

**CORK INSTITUTE OF TECHNOLOGY
INSTITIÚID TEICNEOLAÍOCHTA CHORCAÍ**

Autumn Examinations 2015

Module Title: Human Anatomy and Physiology – CA

Module Code: PHOL6006

School: Science and Informatics

Programme Title(s): Bachelor of Science (Honours) Herbal Science – Year 1
Bachelor of Science (Honours) Nutrition and Health Science – Year 1
Bachelor of Science (Honours) Pharmaceutical Biotechnology – Year 1
Bachelor of Science Applied Biosciences – Year 1

Programmes Code(s): SHERB_8_Y1
SNHSC_8_Y1
SPHB1_8_Y1
SBIOS_7_Y1

External Examiner(s): Prof Olivia Corcoran

Internal Examiner(s): Dr Fiona O'Halloran
Dr Aoife McCarthy
Ms Deirdre Ni Bhuachalla

Instructions: Answer question one **and** three other questions.
All questions carry equal marks.

Duration: 2 hours

Sitting: Autumn 2015

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. If in doubt please contact an Invigilator.

Q1. (compulsory). Answer all parts.

- (a) What is an enzyme? Name two digestive enzymes.
- (b) Name a reagent that can be used to test for the following carbohydrates and describe the colour reaction that occurs in each case
- (i) Maltose
 - (ii) Starch
- (c) Differentiate between negative and positive experimental control samples and explain briefly why controls are important in laboratory experiments.
- (d) Draw a labelled diagram of a nephron.
- (e) Name five types of white blood cells and list one function of each cell type.
- (f) Based on the following ABO red blood cell types, name the compatible antibodies that are present in blood plasma
- (i) Blood type A
 - (ii) Blood type B
 - (iii) Blood type AB
 - (iv) Blood type O
- (g) Define the following terms:
- (i) Body mass index
 - (ii) Basal metabolic rate

- (h) The blood glucose levels were investigated for two patients (A and B) using the glucose hexokinase assay and the following absorbance data were recorded.
- (i) Using the data determine the concentration of glucose in each patient sample.
 - (ii) Using the normal adult glucose reference range briefly comment on the patients results

<u>Test Sample</u>	<u>Absorbance @340nm</u>
Patient A	0.47
Patient B	0.32
Glucose standard	0.60

Glucose standard concentration: 5.5 mmol/l

Normal adult glucose reference range: 4.0-7.0 mmol/l

(20 marks)

Q2.

- (a) The gastrointestinal tract is composed of four main tissue layers. Name each tissue layer and describe each of the tissue types.

(8 marks)

- (b) Describe the digestion mechanisms, both mechanical and chemical, that occur in the stomach.

(8 marks)

- (c) List two important functions of the large intestine.

(4 marks)

Q3.

- (a) Describe the two lines of defence of the non-specific innate immune system.
(10 marks)
- (b) List two key differences between the innate and the adaptive immune system.
(4 marks)
- (c) Write a short note on the function of lymphocytes in the immune system.
(6 marks)

Q4.

- (a) Distinguish between systemic and pulmonary circulatory pathways.
(5 marks)
- (b) Using a diagram describe the sequence of events that occurs in the cardiac cycle to produce a heartbeat.
(15 marks)

Q5.

- (a) List and describe the three types of neurons.
(6 marks)
- (b) Describe, with the aid of a labelled diagram, how a change in membrane potential can result in a nerve impulse.
(14 marks)

Q6.

The female menstrual cycle can be described by changes occurring in the follicles of the ovary and in the lining of the uterus. Write an essay on the menstrual cycle under the following headings:

- The three phases of the ovarian cycle
- Hormonal control of the ovarian cycle
- Structural changes that occur during the uterine cycle

(20 marks)