CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ

Autumn Examination 2014

Module Title: Biomolecules and Cells (CA)

Module Code: **BIOL6007**

School: Science

Programme Title: **BSc in Applied Biosciences& Biotechnology**
BSc Hons Pharmaceutical Biotechnology
BSc Hons in Nutrition and Health science
BSc Analytical & Pharmaceutical Chemistry
BSc Hons in Analytical Chemistry

Programme Code:

SPBHI_8_Y1
SBIOS_7_ Y1
SNHSC_8_Y1
SCHQA_8_ Y1
SCHEM_7_ Y1
SESST_8_Y1

External Examiner(s): **Dr Tom O'Connor**

Internal Examiner(s): **Ms Margaret Lane**
Ms Anne Ward
Ms Richenda Kiernan

Instructions: **Answer 4 Questions.**
Question 1 is compulsory.

Duration: 2 Hours

Sitting: Autumn 2014

Requirements for this examination:

Note to Candidates: Please check the Programme Title and the Module Title to ensure that you have received the correct examination paper.
If in doubt please contact an Invigilator.

Q1 is Compulsory

Q1.Answer all parts (total 25 marks)

Q1

(a) Use the data below to construct a standard graph (on graph paper)of the concentration of protein (%) versus absorbance at (540nm) and answer the following questions. Use appropriate headings and labels on the graph.

Tube No.	Protein std (mls)	Water (mls)	Protein conc (%)	Absorbance (540 nm)
1	0	0	0.00	0
2	0.1	0.5	0.2	0.1
3	0.2	0.4	0.4	0.2
4	0.3	0.3	0.6	0.3
5	0.4	0.2	0.8	0.4
6	0.5	0.1	1	0.5

(10 marks)

(b) Using your graph determine and show on the graph the concentration of protein present in sample A which gives absorbance readings of 0.15 and sample B which gives an absorbance reading of 0.35 on your standard graph.

(4 marks)

(c) Suggest a reagent that could be used to produce a colour when added to protein.

(1 mark)

(d) What is the purpose of tube no 1 in this experiment.

(4 marks)

(e) What is the total magnification possible using the compound light microscopes you used during your laboratory sessions.

(1 mark)

(f) What samples are viewed using oil immersion?

(1 mark)

(g) State a reagent you would use to determine if the following substances are present in a solution.

(ii)Glucose

(iii)Starch

(2 marks)

(h) What is TLC?

(2 marks)

Q2

(a) Transcribe and complete the following table in your answer book.

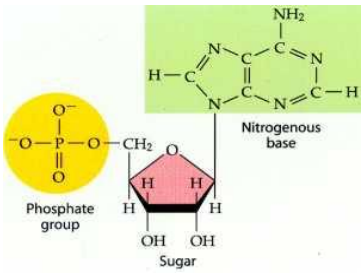
Category	Example	Subunits
Lipids		
Proteins		
Carbohydrate		
Nucleic acids		

(8 marks)

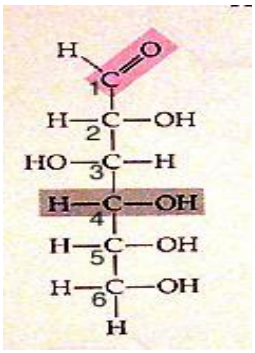
(b) Describe with the aid of a diagram the synthesis of any macromolecule from its subunits and describe the reaction that takes place. (7 marks)

(c) Identify each of the following structures.

(i)



(ii)



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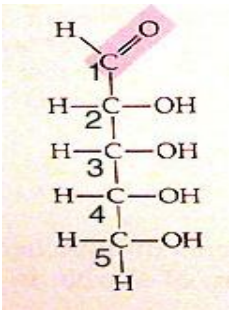

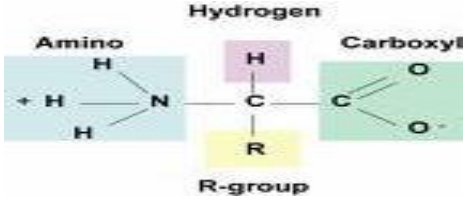

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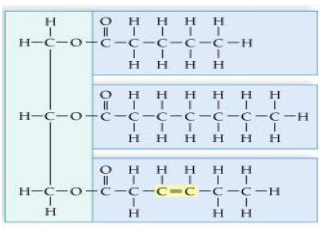

(v)

(10 marks)

Q3

(a) List 3 differences between Eukaryotic and Prokaryotic cells

(6 marks)

(b) Draw a labelled diagram of a prokaryotic cell and briefly explain the function of each structure

(19 marks)

Q4.

(a) List and briefly describe in the order in which they are involved, the organelles involved in the synthesis and export from a cell of phosphorylated glycoprotein.

(10 marks)

(b) List the components of the cytoskeleton

(6 marks)

(c) List the functions of the plasma membrane

(9 marks)

OR

(a) Using diagrams for illustration, write an overview of the structure and function of the cellular organelles found in the endomembrane system.

(10 marks)

(b) What is the structure of the flagellum in eukaryotic cells (6 marks)

(c) Draw a labelled diagram of either the mitochondria or chloroplast (9 marks)

Q5

(a) What is the cell cycle?

(5 marks)

(b) List the 5 phases in the cell cycle.

(5 marks)

(c) List the stages during the cell cycle where the cycle is controlled and name two proteins involved in controlling the cell cycle

(5 marks)

(d) Define what is meant by Apoptosis

(5 marks)

(e) List the main differences between cancer cells and normal cells.

(5 marks)

Q6

(a) List the six functions of proteins and give an example of each. (12 marks)

(b) Describe the four levels of protein structure (8 marks)

(c) Compare the structure and function of DNA and RNA (5 marks)