



**FACULTY OF INDUSTRIAL SCIENCES & TECHNOLOGY
FINAL EXAMINATION**

COURSE	:	ORGANIC CHEMISTRY I
COURSE CODE	:	BSK1103
LECTURER	:	AZHARI HAMID NOUR ABDUELRAHMAN
DATE	:	6 JANUARY 2014
DURATION	:	3 HOURS
SESSION/SEMESTER	:	SESSION 2013/2014 SEMESTER I
PROGRAMME CODE	:	BSK

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of **FOUR (4)** questions. Answer **ALL** questions.
2. All answers to a new question should start on new page.
3. Candidates are not allowed to bring any material other than those allowed by the invigilator into the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This examination paper consists of **SIX (6)** printed pages including front page.

QUESTION 1

(a) Choose the best answer:

(1) Optically active molecules which rotate plane-polarized light in a counter clockwise direction are said to be

- (i) Levorotary
- (ii) of R configuration
- (iii) dextrorotary
- (iv) of S configuration

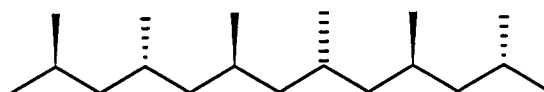
(2) Lactose is composed of:

- (i) One fructose + one glucose units
- (ii) One galactose + one glucose units
- (iii) Two glucose units
- (iv) Two fructose units

(3) Amylose is a polysaccharide with a _____ linkage.

- (i) β -1,4'-glycosidic
- (ii) α -1,4'-glycosidic
- (iii) β -1,6'-glycosidic
- (iv) α -1,6'-glycosidic

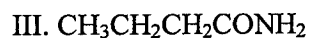
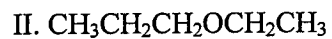
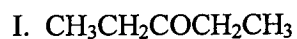
(4) Which of the following best describes the polymer chain shown below?



- (i) Atactic polypropylene
- (ii) Isotactic polypropylene
- (iii) Syndiotactic polypropylene
- (iv) Cross-linked polypropylene

(4 Marks)

(b) Given below are group of compounds



(i) Which compound has the highest boiling point?

(2 Marks)

(ii) Explain why the compound has the highest boiling point

(6 Marks)

(c) Calculate the degree of unsaturation in compound C_6H_4

(5 Marks)

(d) Draw the structure of a compound representing each of the following classes:

(i) Imine

(ii) Hemiacetal

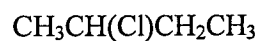
(iii) Enamine

(9 Marks)

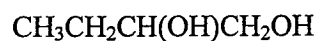
QUESTION 2

(a) Locate the stereogenic center in each compound and draw both enantiomers

(i)

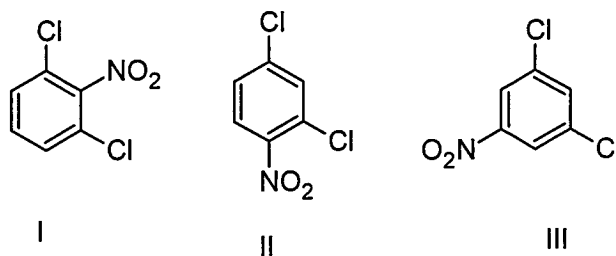


(ii)



(6 Marks)

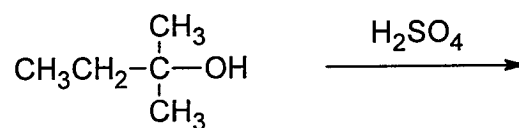
- (b) What would you expect to be the **major** product obtained from the mononitration of m-dichlorobenzene; give a rationale?



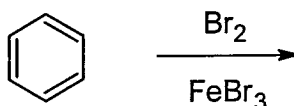
(4 Marks)

- (c) Given below are two types of chemical reactions (A & B)

A.



B.



- (i) What is the main product in each reaction (A & B)

(6 Marks)

- (ii) Draw a stepwise mechanism for each reaction (A & B)

(6 Marks)

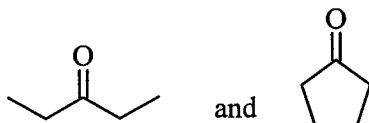
QUESTION 3

- (a) Briefly explain on the industrial application of the alcohols (as raw materials used by the chemical industry), with an example.

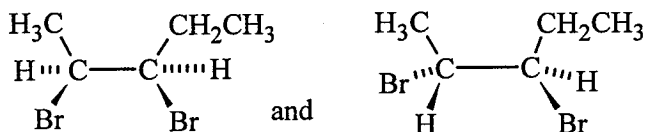
(5 Marks)

(b) Specify the isomeric relationship between the following pairs of compounds, if any:

(i)

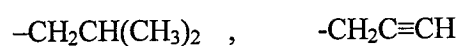


(ii)



(c) Which member in each pair is assigned the higher priority in R, S nomenclature?

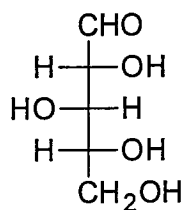
(i)



(ii)



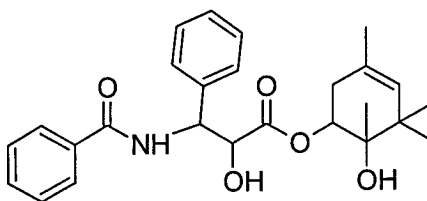
(d) How many possible stereoisomers are there of the following compound?



(e) The negative environmental impact of polymer synthesis has prompted the development of Green Polymer Synthesis; mention three points on approaches which are more environmentally benign (friendly) to synthesize polymers.

(6 Marks)

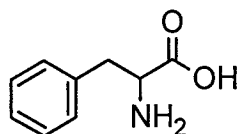
- (f) Locate the chiral centres in compound below



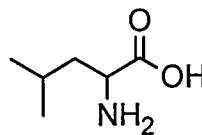
(4 Marks)

QUESTION 4

- (a) Given the following two amino acids



Phenylalanine



Leucine

- (i) Draw the structures of the four different dipeptides that could be formed from them. Name the dipeptides formed.
- (8 Marks)
- (ii) Show a controlled synthetic scheme that would lead to the formation of only the dipeptide phe-leu.
- (12 Marks)
- (b) Briefly explain how the secondary and tertiary structures of a protein are stabilized (the nature of the forces involved).
- (4 Marks)

END OF QUESTION PAPER