



Time : 00: 45 Hour

Date : 06-09-2018

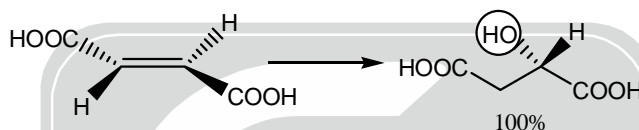
M.M. : 60

INSTRUCTION :

- There are Two Parts. Part-A contains 10 objective type questions, each question carry 2 marks and Part-B contains 10 objective type questions, each question carry 4 marks.
- There is negative marking, @ 25% will be deducted for each wrong answer.
- Attempt all the questions, use of calculator is not allowed.

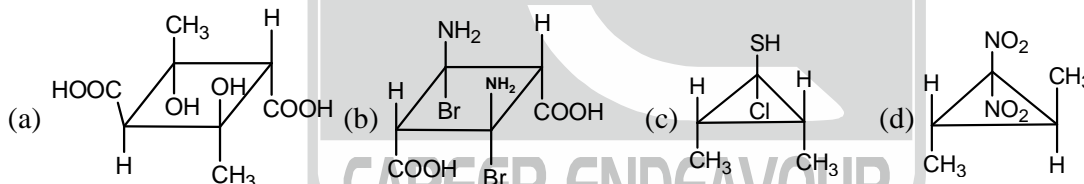
PART - A

1. Fumaric acid is converted to S-2-hydroxybutanedioic acid by the enzyme fumarase such as

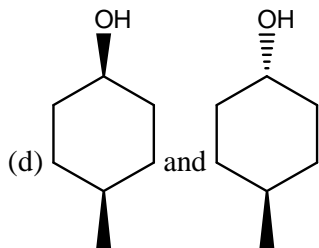
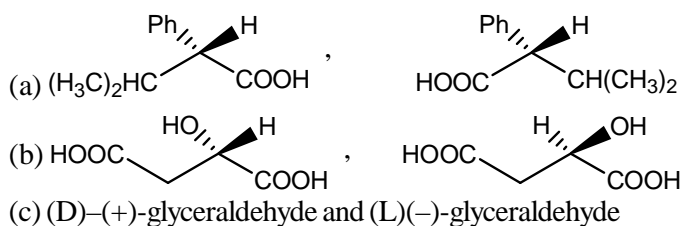


Which of the following statement is **true** about above enzymatic conversion

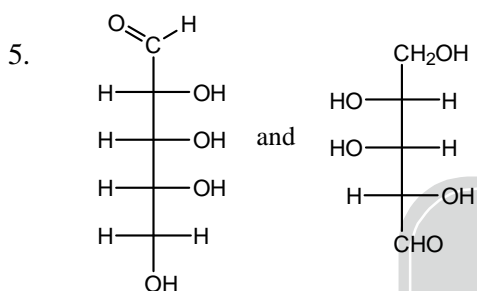
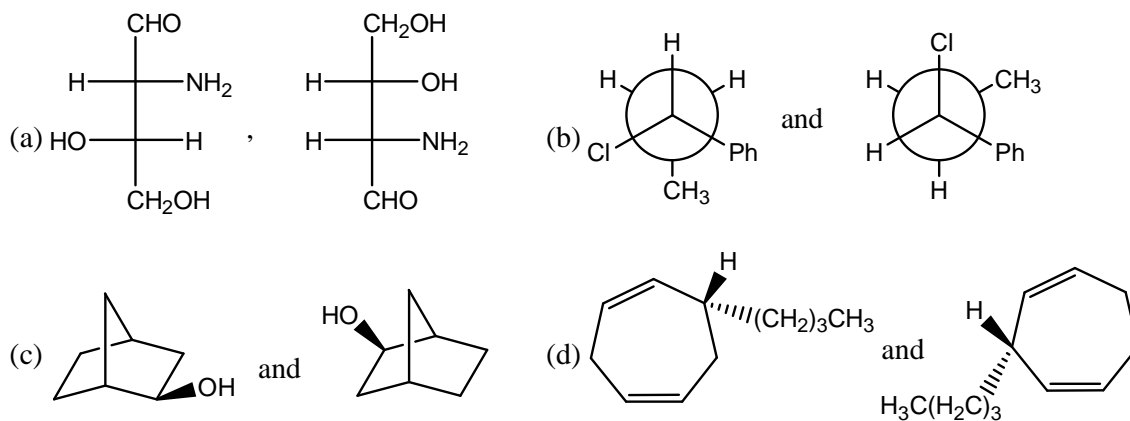
- The hydroxyl group is added stereospecifically from 'Si' face of the double bond
 - The hydroxyl group is added stereospecifically from 'Re' face at the double bond
 - The 'Si' and 'Re' face gives the same product.
 - The enzyme fumarase is not able to distinguish between these two faces. Therefore, the product should be racemic mixture.
2. Among the following which compound is resolvable?



3. Which of the following pair can be distinguishable by ¹H NMR spectroscopy



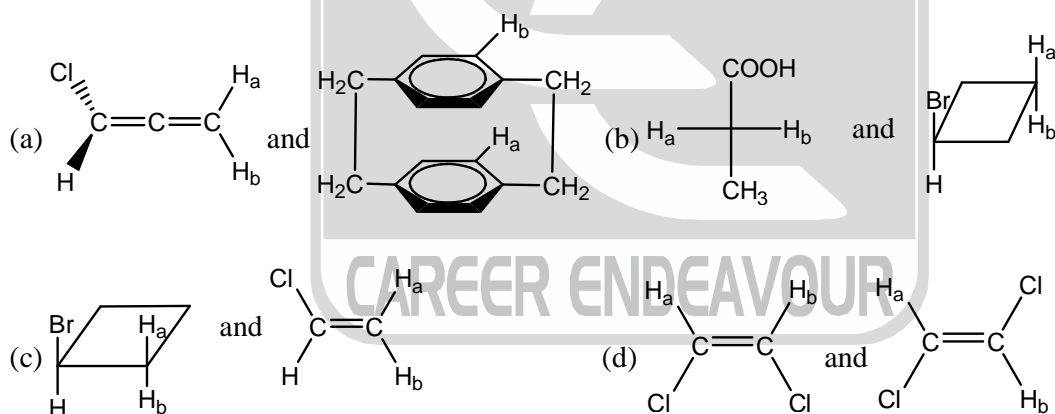
4. Which of the following pairs of compound are enantiomers



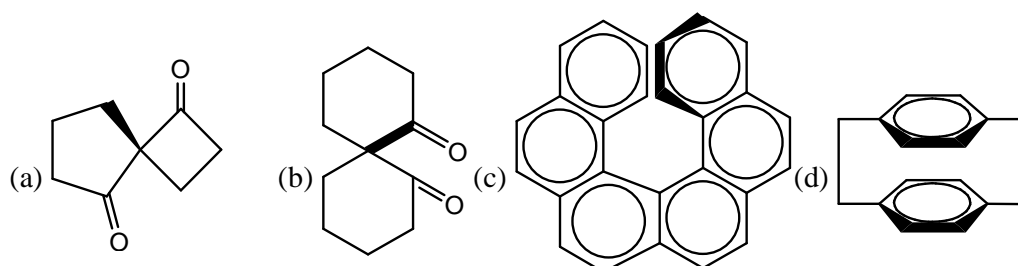
The above pair is the case of

(a) Enantiomers (b) Anomer (c) Epimer (d) Identical

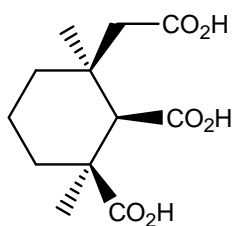
6. Which of the following pair containing enantiotopic and 'distereotopic H_a and H_b proton respectively.



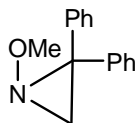
7. Which of the following compound is achiral



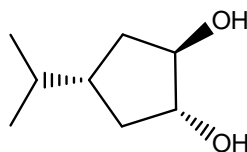
8. Among A-C, the compounds which can exhibit optical activity are



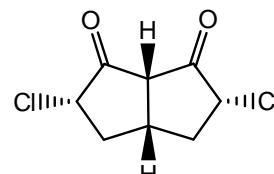
(A)



(B)



(C)



(D)

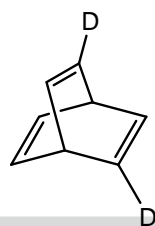
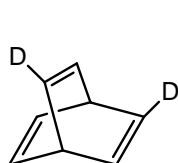
(a) A, B and C

(b) B and C

(c) C and D

(d) B and D

9. The compounds given below are



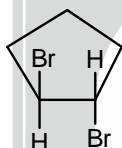
(a) Regioisomers

(b) Identical

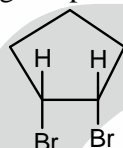
(c) Enantiomers

(d) Diastereomers

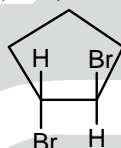
10. The correct statements about the following compounds (A-D) are



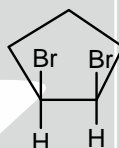
(A)



(B)



(C)



(D)

(I) A and B are identical

(II) C and D are homomers

(III) A and B are diastereomers

(IV) C and D are enantiomers

(V) A and C are enantiomers

(VI) C and D are diastereomers

(a) I, III, V

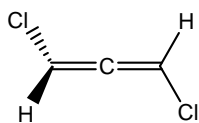
(b) II, VI

(c) I, IV and VI

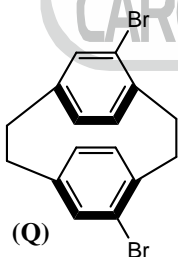
(d) III, V and VI

PART - B

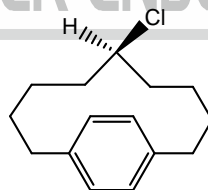
11. Amongst the following the correct statement for the compound P, Q and R is



(P)



(Q)



(R)

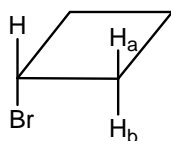
(a) P and Q are achiral and R is chiral

(b) P is chiral and Q and R are achiral

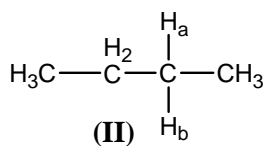
(c) P and Q are chiral and R is achiral

(d) P is achiral and Q and R are chiral.

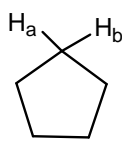
12. Consider the following molecules



(I)



(II)

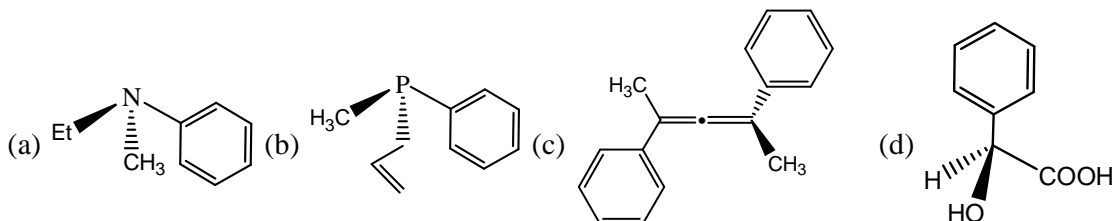


(III)

Identify H_a and H_b hydrogen in the above compound

- (a) Diastereotopic, enantiotopic, homotopic respectively
 (b) Enantiotopic, diastereotopic, homotopic respectively
 (c) Homotopic, diastereotopic, diastereotopic respectively
 (d) Diastereotopic, enantiotopic, diastereotopic respectively

13. Among the following, the optically inactive compounds is

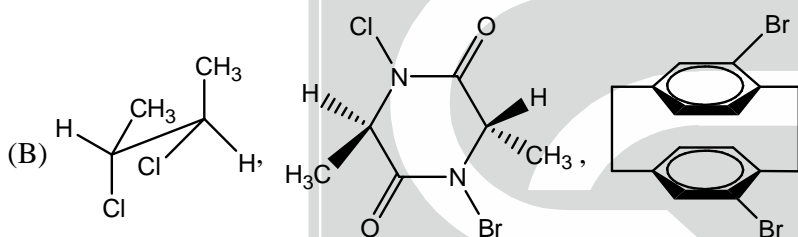


14. Which of the following statement is incorrect for cis-1, 2 dibromocyclopentane?

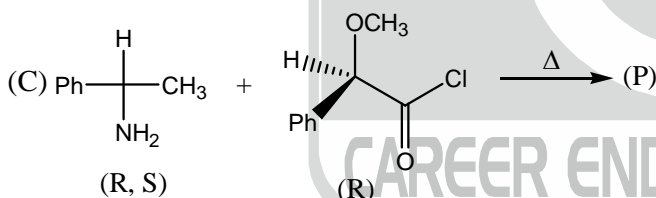
- (a) it contains two chiral centres but is optically inactive
 (b) it can exist in two enantiomeric forms but can not be optically active
 (c) It is with two chiral centres and is optically active
 (d) it is a meso compound

15. Consider the following statements

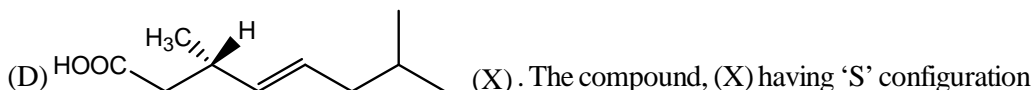
(A) Diastereomers are more or less easy to separate from one another by conventional crystalization, distillation or sublimation



All these compounds are chiral



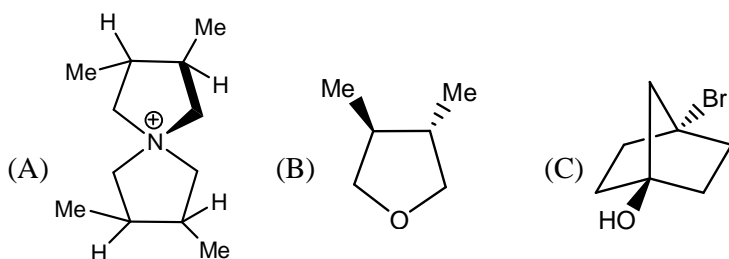
The product (P) of the above reaction will be diastereo isomers



Among the statement mentioned above the correct one is/are

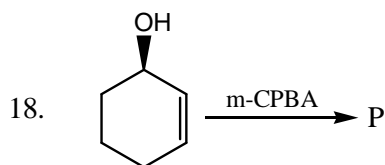
- (a) A, B, C (b) B and D (c) A, C and D (d) All

16. The correct statements for compounds (A–C) are

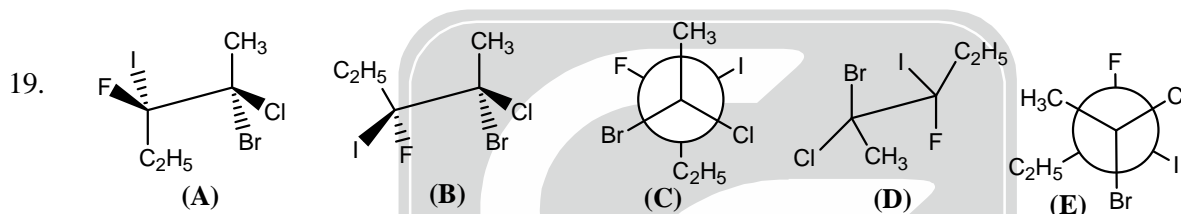


- (I) A has 4-fold rotation-reflection axis of symmetry and is achiral
 (II) B has 2-fold rotation axis and is chiral
 (III) C has plane of symmetry and is achiral
 (a) I only (b) all are correct (c) II only (d) II and III

17. The number of asymmetric center and configuration in D-glucose
 (a) 4 and 2R, 3R, 4S, 5R (b) 5 and, 1S, 2R, 3S, 4R, 5R
 (c) 4 and 2R, 3S, 4R, 5R (d) 5 and, 1S, 2R, 3R, 4R, 5R



- Which of the following statement is correct about product 'P'
 (a) The number of asymmetric center is increased by one unit in the product.
 (b) The number of asymmetric center is increased by two units in the product.
 (c) There is no change in asymmetric center in the product
 (d) In product the number of asymmetric center will be two.



- The correct option about above compounds is
 (a) A/B are homomer, C/D are enantiomers (b) D/E are diastereomers, A/C are homomer
 (c) A/C are enantiomers and A/E are homomer (d) B/E are diastereomers and C/D are homomer

20. Which of the following statements for meso compound is incorrect
 (a) The meso compound has either a plane or point of symmetry
 (b) The meso compound has atleast one pair of similar stereocentre
 (c) The meso compound is formed when equal amount of two enantiomer are mixed
 (d) The meso compound is optically inactive.



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CSIR-UGC-NET/JRF | GATE CHEMISTRY
TEST : STEREOCHEMISTRY

Date : 06-09-2018

[ANSWERS]

PART-A

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

PART-B

- | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|
| 11. (c) | 12. (a) | 13. (a) | 14. (c) | 15. (d) | 16. (b) | 17. (c) |
| 18. (b) | 19. (d) | 20. (c) | | | | |

