

CONFIDENTIAL



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2013/2014**

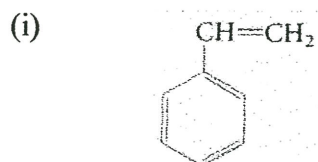
COURSE NAME : ORGANIC CHEMISTRY
COURSE CODE : DAS 22503
PROGRAMME : 2 DAU
EXAMINATION DATE : DECEMBER 2013/JANUARY 2014
DURATION : 2½ HOURS
INSTRUCTION : A) ANSWER ALL QUESTIONS
IN SECTION A
B) ANSWER TWO (2)
QUESTION ONLY IN
SECTION B

THIS QUESTION PAPER CONSISTS OF NINE (9) PAGES

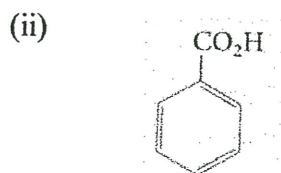
CONFIDENTIAL

SECTION A

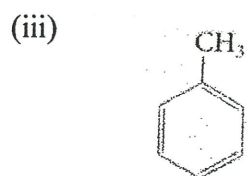
Q1 (a) Name the following aromatic compounds.



(1 mark)



(1 mark)



(1 mark)

(b) Write the structural formula for benzaldehyde and phenol.

(2 marks)

(c) Draw all possible contributing structures to the carbocation intermediate in the bromination of

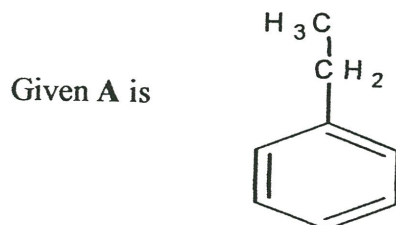
(i) Benzene

(5 marks)

(ii) Chlorobenzene

(5 marks)

- (d) A hydrocarbon A, C_8H_{10} is oxidized to form carboxylic acid, B. esterification of B with ethanol forms ethylbenzoate. A gives 2 products, C and D upon monobromination with Br_2 in uv light. The major product, D again undergo chlorination reaction in the presence of $FeCl_3$ catalyst to forms 2 compounds, E and F.



- (i) Draw the mechanism of this reaction.

(5 marks)

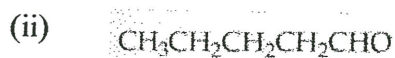
- (ii) Suggest the molecular structure of B, C, D, E, and F

(5 marks)

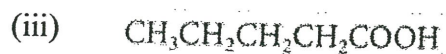
- Q2 (a) Identify the functional group in the following compounds and name them according to IUPAC.



(2 marks)



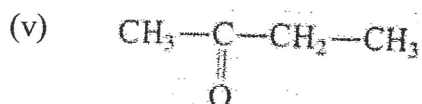
(2 marks)



(2 marks)



(2 marks)



(2 marks)

(b) Amino acids are the basic structural units or building blocks of protein.

(i) Name the two functional groups present in amino acids.

(2 marks)

(ii) Describe the reaction involved in the synthesis of dipeptide

(3 marks)

(c) Define the following :

(i) Carbohydrates

(2 marks)

(ii) Monosaccharides

(2 marks)

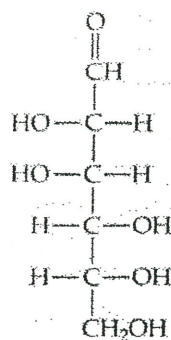
(iii) Disaccharides

(2 marks)

(iv) Polysaccharides

(2 marks)

(d) Given the structural formula for the linear form of D-mannose:

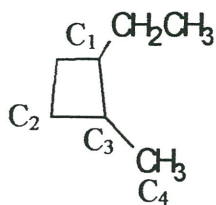


Redraw the structure, number the carbons and determine which carbon atoms are chiral.

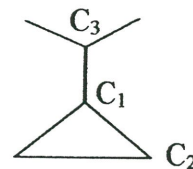
(2 marks)

SECTION B

Q3 (a)



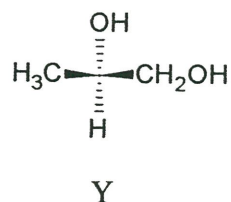
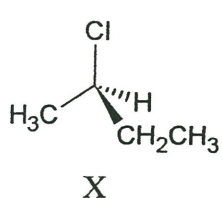
A



B

- (i) Classify the carbons labeled C_1 , C_2 , C_3 and C_4 in the given compound A and B. Explain your answer. (7 marks)
- (ii) Convert the given compound A and B to expanded structural formula (2 marks)
- (b) X, C_3H_5Br , and Y, $C_2H_2Cl_2$ are an unsaturated organic compound.
- (i) Define the term unsaturated organic compound. (2 marks)
- (ii) Draw a possible structural formula X and Y which can exhibit *cis* – *trans* isomerism. (4 marks)
- (iii) Write the name of compound Y. (1 mark)

(c) Draw stereorepresentations for each pair of enantiomers.



(i) Draw stereorepresentations for each pair of enantiomers.

(4 marks)

(ii) Give each molecule (X and Y) and IUPAC name.

(2 marks)

(d) Define the term

(i) Stereoisomer

(2 marks)

(ii) Meso compound

(1 mark)

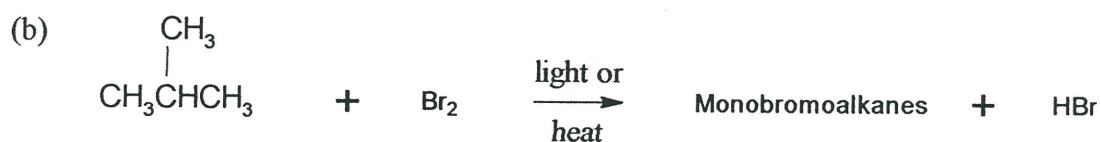
Q4 (a) Butane Decane Hexane

(i) Convert the given alkanes to skeletal structures.

(3 marks)

(ii) Arrange the given alkanes in each set in order of increasing boiling point. Justify your answer.

(3 marks)



(i) Name and draw structural formulas for all monobromination products formed by treatment of 2-methylpropane with Br₂.

(6 marks)

(ii) Predict the major product. State your answer.

(3 marks)



(i) Draw structural formulas for the two possible products of this reaction.

(2 marks)

(ii) Predict the major product by using Markovnikov's rule.

(2 marks)

(iii) Name the process of this reaction.

(1 mark)

(d) Define the term:

(i) Nucleophile

(1 mark)

(ii) Electrophile

(1 mark)

(iii) Homolytic cleavage

(2 marks)

(iv) Heterolytic cleavage

(1 mark)

Q5 (a) Name the commercial application of catalytic hydrogenation of alkenes.

(2 marks)

(b) Write an equation, draw the structure and name the compound formed from the reaction of $\text{CH}_2=\text{CHCH}_2\text{CH}_3$ with the following reagents :

(i) Hydrogen chloride, HCl

(3 marks)

(ii) Bromine, Br_2

(2 marks)

(iii) Hydrogen (Pt catalyst)

(3 marks)

(iv) H_2O (H^+)

(3 marks)

(v) KMnO_4 (OH^-)

(3 marks)

- (c) Write a complete reaction mechanism for the addition of HCl to 1-butyne.
(5 marks)
- (d) Discuss the free radical polymerization of ethylene, C_2H_4 to produce polyethylene.
(4 marks)

- END OF QUESTION -