Reg. No. | | | | | | | | | |

THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. Degree Programme

and Stand Alone Courses in Science - 2014/2015

CMU2221/CME4221 - Organic Chemistry 1

CONTINUOUS ASSESSMENT TEST II

Ques No.	Max.	Marks
MCQ	40	
1	60	
Total	100	

Sunday, 12th July 2015 14.30 – 15.30 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

Structured Essay Question

1. (a) If you were given the two solvents methanol and chloroform, which will be more suitable to carry out an S_N1 reaction? .....

Briefly give your reasoning.

.....

.....

(b) Consider the hydrolysis of 2-bromooctane in water.

(i) Give the mechanism of this reaction.

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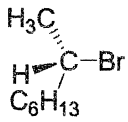
(ii) Explain why optically pure (*S*)-2-bromooctane loses its optical purity when reacted with water.



(*S*)-2-bromooctane

(iii) Give the structure of product with its stereochemistry when (*S*)-2-bromooctane is reacted with aq. NaOH in acetone.

(iv) Explain your answer to the above question.

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THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. Degree Programme and Stand Alone Courses in Science - 2014/2015

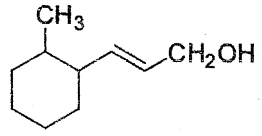
CMU2221/CME4221 - Organic Chemistry 1

CONTINUOUS ASSESSMENT TEST II – Multiple Choice Questions

Sunday 12th July 2015 14.30 – 15.30 hrs

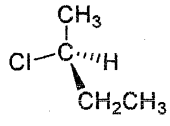
Instructions: Each correct answer carries **04 marks** while **01 mark** will be **deducted for each wrong answer**

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

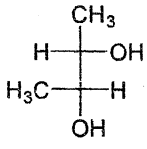


(1) 2 (2) 3 (3) 4 (4) 8 (5) 16

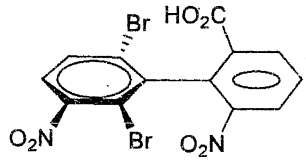
2. Which of the following compounds show optical activity?



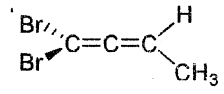
A



B



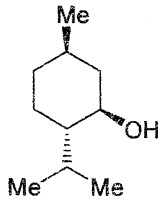
C



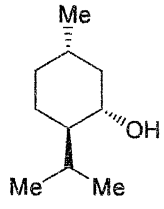
D

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

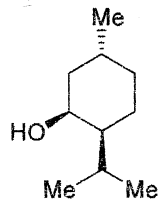
Questions 3 and 4 are based on the following structures.



A



B



C

3. Consider the following statements.
   (a) Structures **A** and **B** represent a pair of enantiomers.
   (b) Structures **B** and **C** represent a pair of enantiomers.
   (c) Structures **A** and **C** represent a pair of diastereomers.

   Correct statement/s is/are:

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

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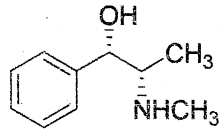
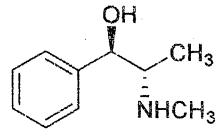
4. $[\alpha]_D$ value of **A** is -49^0. Select the **wrong** statement.
   (1) $[\alpha]_D$ value of **B** is $+49^0$.
   (2) $[\alpha]_D$ value of 1:1 mixture of **A** and **C** is 0^0.
   (3) $[\alpha]_D$ value of 1:1 mixture of **A** and **B** is 0^0.
   (4) $[\alpha]_D$ value of **C** cannot be predicted from the available data.
   (5) $[\alpha]_D$ value of 1:1 mixture of **B** and **C** cannot be predicted from the available data.

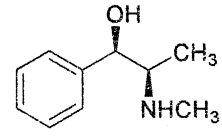
5. Consider the following compound **D**.

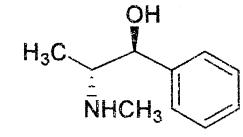


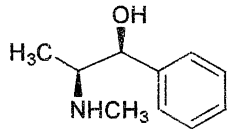
D

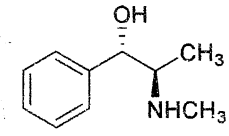
E is a diastereoisomer of **D**. Both **D** and **E** gave the same ketone on oxidation. Identify **E**.

(1) 

(2) 

(3) 

(4) 

(5) 

6. Select the **correct** statement regarding the following organic solvents.

Acetic acid (CH_3CO_2H)	Acetonitrile (MeCN)	Dimethylformamide ($HCONMe_2$)
Ethanol (EtOH)	Chloroform ($CHCl_3$)	

   (1) Dimethylformamide is a nonpolar protic solvent
   (2) Chloroform and ethanol are polar protic solvents
   (3) Acetic acid is a polar aprotic solvent
   (4) Acetonitrile is a polar aprotic solvent
   (5) Dimethylformamide is a nonpolar aprotic solvent

7. Consider the following statements.

   (a) Carbocations are more stabilized in EtOH than in acetone.
   (b) S_N2 reactions are favoured in MeOH than in dimethyl sulfoxide (DMSO).
   (c) S_N1 reactions **always** occur with rearrangement.

   Correct statement/s is/are,

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

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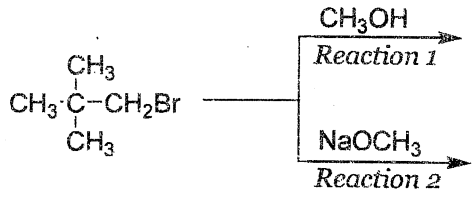
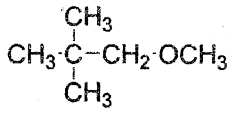
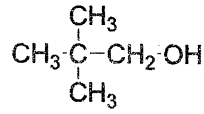
8. Consider the following two reactions and the compounds **A**, **B** and **C** given below.

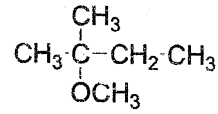




A



B

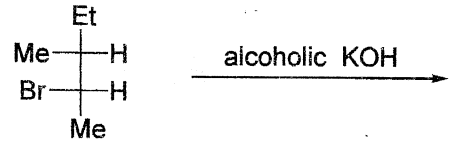


C

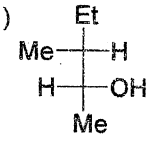
Select the correct statement.

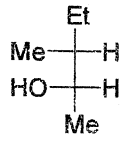
(1) Products of both reactions 1 and 2 are the same and it is **A**.
(2) Products of both reactions 1 and 2 are the same and it is **B**.
(3) Product of reaction 1 is **A** and product of reaction 2 is **B**.
(4) Product of reaction 1 is **C** and product of reaction 2 is **B**.
(5) Product of reaction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

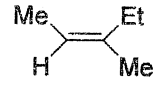
9. Consider the following reaction.

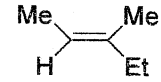


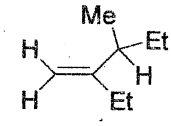
Major product of this reaction is,

(1) 

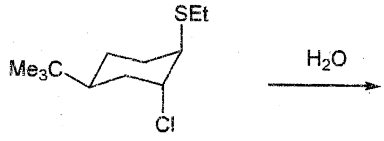
(2) 

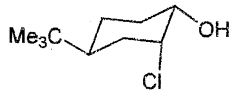
(3) 

(4) 

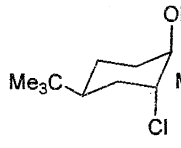
(5) 

10. Consider the following reaction and compounds **A** – **F** given below.

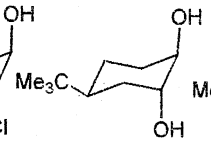




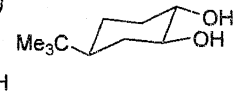
(A)



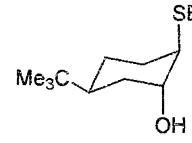
(B)



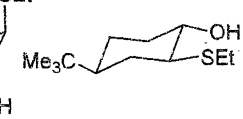
(C)



(D)



(E)



(F)

Products formed are,

(1) **(A)** and **(B)** (2) **(C)** and **(D)** (3) **(E)** and **(F)** (4) **(A)** and **(E)** (5) **(A)** **(B)** and **(E)**

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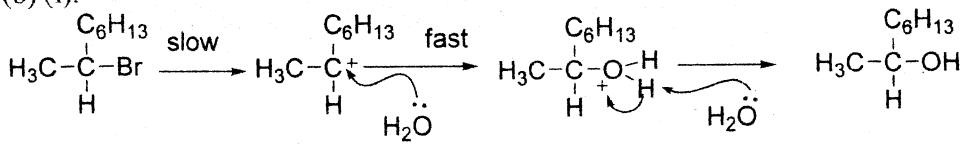
CMU2221/CME4221 - Organic Chemistry 1 Answer Guide - CAT II

Answers for MCQ.

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

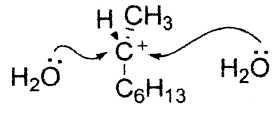
1. (a) methanol;
In S_N1 reactions a carbocation is formed. MeOH is a polar protics olvent and it stabilizes the carbocation which is favourable for S_N1. .....(Unit II, p.35)

(b) (i).



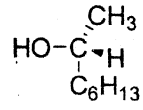
.....(Unit II, p.19)

(ii)Reaction takes place via S_N1 mechanism where a carbocation is formed.



Nucleophile (H_2O) can attack the carbocation from both sides. Therefore both R and S isomers are formed (racemization). Hence the optical purity is lost. ....(Unit I, p. 26-29 ; Unit II p.23,24)

1. (iii)



(R) ; Inversion of configuration takes place. ..... (Unit II, p. 30-34)

(iv) OH^- is a negatively charged strong nucleophile. Acetone is a polar aprotic solvent. Reaction takes place via S_N2 pathway. S_N2 mechanism leads to inversion of configuration.

..... (Unit II, p. 30-34)