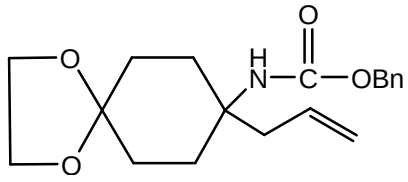
(b) 

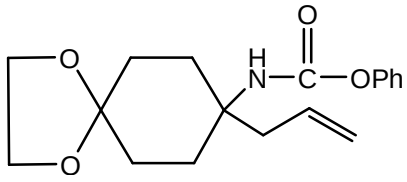
(c) 

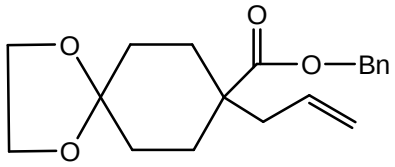
(d) 

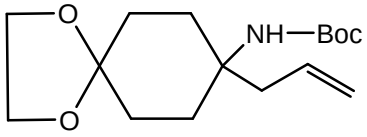
15. The major product (P) is



(a) 

(b) 

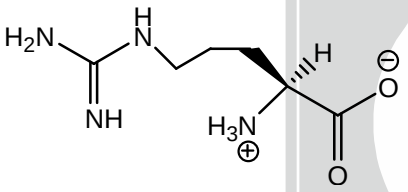
(c) 

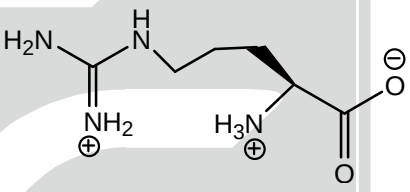
(d) 

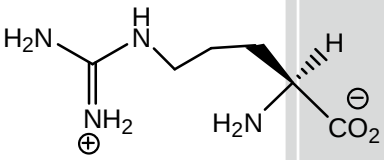
16. Which among the following disaccharides has $\beta-1,4-$ glycosidic linkage and upon acid hydrolysis gives two different monosaccharides

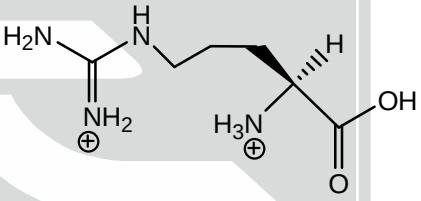
(a) Maltose (b) Lactose (c) Cellobiose (d) Sucrose

17. Among the following structures of an α-amino acid s which one will exist at pH = 10

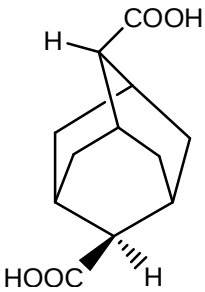
(a) 

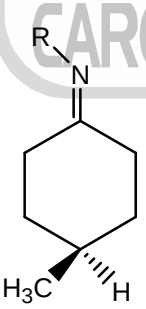
(b) 

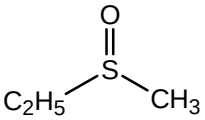
(c) 

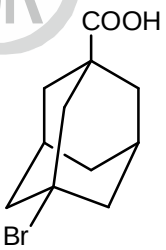
(d) 

18. Among the following, identify the achiral molecule

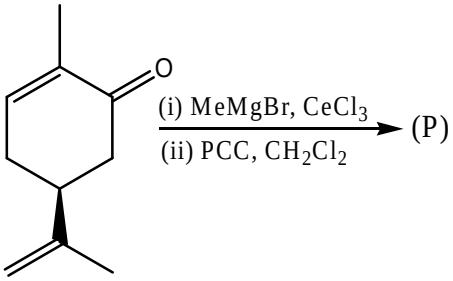
(a) 

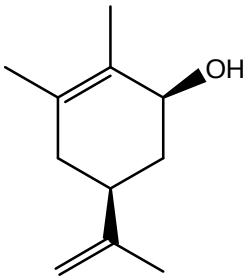
(b) 

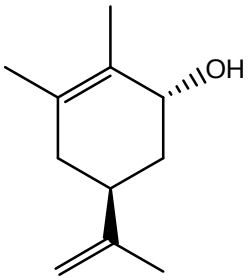
(c) 

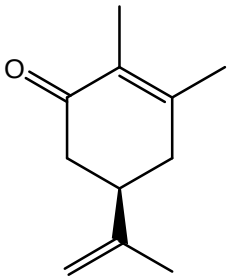
(d) 

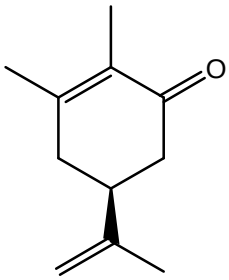
19. The major product formed in the following reaction is



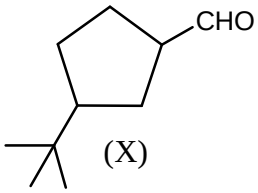
(a) 

(b) 

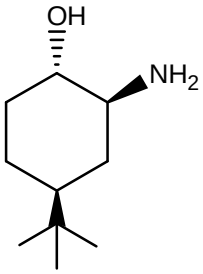
(c) 

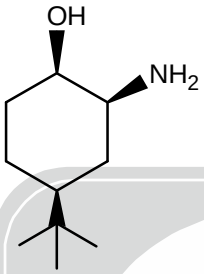
(d) 

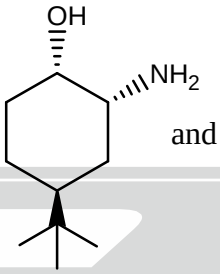
20. The compound 'X' can be obtained by diazotization ($NaNO_2$ + HCl)

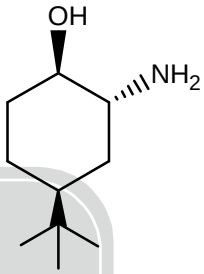


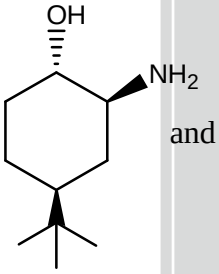
(X)

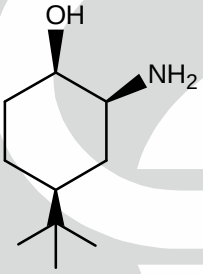
(a) 

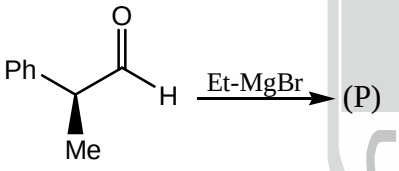
(b) 

(c) 

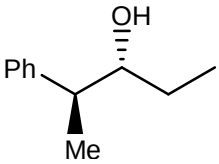
and 

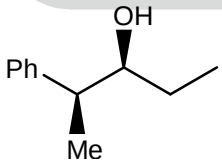
(d) By both 

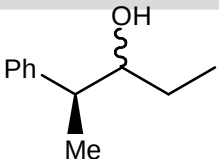
and 

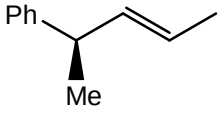
21. 

The major product (P) in the above synthetic transformation is

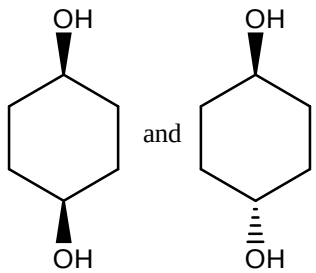
(a) 

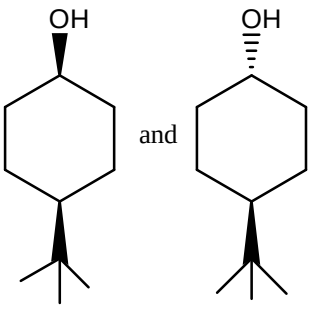
(b) 

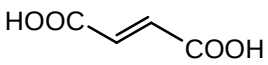
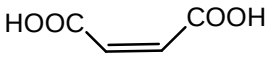
(c) 

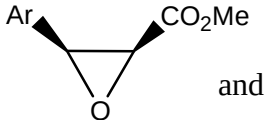
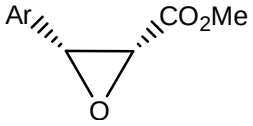
(d) 

22. Which among the following pair can't be distinguish on the basis of the melting point

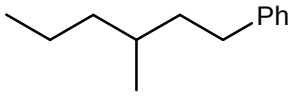
(a) 

(b) 

(c)  and 

(d)  and 

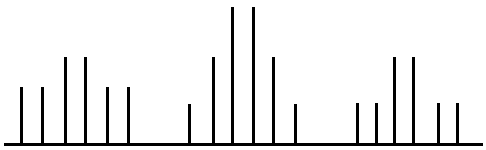
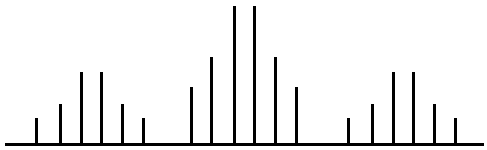
23. In the given molecule,

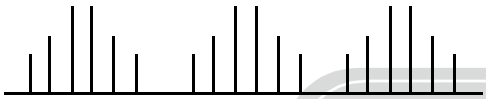
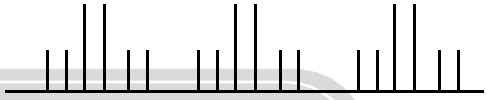


The base fragment (m/z) in mass spectrometry is

(a) 92 (b) 91 (c) 162 (d) 77

24. AB_7 is a pentagonal bipyramidal molecule (I_A = ½ N_A 100% and I_B = ½ N_A 100%). What will be the correct appearance for NMR signal of A

(a)  (b) 

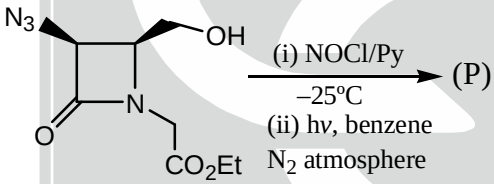
(c)  (d) 

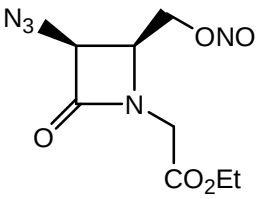
25. The correct order of carbonyl stretching frequencies in the IR-spectrum of following compounds (I-III), are

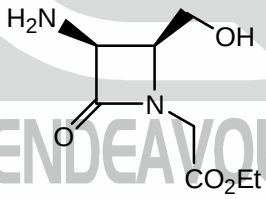
(I) Ethylbutyrate (II) Vinyl acetate (III) Methyl benzoate

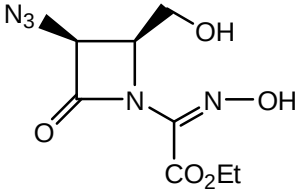
(a) I > II > III (b) III > II > I (c) II > I > III (d) II > III > I

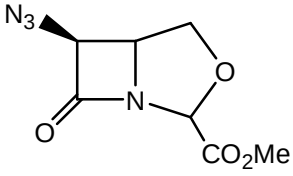
26. The major product (P) is



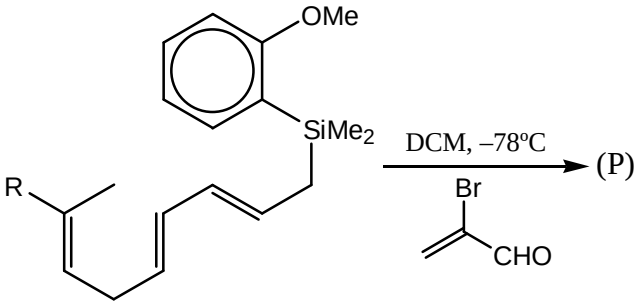
(a) 

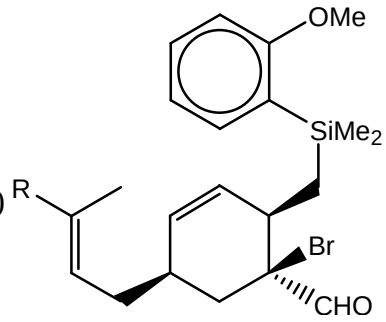
(b) 

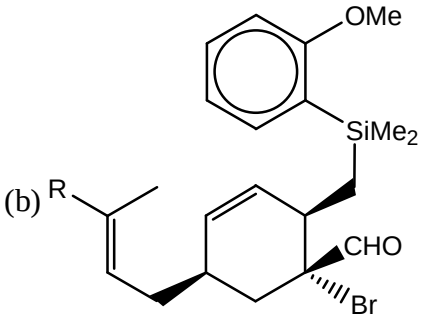
(c) 

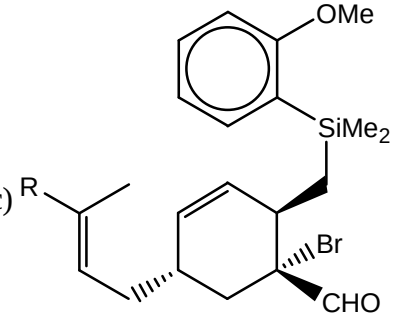
(d) 

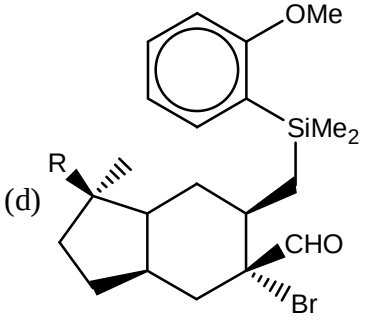
27. The major product (P) is



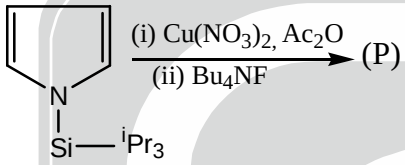
(a) 

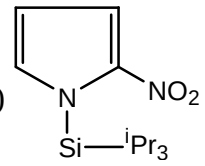
(b) 

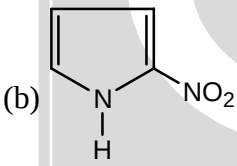
(c) 

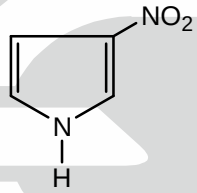
(d) 

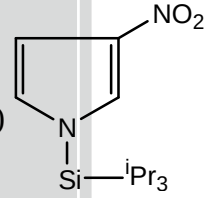
28. The major product (P) is



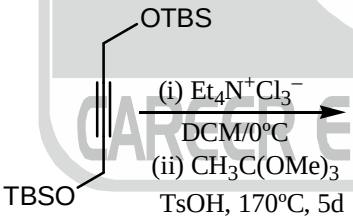
(a) 

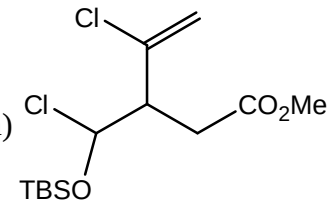
(b) 

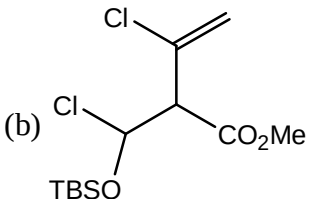
(c) 

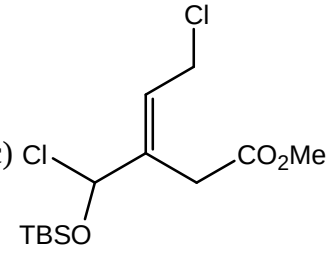
(d) 

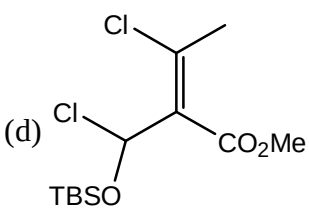
29. The major product (P) is



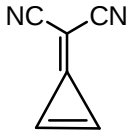
(a) 

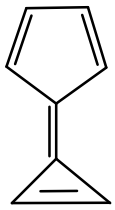
(b) 

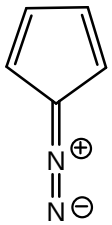
(c) 

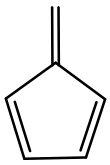
(d) 

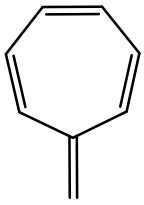
30. The number of aromatic compound among following will be

(1) 

(2) 

(3) 

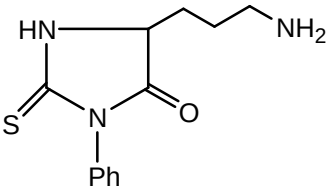
(4) 

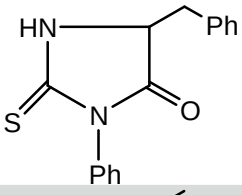
(5) 

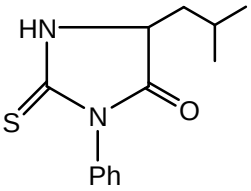
(a) 5 (b) 4 (c) 3 (d) 2

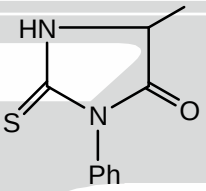
PART – C

31. A tetrapeptide (A) contains amino-acids **Phe, Val, Lys, Leu**. In tetrapeptide (A) aromatic side chain is present in N-terminal amino acid. Treatment of tetrapeptide (A) with Edmann reagent would give

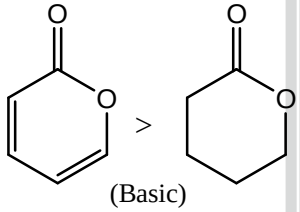
(a) 

(b) 

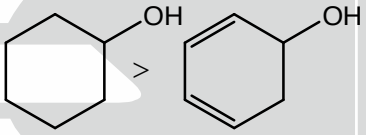
(c) 

(d) 

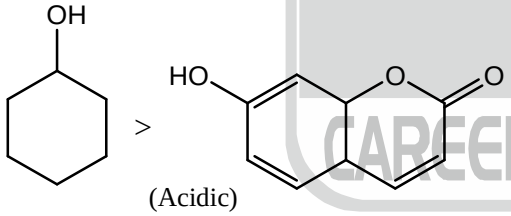
32. The pair from the followings with correct order of its property indicated is

(a) 

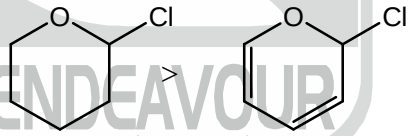
(Basic)

(b) 

(Dehydration)

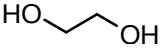
(c) 

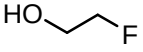
(Acidic)

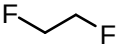
(d) 

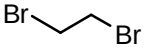
(Ionisation)

33. Among the following compounds, the compound having anti-conformation as a most stable conformation

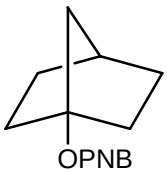
(a) 

(b) 

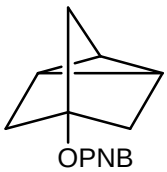
(c) 

(d) 

34. The correct order of solvolysis of the following pairs I, II and III, IV is

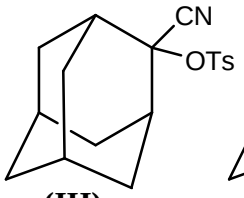


(I)

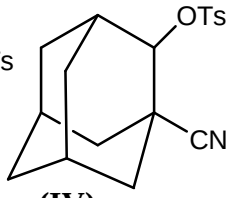


(II)

and



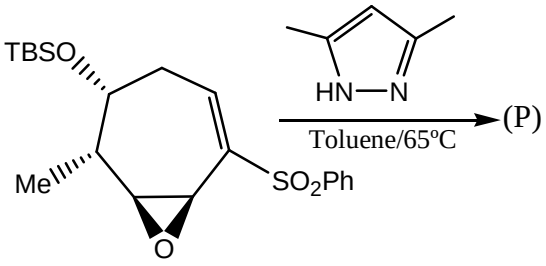
(III)



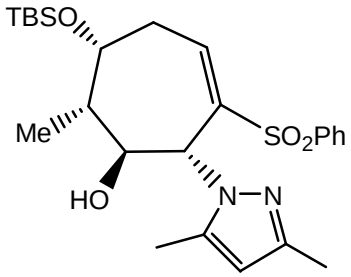
(IV)

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

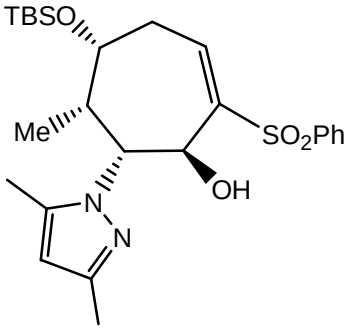
35. The major product (P) is



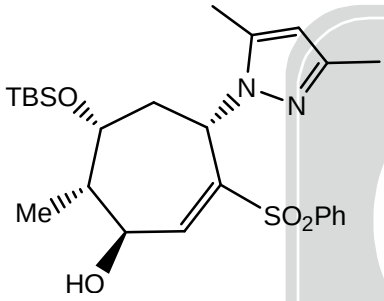
(a)



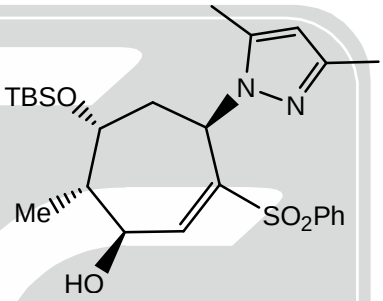
(b)



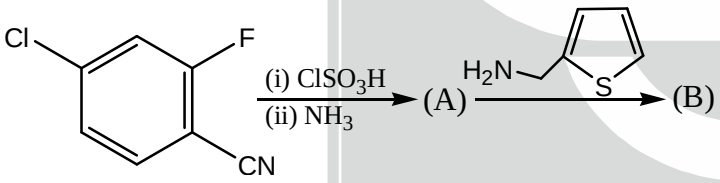
(c)



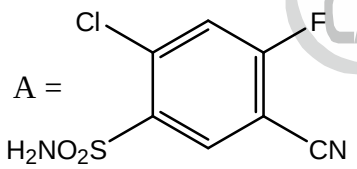
(d)



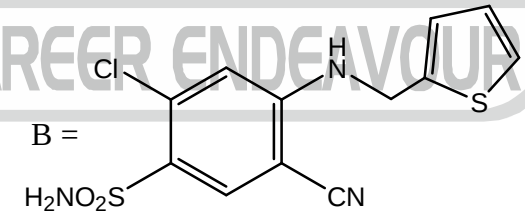
36. The major products (A) and (B) in the given reaction sequence are



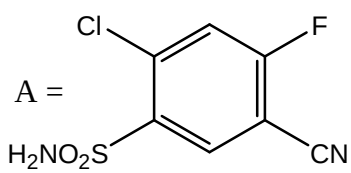
(a) A =



B =



(b) A =



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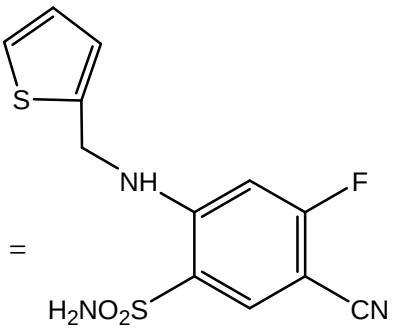
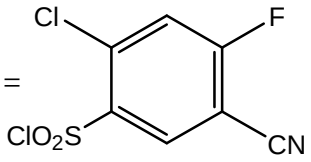
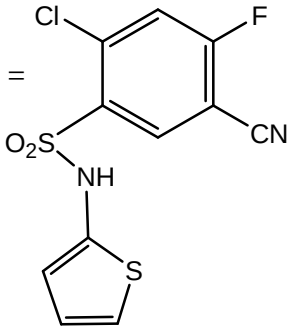
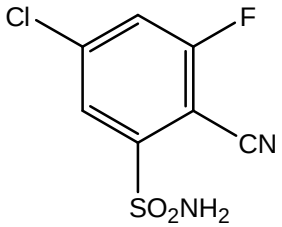
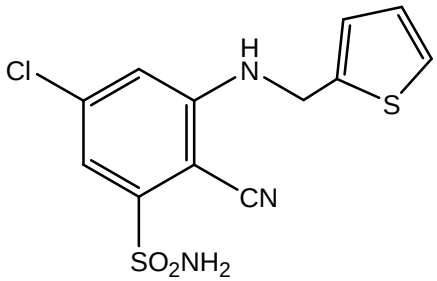


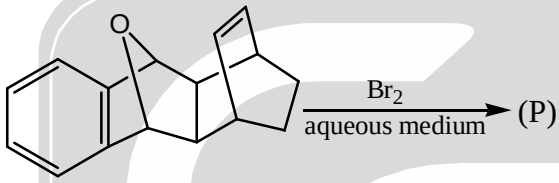
(c) A = 

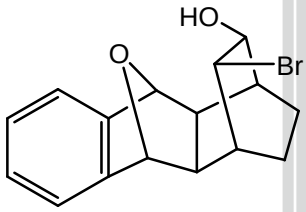
B = 

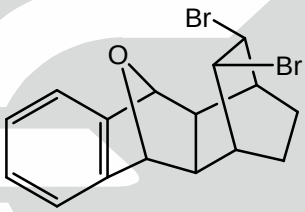
(d) A = 

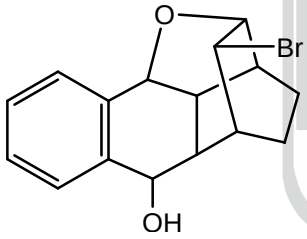
B = 

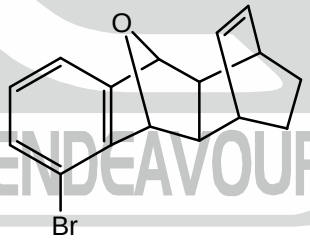
37. The major product (P) in the following reaction is



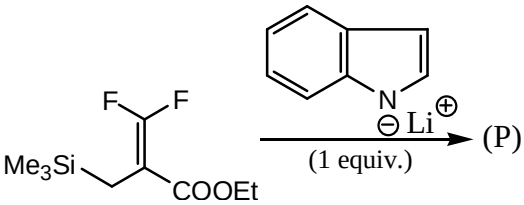
(a) 

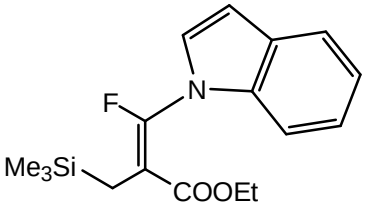
(b) 

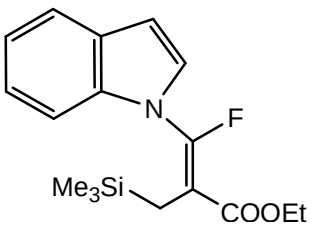
(c) 

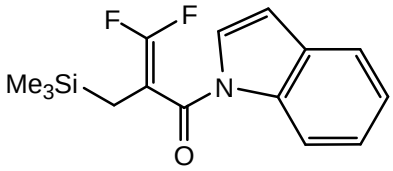
(d) 

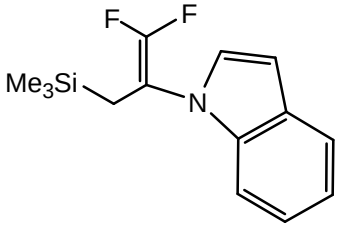
38. The major product (P) is

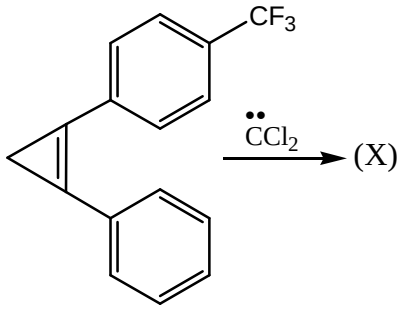


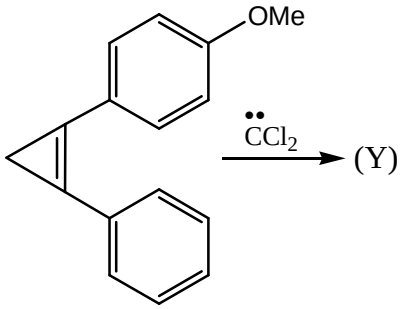
(a) 

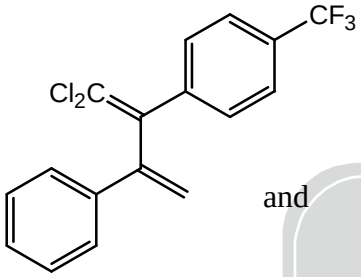
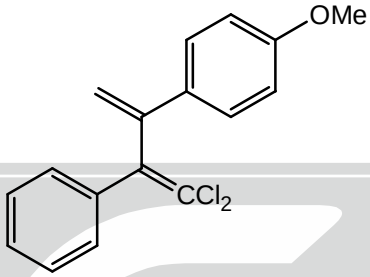
(b) 

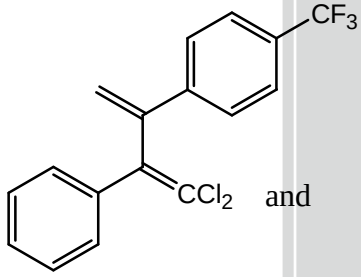
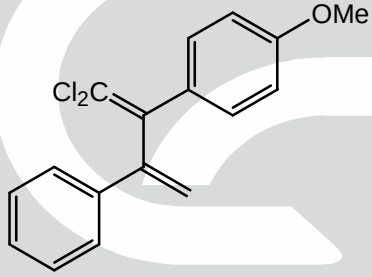
(c) 

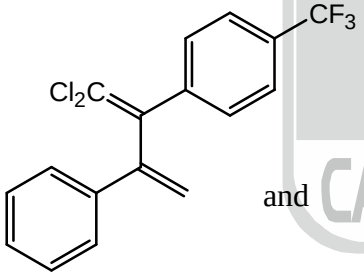
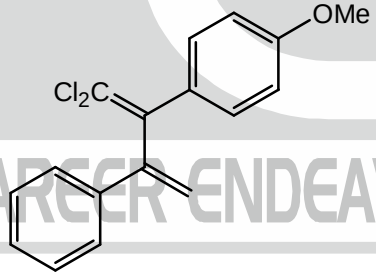
(d) 

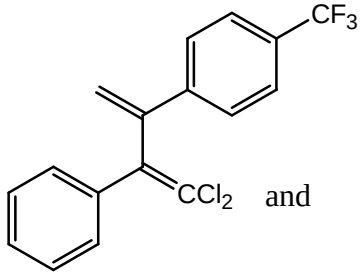
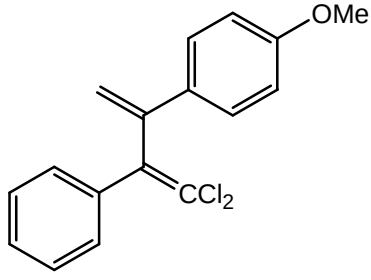
39. 



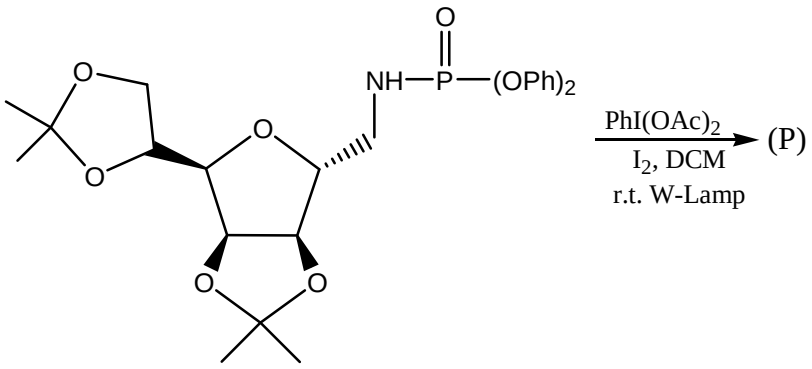
(a)  and 

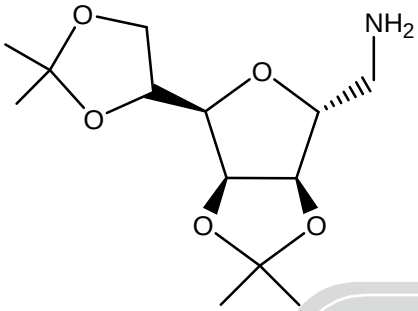
(b)  and 

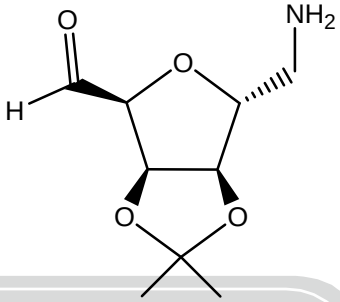
(c)  and 

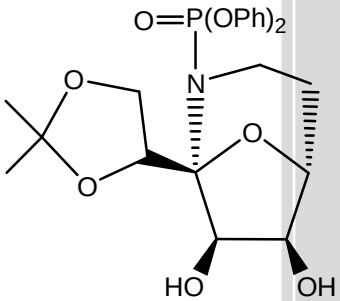
(d)  and 

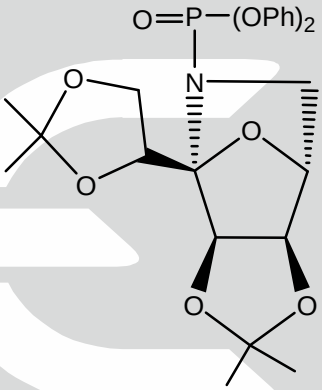
40. The major product (P) is



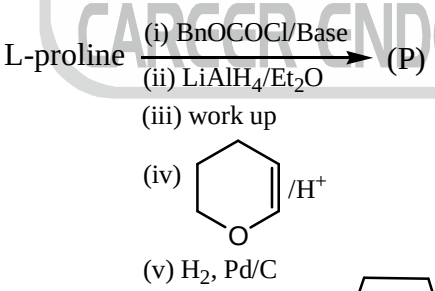
(a) 

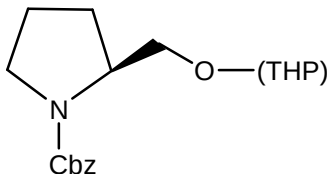
(b) 

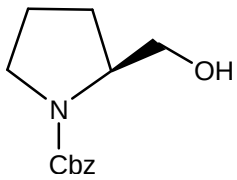
(c) 

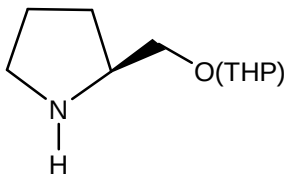
(d) 

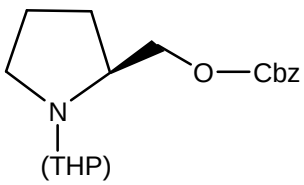
41. The product (P) formed in the following reaction sequence is



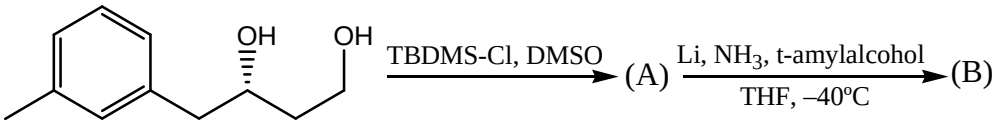
(a) 

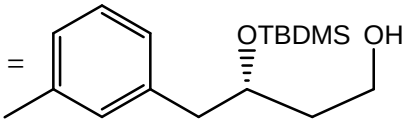
(b) 

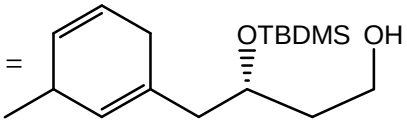
(c) 

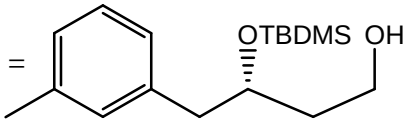
(d) 

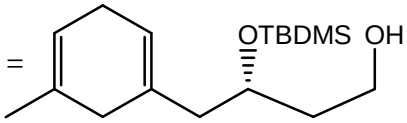
42. The major product A + B formed in the following reaction sequence are

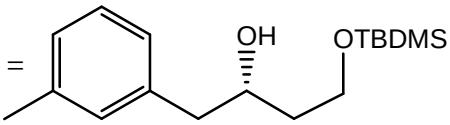


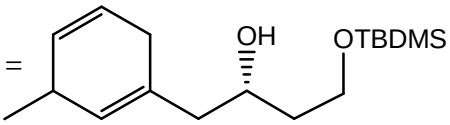
(a) A = 

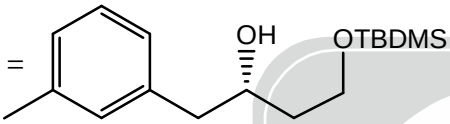
B = 

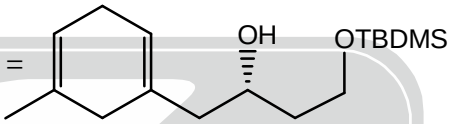
(b) A = 

B = 

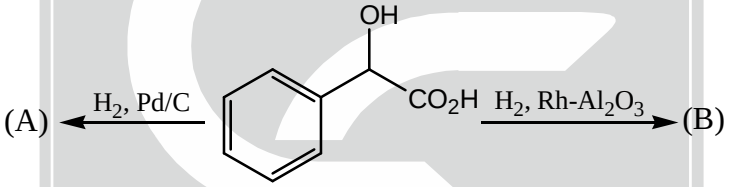
(c) A = 

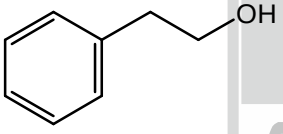
B = 

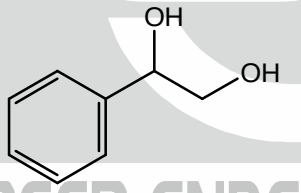
(d) A = 

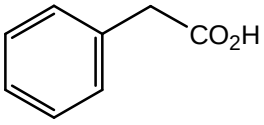
B = 

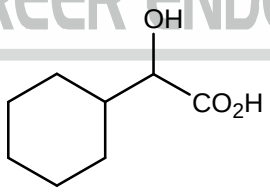
43. The major products A and B formed in the following reaction are

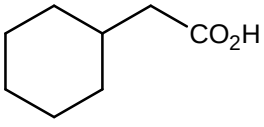


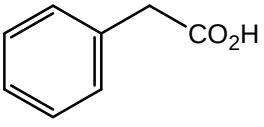
(a) A = 

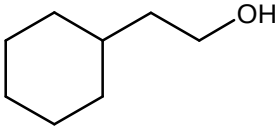
B = 

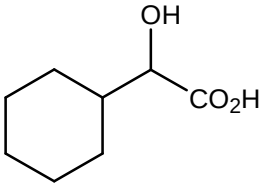
(b) A = 

B = 

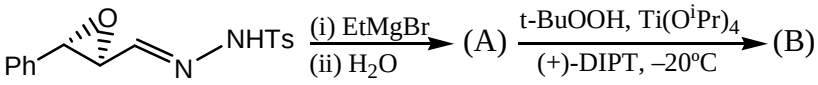
(c) A = 

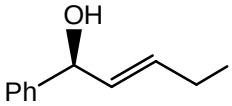
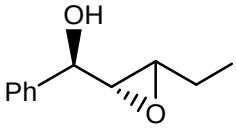
B = 

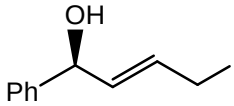
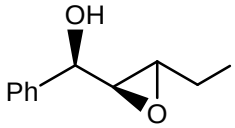
(d) A = 

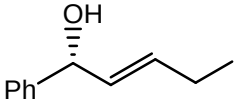
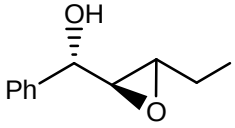
B = 

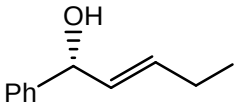
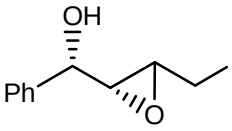
44. The major products (A) and (B) formed in the following reaction sequence are



(a) A =  B = 

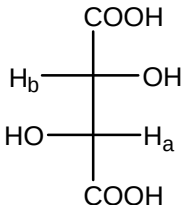
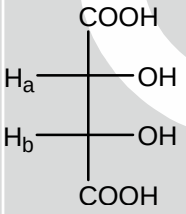
(b) A =  B = 

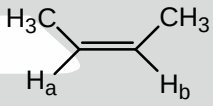
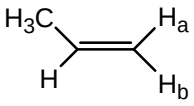
(c) A =  B = 

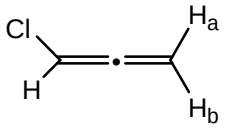
(d) A =  B = 

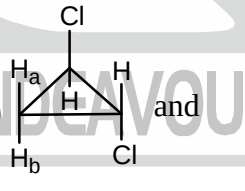
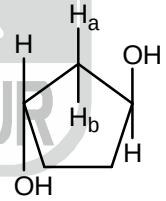
45. Addition of Br_2 to (Z)-2-butene gives
(a) (2R, 3R) dibromobutane through achiral brominium ion
(b) (2S, 3S) dibromobutane through achiral brominium ion
(c) Mixture of (2R, 3R) and (2S, 3S) dibromobutane through chiral brominium ion.
(d) Mixture of (2R, 3R) and (2S, 3S) dibromobutane through achiral brominium ion.

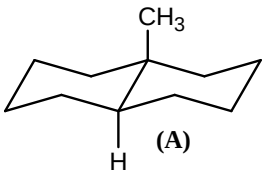
46. Which of the following pair having homotopic ligand

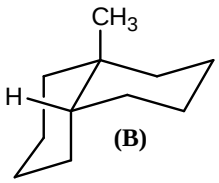
(a)  and 

(b)  and 

(c)  and 

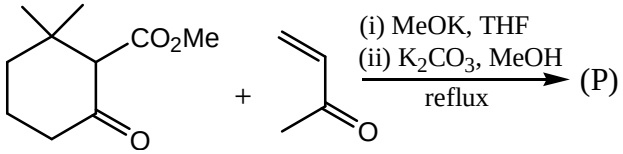
(d)  and 

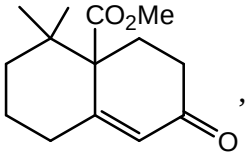
47. 



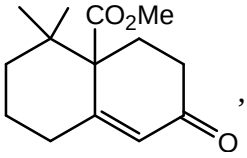
The correct statement regarding structure (A) and (B) is
(a) (A) is more stable over (B) (b) (B) is more stable over (A)
(c) Both (A) and (B) are having same energy (d) Conformational flipping is possible in both (A) and (B)

48. The major product (P) and the steps involved the following reaction sequence are

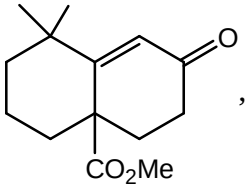


(a) P = 

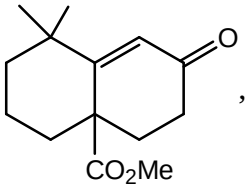
, Michael addition followed by intramolecular Aldol and dehydration

(b) P = 

, intramolecular Aldol followed by Michael addition and dehydration

(c) P = 

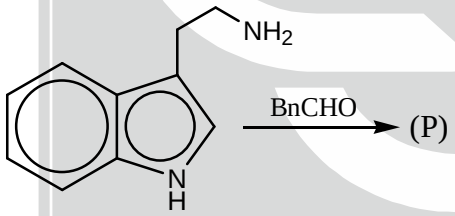
, Michael addition followed by intramolecular Aldol and dehydration

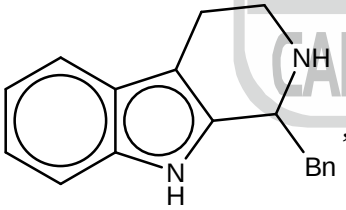
(d) P = 

, intramolecular Aldol, followed by Michael addition and dehydration.

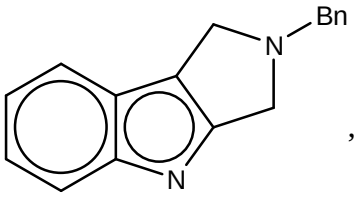
49. Consider the following statements
(A) Base pairing will be never possible between two purine or two pyrimdine bases
(B) Sugar containing hemiacetal can undergo mutarotation
(C) All amino acid reacts in the same manner with nitrous acid
(D) Majority of terpenoids belongs to animal kingdom
The *incorrect* statement among the following are
(a) A and D only (b) A and C only (c) A, C and D only (d) C and D only

50. The major product (P) and the reaction involved in the following reaction is

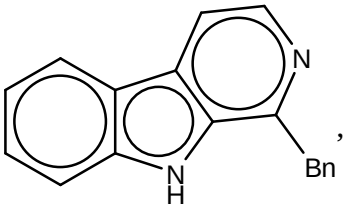


(a) P = 

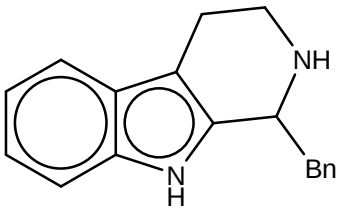
, mannich reaction

(b) P = 

, mannich reaction

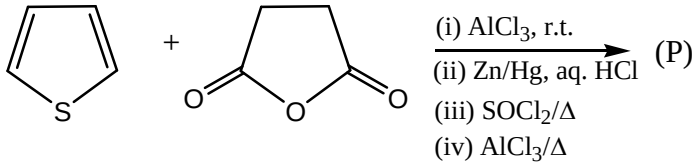
(c) P = 

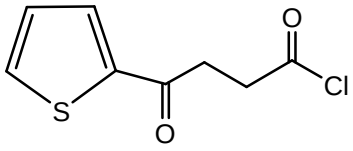
, Aza-cope rearrangement

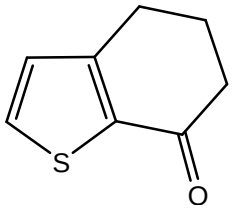
(d) P = 

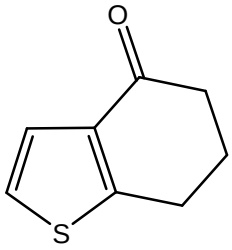
, Aza-cope rearrangement

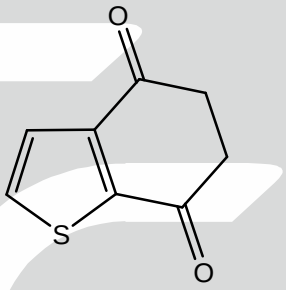
51. The major product (P), is



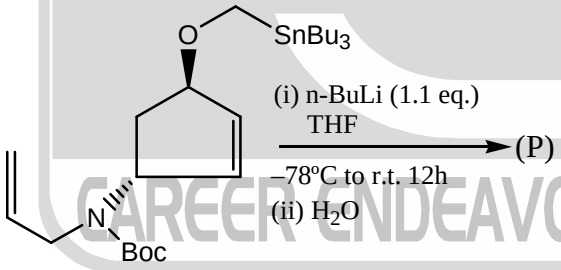
(a) 

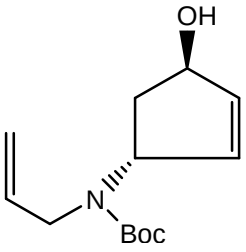
(b) 

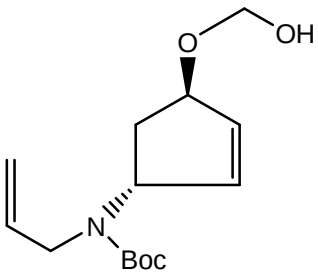
(c) 

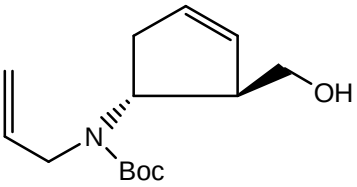
(d) 

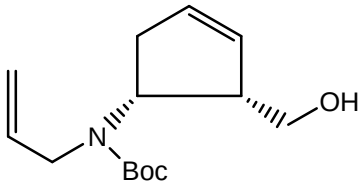
52. The major product (P) is



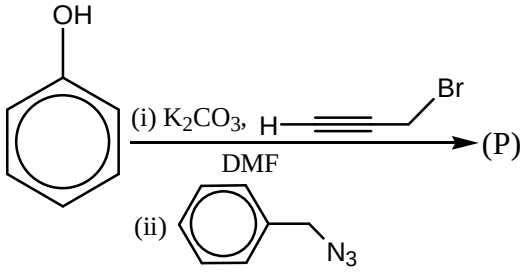
(a) 

(b) 

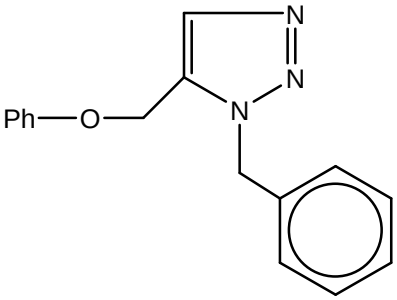
(c) 

(d) 

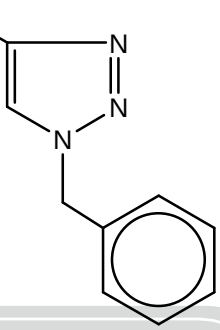
53. The major product (P) is



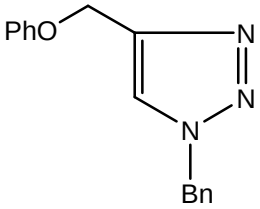
(a)



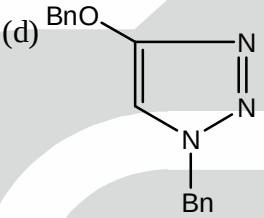
(b)



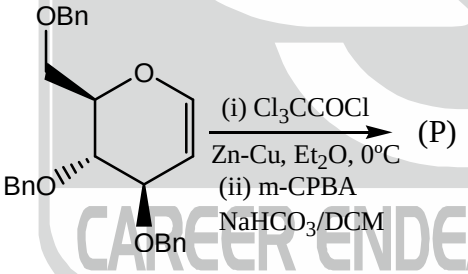
(c)



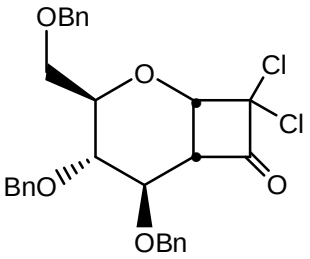
(d)



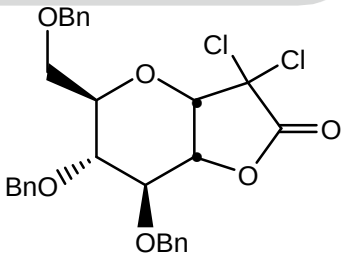
54. The major product (P) is



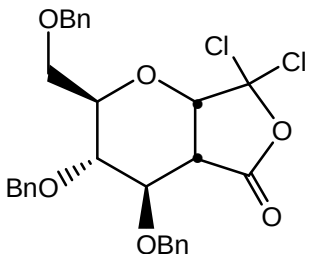
(a)



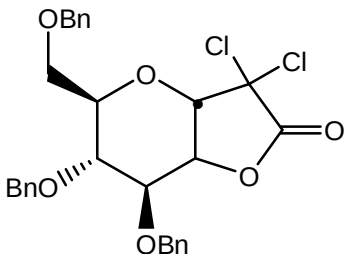
(b)



(c)



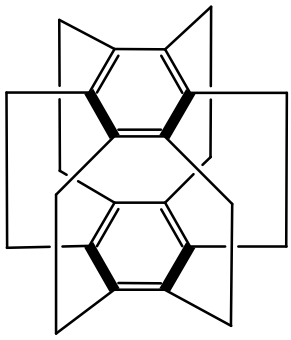
(d)

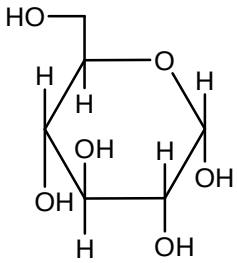


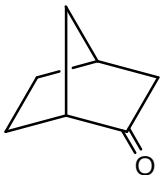
55. In a NMR spectrometer containing a 4.5T magnet. The Larmor precession frequency of ^1H is 500 MHz . The radio frequency used in this spectrometer has an associated magnetic field strength of 5×10^{-6} T. The duration of a 90° pulse in this instrument is

(a) 2.5×10^{-4} sec (b) 25×10^{-6} sec (c) 4.5×10^{-5} sec (d) 9.5×10^{-6} sec

56. The number of ^{13}C NMR signals exhibited by the compounds (A-C), are, respectively

(A) 

(B) 

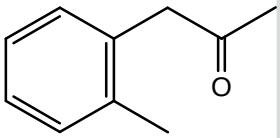
(C) 

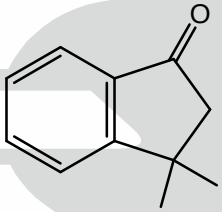
(a) 4, 5, 5 (b) 4, 6, 6 (c) 2, 5, 7 (d) 2, 6, 7

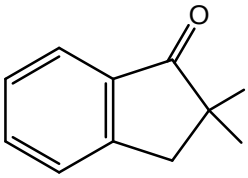
57. A compound having molecular formula $C_{11}H_{12}O$ exhibits following spectral data:

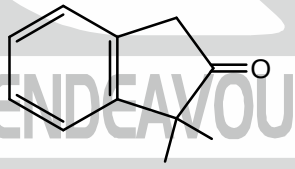
IR $\left(\overline{v}, cm^{-1}\right)$	:	1706, 1600
Mass (m/z)	:	160, 145 (base peak)
^1H NMR (δ, ppm)	:	7.3–7.8(m, 4H); 1.5 (s, 6H), 2.6 (2H, s)

The singlet at δ 2.6 ppm is exchangeable after prolonged treatment with D_2O containing a trace of DCl.

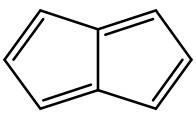
(a) 

(b) 

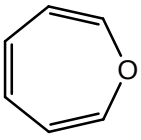
(c) 

(d) 

58. Aromatic compounds among (I to V) are

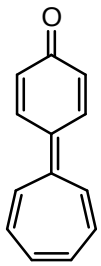


(I)

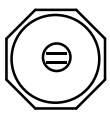


(II)

(III)



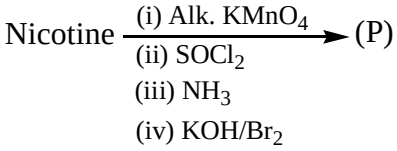
(IV)



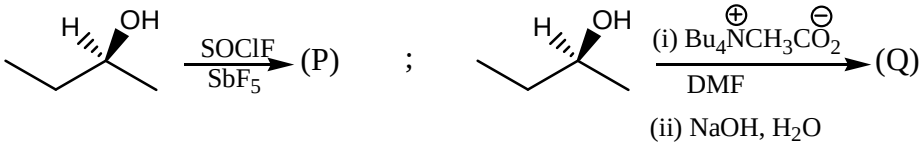
(V)

(a) I, III and IV (b) I, II and IV (c) III and IV (d) III, IV and V

59. The product (P) in the following reaction is



(a) 2-amino-Py
(b) 3-Amino-Py
(c) 2-amino-nicotinamide
(d) 3-amino-nicotinic acid

60. 

Which of the following statement is true regarding above reaction.
(a) P = Q = optically active R-2-butanol
(b) P = Q = racemic mixture of 2-butanol
(c) P = racemic mixture of 2-butanol whereas Q is optically active R-2-butanol
(d) P = optically active R-2-butanol whereas Q = racemic mixture of 2-butanol

Space for rough work

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

CSIR-UGC-NET/JRF | GATE CHEMISTRY

CHEMICAL SCIENCES

Date : 21-11-2018

TEST SERIES-B (ORGANIC CHEMISTRY)

ANSWER KEY

PART-A

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

PART-B

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

PART-C

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