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**THE OPEN UNIVERSITY OF SRI LANKA**

**B.Sc. Degree Programme and Stand Alone Courses in Science - 2017/2018**

**CYU4303/CYE4303 - Organic Chemistry 1**

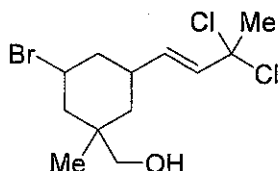
**CONTINUOUS ASSESSMENT TEST II – Multiple Choice Questions**

Saturday 24<sup>th</sup> November 2018

09.30 – 10.30 hrs

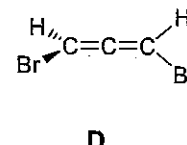
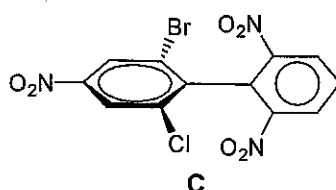
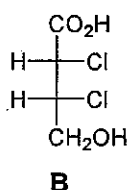
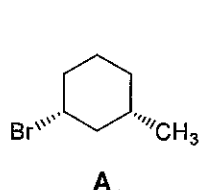
Each correct answer carries 04 marks

1. How many stereoisomers are possible for the following compound?



- (1) None      (2) 4      (3) 8      (4) 16      (5) 32

2. Which of the following compounds show optical activity?



- (1) A and B      (2) B and C      (3) B and D      (4) A, B and C      (5) A, B and D

3. Specific rotation of a compound is determined by using:

- (1) Rotavapour  
 (2) Polarimeter  
 (3) Barometer  
 (4) Planimeter  
 (5) Rotameter

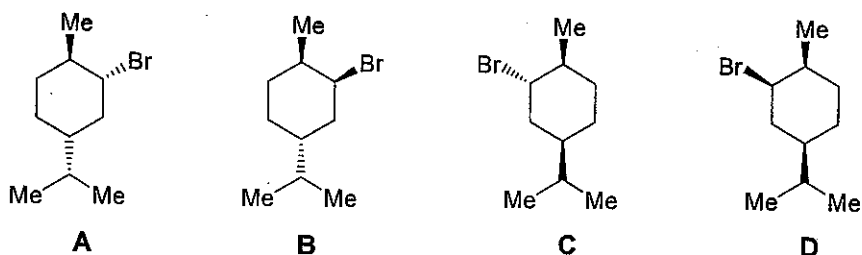
4. Consider the following statements.

- (a) Carbocations are more stabilized in water than in ethanol  
 (b) S<sub>N</sub>2 reactions are favoured in acetone than in ethanol.  
 (c) S<sub>N</sub>1 reactions **always** occur with rearrangement.

Correct statement/s is/are,

- (1) (a) only      (2) (b) only      (3) (a) and (b) only  
 (4) (a) and (c) only      (5) All (a) (b) and (c)

Questions 5, 6 and 7 are based on the following structures.



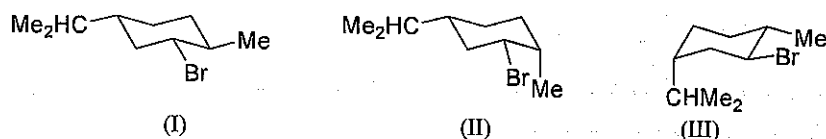
5. Consider the following statements.

- (a) Structures **A** and **B** represent a pair of enantiomers.
- (b) Structures **B** and **C** represent a pair of diastereomers.
- (c) Structures **A** and **C** represent a pair of diastereomers.
- (d) Structures **A** and **D** represent a pair of enantiomers.

**Correct statement/s is/are:**

- (1) (a) and (b) only      (2) (a) and (c) only      (3) (b) and (c) only  
 (4) (a) and (d) only      (5) (b) and (d) only

6. Select the **wrong** statement with respect to the following conformations (I) – (III).

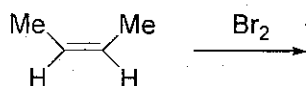


- (1) Most stable chair conformation of **A** is (I).
- (2) Least stable chair conformation of **A** is (III).
- (3) Most stable chair conformation of **D** is (II).
- (4) Least stable chair conformation of **C** is (III).
- (5) Most stable chair conformation among these three is (I).

7. Select the **correct** statement.

- (1) **A** undergoes E2 elimination readily with alc. KOH to give two products.
- (2) **B** undergoes E2 elimination readily with alc. KOH to give one product.
- (3) **C** undergoes E2 elimination readily with alc. KOH to give one product.
- (4) **D** undergoes E2 elimination slowly with alc. KOH to give one product.
- (5) All **A**, **B**, **C** and **D** undergo E2 elimination readily with alc. KOH each giving two products.

8. The product of the following reaction is,

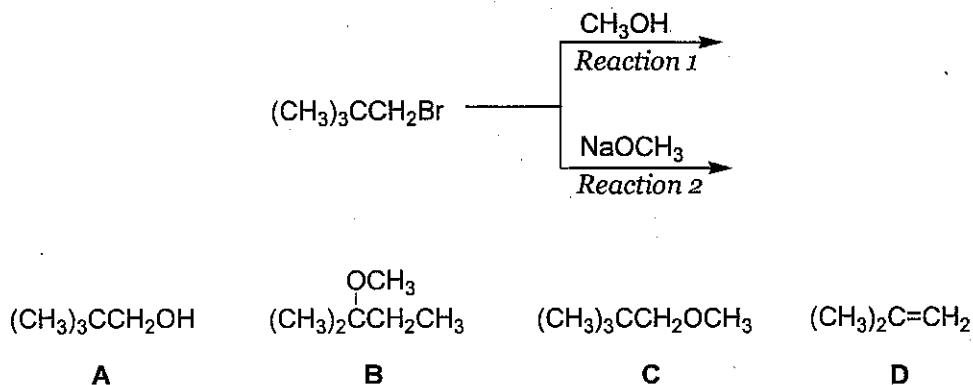


- (1) Meso-2,3-dibromobutane
- (2) A racemic mixture of 2,3-dibromobutane
- (3) A mixture of all three stereoisomers of 2,3-dibromobutane
- (4) A racemic mixture of 2-bromobutane.
- (5) A diastereoisomeric mixture of 2,3-dibromobutane.

9. Select the **incorrect** statement regarding the following organic solvents.

- (1) Dimethylformamide (HCONMe<sub>2</sub>) is a polar aprotic solvent
- (2) Ethanol (EtOH) and water are polar protic solvents.
- (3) Water is less polar than ethanol.
- (4) Acetonitrile (MeCN) is a polar aprotic solvent
- (5) Dichloromethane (CH<sub>2</sub>Cl<sub>2</sub>) is a nonpolar aprotic solvent

10. Consider the following two reactions and the compounds **A**, **B**, **C** and **D** given below.



Select the **correct** statement.

- (1) Products of both reactions 1 and 2 are the same and it is **C**.
- (2) Products of both reactions 1 and 2 are the same and it is **A**.
- (3) Product of reaction 1 is **A** and product of reaction 2 is **C**.
- (4) Product of reaction 1 is **B** and product of reaction 2 is **C**.
- (5) Products of reaction 1 are **A** and **D** and products of reaction 2 are **B** and **C**.



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THE OPEN UNIVERSITY OF SRI LANKA  
B.Sc. Degree Programme  
and Stand Alone Courses in Science - 2017/2018  
CYU4303/CYE4303 - Organic Chemistry 1  
CONTINUOUS ASSESSMENT TEST II

| Ques No. | Max. | Marks |
|----------|------|-------|
| 1        | 40   |       |
| 2        | 60   |       |
| Total    | 100  |       |

Saturday 24<sup>th</sup> November 2018

09.30 – 10.30 hrs

## MCQ Answer sheet

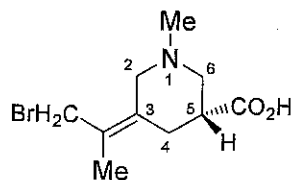
1. 1 2 3 4 5    2. 1 2 3 4 5    3. 1 2 3 4 5    4. 1 2 3 4 5    5. 1 2 3 4 5  
6. 1 2 3 4 5    7. 1 2 3 4 5    8. 1 2 3 4 5    9. 1 2 3 4 5    10. 1 2 3 4 5

## PART II – Structured Essay Question

## ANSWER ALL QUESTIONS

1. (a) Determine the configuration of the Chiral centers as *R* or *S* and double bonds as *E* or *Z* of the following compound showing the priorities of the groups attached to them according to Cahn-Ingold-Prelog rules.

**Note:** *If priorities of the groups are not clearly shown marks will not be awarded.*

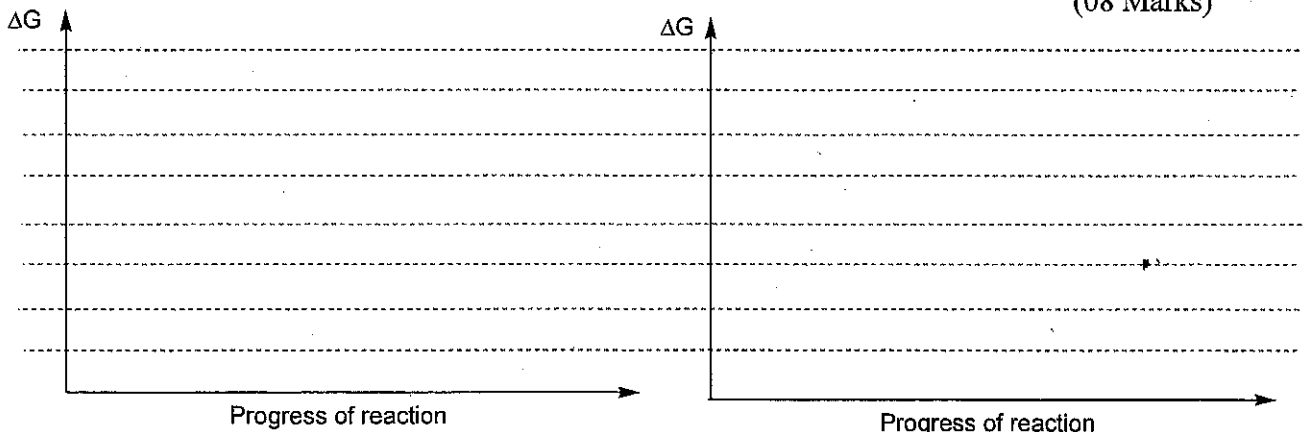


..... (20 Marks)

2. (a) Give the product and the mechanism of solvolysis of 2-bromo-2-methylpropane in water. (10 Marks)

(b) Draw the completely labeled energy diagram for the above reaction (*diagram A*).

(08 Marks)



(A) Energy diagram for solvolysis in water

(B) Energy diagram for solvolysis in ethanol

(c) Giving reasons state what happens to the **rate of the reaction** if the solvolysis of 2-bromo-2-methylpropane is carried out in ethanol.

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(06 Marks)

(d) Draw the labeled energy diagram to show the changes you have explained in (c) next to the diagram you have drawn previously (*see above*) (*diagram B*).

(06 Marks)

(e) Explain why the rate of the reaction of solvolysis of 2-bromo-2-methylpropane in water does not change with the addition of aq. NaOH but changes the rate of reaction of hydrolysis of bromoethane.

(10 Marks)

Answer Guide - CAT 2  
CYU4303/CYE4303 – Organic Chemistry I – 2017/18

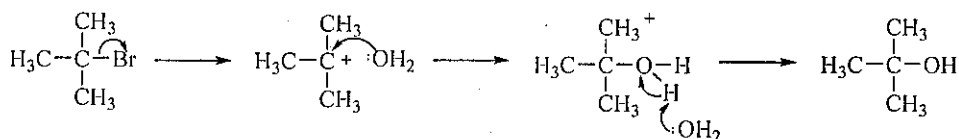
**PART I**

|    |   |    |   |    |   |    |   |     |   |
|----|---|----|---|----|---|----|---|-----|---|
| 1. | 3 | 2. | 5 | 3. | 2 | 4. | 3 | 5.  | 3 |
| 6. | 2 | 7. | 3 | 8. | 2 | 9. | 3 | 10. | 4 |

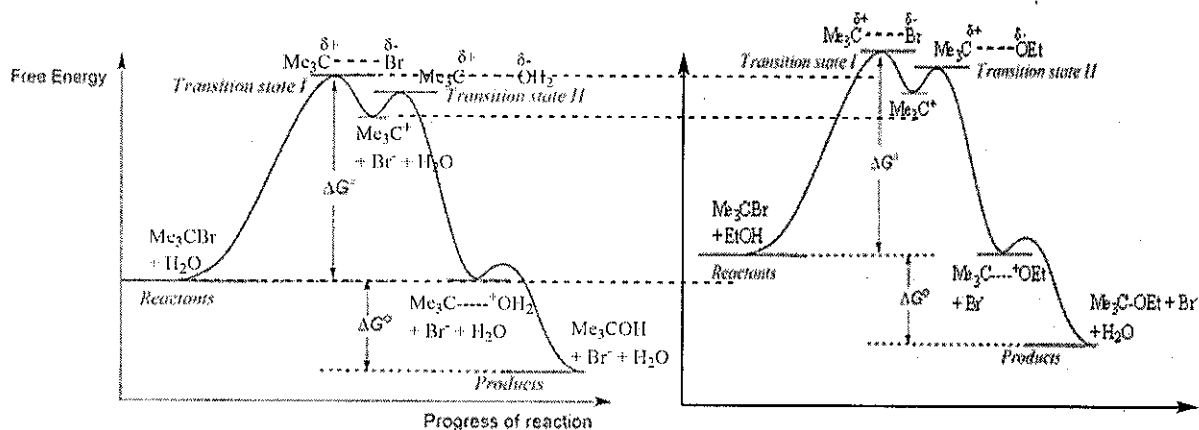
**PART II**

1. (a). 3(Z), 5(R)

2. (a)



(b)



(c) This reaction undergoes  $S_N1$  reaction mechanism and via the carbocation formation. Ethanol is less polar (protic) solvent than water. The carbocation stabilization is less in ethanol than water. Therefore, the rate of the reaction is decreased in ethanol than water.

(e) 2-Bromo-2-methylpropane is a tertiary alkyl halide. The solvolysis reaction goes through the  $S_N1$  mechanism. The carbocation formation is the rate determining step. Therefore, the concentration of the nucleophile has no effect on the rate of the reaction.

While, bromoethane is a primary alkyl halide and under goes  $S_N2$  reaction. The rate determining step involves the both substrate and the nucleophile. The addition of NaOH changes the rate of the reaction.