THE OPEN UNIVERSITY OF SRI LANKA
B.Sc DEGREE PROGRAMME – 2008/09 – LEVEL 3
FINAL EXAMINATION

CHU 1140/CHE 3140/NSU 1140 – INTRODUCTION TO BIOCEMISTRY & BIOPHYSICS

DURATION : TWO (02) HOURS

Date: 12th January 2009 Time: 1.00 p.m. – 3.00 p.m

**Instructions to candidates**

**This question paper consists of two parts: Part A and Part B. Each part consists of three questions. You are required to answer four questions in all choosing two questions from each part. Answer Part A and Part B in separate books.**

## PART A - BIOCHEMISTRY

01. (a) Name five (05) trace elements that are important for the proper functioning of living cells. Indicate their functions.

(15 marks)

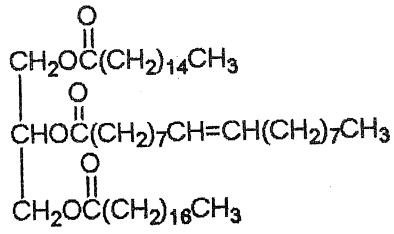
(b) i. What are the main differences between plant and animal cells?

(15 marks)

ii. What is the "Power House" of an eukaryotic cell? Describe its structure and function.

(20 marks)

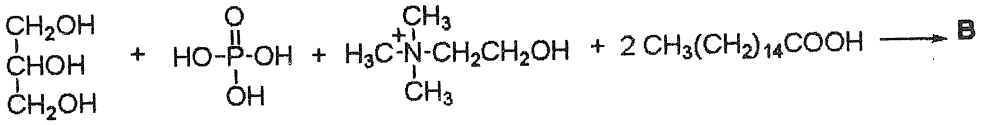
(c) i. Give the balanced equation for the reaction involved when the triglyceride (A) is completely saponified.



(A)

(15 marks)

ii. Identify the product B obtained from the following reaction.



(10 marks)

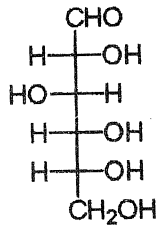
(d) i. Explain briefly why the following steroids are biologically important.
(1) bile acids.
(ii) aldosterone

(10 marks)

ii.Explain the chemistry involved in the action of soap as a cleansing agent?

(15 marks)

02. (a) Draw the Haworth formula of
i. β-D-glucopyranose.
ii. Methyl α-D-glucopyranoside.



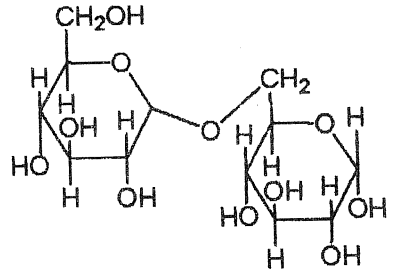
Glucose (C)

(20 marks)

(b) Explain the following terms using glucose (C) as the example.
i. anomer.
ii. mutarotaion

(20 marks)

(c) i. State the glycosidic linkage in disaccharide D.



D

(10 marks)

ii. Will the compound D answer Benedict's test? Explain.

(20 marks)

iii. Draw the structure of the products obtained when D is subjected to acid hydrolysis.

(10 marks)

(d) Describe briefly the structural features in starch.
N.B. You need not draw its structure.

(20 marks)

03. (a) i. Calculate the isoelectric point of an amino acid X given that its $pKa_1$ and $pKa_2$ values are 2.3 and 9.7 respectively.

(10 marks)

ii. What is the net charge of X at the isoelectric point?

(05 marks)

(b) i. Write the full name of the peptide F given below.

(10 marks)

ii. Identify the N-terminal and C-terminal amino acid of F.

Ala-Phe-Ser-Pro-Gly
F

(10 marks)

(c) i. Describe briefly the different types of secondary structures found in protein.

(20 marks)

ii. Explain what is meant by denaturation of protein.

(10 marks)

(d) i. What are different types of nucleosides present in DNA?

(10 marks)

ii. Explain briefly the characteristics of secondary structure of DNA.

(15 marks)

iii. Write down the complementary sequence of the following nucleotide chain.

5'GGATCATC3'

(10 marks)