

KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2011/2012

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE

SCH 207N FUNDAMENTALS OF CARBONYL COMPOUNDS AND AMINES

DATE: THURSDAY, 29TH MARCH 2012

TIME: 11.00 A.M. – 1.00 P.M.

INSTRUCTIONS: Answer All Questions

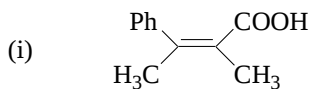
Q1.

- (a) Draw structures of each of the following compounds including stereochemistry where appropriate.

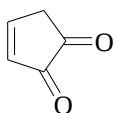
- (i) 4-Chloro-5-hydroxy-2-phenyl-3-hexanone
- (ii) (2-Bromophenyl)ethanoic acid
- (iii) 3-amino-2-butenal
- (iv) (*Cis*)-Ethyl 2-butenate
- (v) Propanoic 3-methylpentanoic acid anhydride
- (vi) *N,N*-Diethyl-4-iodo-2,2-dimethylpentanamine

[10 Marks]

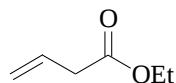
- (b) Write systematic names for the following compounds including stereochemistry where appropriate.



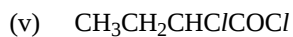
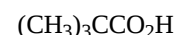
(ii)



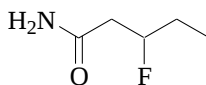
(iii)



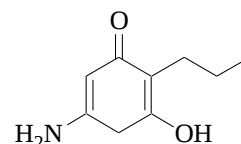
(iv)



(vi)



(vii)



[7 Marks]

(c) Explain the following using the appropriate equations and or structures

(i) Methanal is more reactive than acetone towards nucleophilic addition reactions.

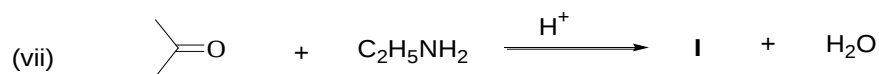
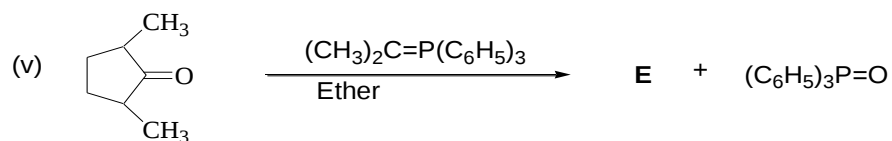
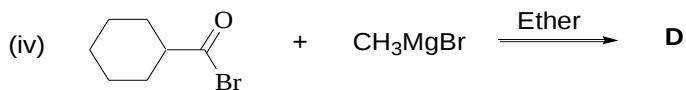
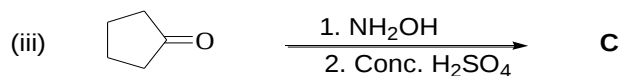
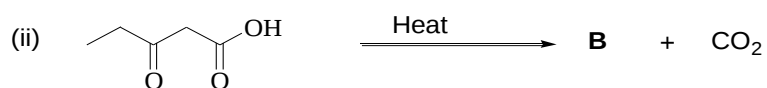
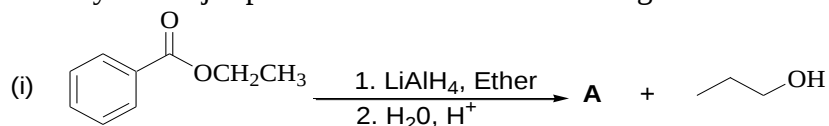
(ii) Ethanedioic acid has a higher boiling point than ethanoic acid.

(iii) Amines are more basic than amides and the basicity of depends on the number of alkyl groups attached to nitrogen.

[7 Marks]

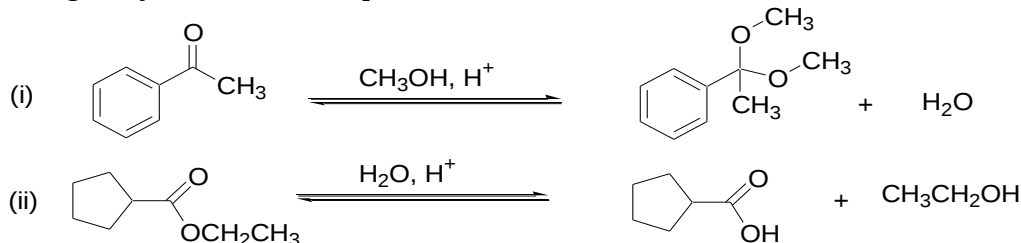
Q2.

(a) Identify the major products A to J in the following transformations.



[7 Marks]

(b) Using curly arrows, write a possible mechanism for the reactions.



[10 Marks]

Q3.

(a) Using structures, equations or mechanisms where appropriate, explain each of the following terms as applied in the study of carbohydrates and proteins.

- (i) Mutarotation
- (ii) Zwitterion
- (iii) Sickle cell anemia
- (iv) Galactosemia

[8 Marks]

(b) Give at least two differences between each of the following pairs.

- (i) Polysaccharides and proteins
- (ii) Cellobiose and lactose
- (iii) Collagens and fibrinogens
- (iv) Amylose and glycogen
- (v) Nucleotide and nucleosides

[10 Marks]

Q4.

(a) Explain the following statements by use of appropriate examples.

- (i) D-fructose is a reducing sugar yet it is a ketose.
- (ii) Lactose is reducing sugars while sucrose is not.

[6 Marks]

(i) Outline reaction scheme for transformations D-lyxose to D-galactose.

[5 Marks]

