



THE OPEN UNIVERSITY OF SRI LANKA
B. Sc. Degree / Stand Alone Courses in Science 2006/2007
Organic Chemistry CHU 2221/CHE 4221
Assignment Test II
Duration: 1 ½ Hrs

Date. Tuesday, 6th March 2007

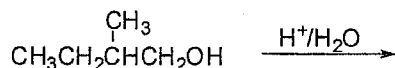
Time. 3.30 pm - 5.00 pm

Maximum marks allocated to this paper are 105. However a candidate who scores 100 marks or above will be awarded 100% and those scoring less will be awarded the score they make.

Answer all questions.

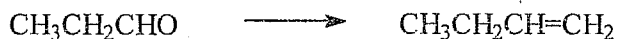
Part A

1. What is the major product of the following reaction?



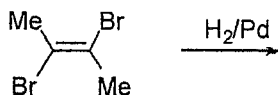
- (1) $\text{CH}_3\text{CH}=\text{CHCH}_3$ (2) $\text{CH}_3\text{CH}_2\text{CH}=\text{CHCH}_3$ (3) $\text{CH}_3\text{CH}=\text{C}(\text{CH}_3)_2$
(4) $\text{CH}_3\text{CH}_2\overset{\text{CH}_3}{\text{C}}=\text{CH}_2$ (5) none of the above

2. What is the best set of reagents to carry out the following reaction?



- (1) (i) MeMgBr (ii) $\text{H}^+/\text{H}_2\text{O}$ (iii) alcoholic KOH/Δ
(2) (i) MeMgBr (ii) $\text{H}^+/\text{H}_2\text{O}$ (iii) conc. $\text{H}_2\text{SO}_4/\Delta$
(3) $\text{CH}_2=\text{PPh}_3$
(4) Both the reagent sets (2) and (3) are equally good
(5) All three reagent sets (1) (2) and (3) are equally good

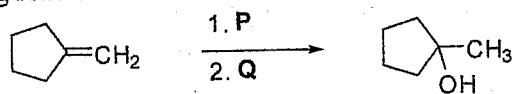
3. Consider the following reaction



The product of this reaction is

- (1) A racemic mixture of 2,3-dibromobutane
(2) *Meso*-2,3-dibromobutane
(3) All three stereoisomers of 2,3-dibromobutane
(4) One of the optically active 2,3-dibromo butane
(5) A diastereoisomeric mixture of 2,3-dibromobutane

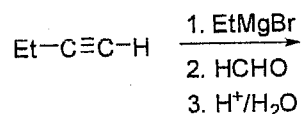
4. Consider the following reaction.



The reagents P and Q respectively are:

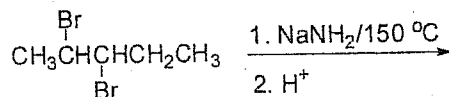
1. HBr and $\text{H}^+/\text{H}_2\text{O}$
2. Conc. $\text{H}_2\text{SO}_4/0^\circ\text{C}$ and $\text{H}_2\text{O}/50^\circ\text{C}$
3. $(\text{BH}_3)_2$ and $\text{H}^+/\text{H}_2\text{O}$
4. $(\text{BH}_3)_2$ and $\text{H}^+/\text{H}_2\text{O}_2$
5. $(\text{BH}_3)_2$ and $\text{OH}^-/\text{H}_2\text{O}_2$

5. What is the major product of the following reaction?



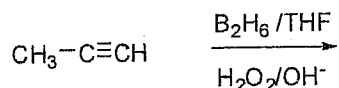
1. $\text{Et}-\text{C}\equiv\text{C}-\text{Et}$
2. $\text{Et}-\text{C}\equiv\text{C}-\text{CH}_2\text{OMgBr}$
3. $\text{Et}-\text{C}\equiv\text{C}-\text{CH}_2\text{OEt}$
4. $\text{Et}-\text{C}\equiv\text{C}-\text{CH}_2\text{OH}$
5. $\text{Et}-\text{C}\equiv\text{C}-\text{MgBr}$

6. What is the major product of the following reaction?



1. $\text{CH}_3\overset{\text{NH}_2}{\underset{\text{NH}_2}{\text{C}}}\text{HCH}_2\text{CH}_2\text{CH}_3$
2. $\text{CH}_3\overset{\text{NH}_2}{\text{C}}\text{HCH}_2\text{CH}_2\text{CH}_3$
3. $\text{CH}_3-\text{C}\equiv\text{C}-\text{CH}_2\text{CH}_3$
4. $\text{H}-\text{C}\equiv\text{C}-\text{CH}_2\text{CH}_2\text{CH}_3$
5. $\text{CH}_3-\text{CH}=\text{C}=\text{CH}-\text{CH}_3$

7. What is the most possible product of the following reaction?



1. $\text{CH}_3\text{CH}_2\text{CHO}$
2. CH_3COCH_3
3. $\text{CH}_3\text{CH}=\text{CHOH}$
4. $\text{CH}_3-\overset{\text{OH}}{\text{C}}=\text{CH}_2$
5. $\text{CH}_3-\overset{\text{BH}_2}{\text{C}}=\text{CH}_2$

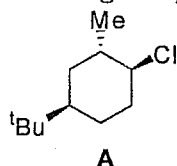
8. Consider the following statements regarding the $\text{S}_\text{N}2$ reactions?

- (a) Primary alkyl halides undergo $\text{S}_\text{N}2$ reactions faster than tertiary alkyl halides
- (b) $\text{S}_\text{N}2$ reactions occur in a single step
- (c) Secondary alkyl halides undergo $\text{S}_\text{N}2$ reactions slower than tertiary alkyl halides

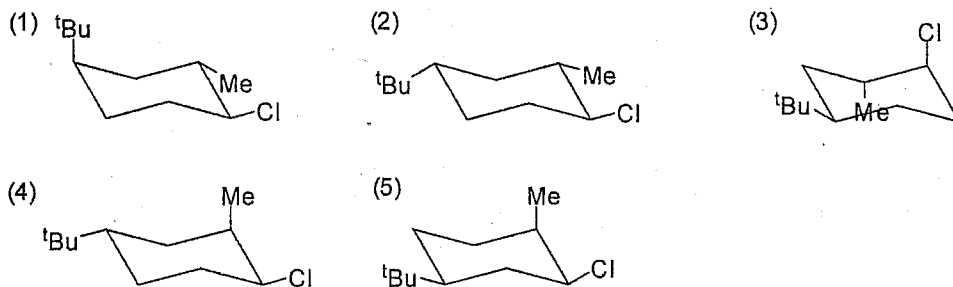
The correct statement(s) is(are): -

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

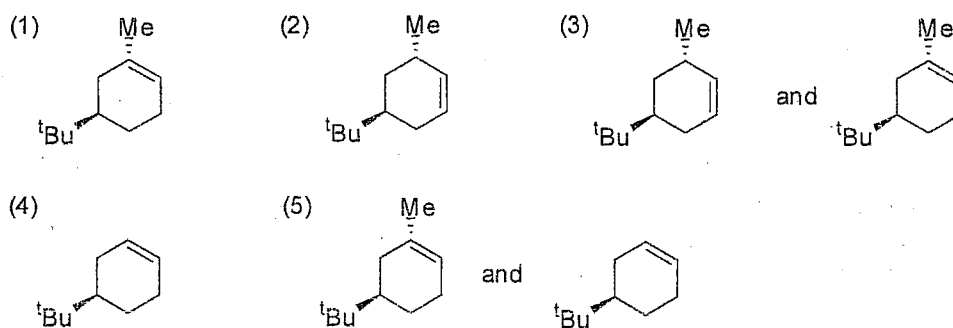
Questions 9 and 10 are based on the following compound A



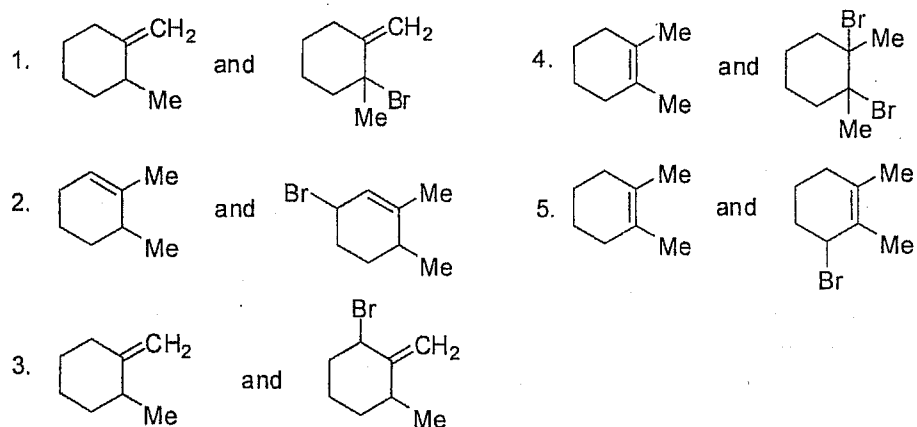
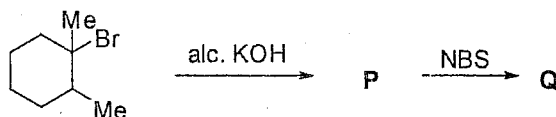
9. What is the most stable conformation of A



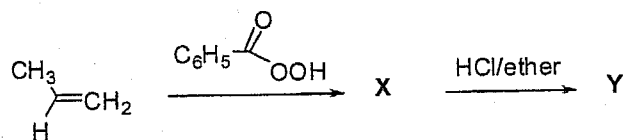
10. What is/are the possible product(s) when A is treated with alcoholic KOH?



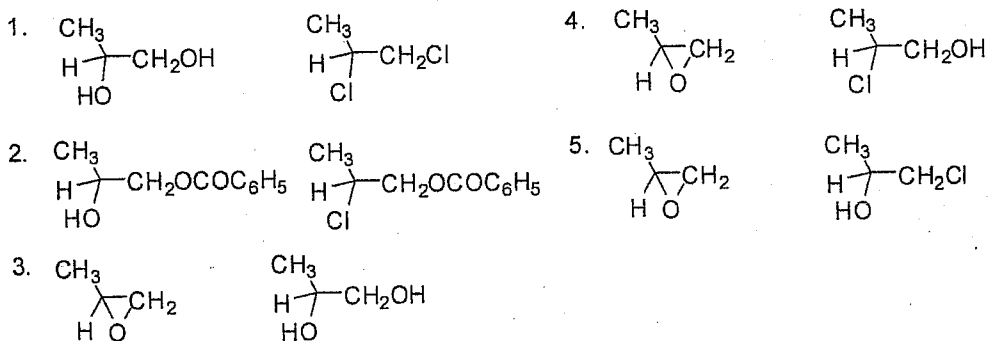
11. What are the product P and Q of the following reaction sequence, respectively?



12. Consider the following reaction



The structures of the major products X and Y respectively are



13. Consider the following statements regarding E1 reactions.

- E1 reactions are stereospecific
- Rate of E1 reactions depends only on the concentration of the substrate.
- Rearrangements are not possible with E1 reaction

The correct statement(s) is(are): -

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

14. Which of the following statements is true regarding nucleophilic substitution reactions?

- $\text{S}_{\text{N}}1$ reactions occur with 100% racemisation.
- Strong nucleophiles favour the $\text{S}_{\text{N}}1$ mechanism
- Non polar solvents favour the $\text{S}_{\text{N}}1$ mechanism
- Rates of $\text{S}_{\text{N}}2$ reactions are largely affected by steric effects.
- $\text{S}_{\text{N}}2$ reactions occur with racemisation.

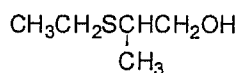
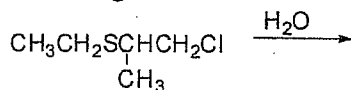
15. Consider the following statements regarding $\text{S}_{\text{N}}2$ reactions

- Rate of $\text{S}_{\text{N}}2$ reactions depends only on the concentration of the substrate.
- Rate of $\text{S}_{\text{N}}2$ reactions depends on the concentration of the substrate and the base.
- Rearrangements are not possible with $\text{S}_{\text{N}}2$ reaction

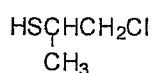
The correct statements are: -

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

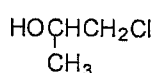
16. What are the products of the following reaction?



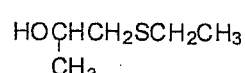
A



B



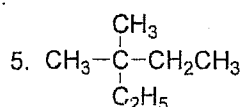
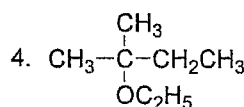
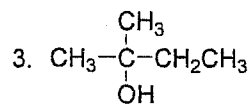
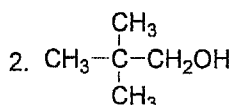
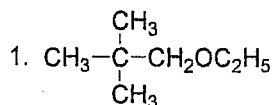
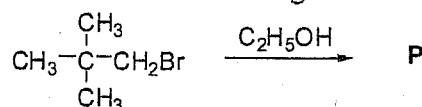
C



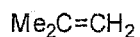
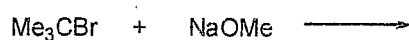
D

1. A and B 2. B and C 3. C and D 4. A and D 5. B and D

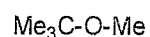
17. What is the structure of product P of the following reaction?



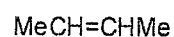
18. What is/are the product/s of the following reaction?



P



Q



R

1. P 2. Q 3. R 4. P and R 5. Q and R

19. Consider the following statements regarding ethers.

- (a) Intermolecular H bonds can form between ether molecules.
 (b) Ethers could not be cleaved by conc. KOH
 (c) Ethers do not react with conc. HI.

The correct statement(s) is(are):

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

20. Consider the following statements.

- (a) *Para* nitro phenol is less water soluble than *ortho* nitro phenol
 (b) Acetone has a higher boiling point than butane
 (c) Acetone cannot form H-bonds with methanol

The correct statement(s) is(are):

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