UNIVERSITY OF JOHANNESBURG

PROGRAM	:	*BIOMEDICAL TECHNOLOGY*
SUBJECT	:	**ANATOMY AND PHYSIOLOGY 1**
CODE	:	**APA 1111**
DATE	:	MID-YEAR EXAMINATION 10 JUNE 2017
DURATION	:	08:30 – 11:30
WEIGHT	:	50: 50
TOTAL MARKS	:	130
EXAMINER	:	MS R. DANGAREMBIZI
MODERATOR	:	MRS A. KADER
NUMBER OF PAGES	:	08 PAGES

INSTRUCTIONS	:	THIS QUESTION PAPER MUST BE RETURNED WITH THE MULTIPLE CHOICE ANSWER SHEET AND THE EXAMINATION SCRIPTS

REQUIREMENTS	:	1 x EXAMINATION SCRIPT 1 x MULTIPLE CHOICE ANSWER SHEET

INSTRUCTIONS TO CANDIDATES:

1. THIS PAPER CONSISTS OF 2 SECTIONS.

   SECTION A CONSIST OF MULTIPLE CHOICE QUESTIONS THAT MUST BE ANSWERED ON THE **MULTIPLE CHOICE ANSWER** SHEET PROVIDED.

   SECTIONS B MUST BE ANSWERED IN THE **SEPARATE EXAMINATION SCRIPTS** PROVIDED**.**

2. THIS QUESTION PAPER MUST BE RETURNED WITH **ALL** YOUR EXAMINATION SCRIPTS.

SECTION A

Answer the following questions on the multiple choice answer sheet provided. Read the instructions carefully and select the single, most correct answer for each question.

MCQ questions available upon request.

SUBTOTAL SECTION A: 40

SECTION B

Answer this section in a SEPARATHE answer script. Label the cover of this script, SECTION B. Ensure that you number your answers exactly as the questions are numbered

QUESTION ONE – INTRODUCTION TO ANATOMY AND PHYSIOLOGY

1.1. Differentiate between positive and negative feedback mechanisms and provide one physiological example for each type. (4 x 1 = 4)

1.2. Provide the correct anatomical term for each of the following: (5 x ½ = 2½)

1.2.1. Forehead

1.2.2. Eye

1.2.3. Knee

1.2.4. Ankle

1.2.5. Back of the knee

1.3. Provide the correct directional term for each of the following: (5 x ½ = 2½)

1.3.1. The umbilical region is found _____ to the inguinal region.

1.3.2. The gluteal region is found _____ to the pubic region.

1.3.3. The umbilicus is found _____ to the antebrachium.

1.3.4. The vertebral column is found in the _____ body cavity.

1.3.5. The femur is _____ to the tibia.

[9]

QUESTION TWO – BASIC CHEMISTRY

2.1. Using the key choices below, select the correct responses to the following descriptive statements. You need only write down the question number and the appropriate **alphabet** in your answer sheet. (10 x ½ = 5)

KEY CHOICES

***A**. Atom*	***B**. Electrons*	***C**. Nucleus*	***D**. Energy*	***E**. Ion*
***F**. Matter*	***G**. Isotopes*	***H**. Neutrons*	***I**. Protons*	***J**. Valence*

2.1.1. An electrically charged particle capable of gaining or losing electrons

2.1.2. Anything that takes up space and has mass (weight)

2.1.3. Responsible for most (if not all) of an atom's mass

2.1.4. Negatively charged particles, forming part of an atom

2.1.5. The outermost electron shell is known as the _____ shell.

2.1.6. The ability to do work

2.1.7. The smallest particle of an element that retains the properties of the element

2.1.8. Have same number of protons and electrons, but neutron numbers vary

2.1.9 Positively charged particles, forming part of an atom

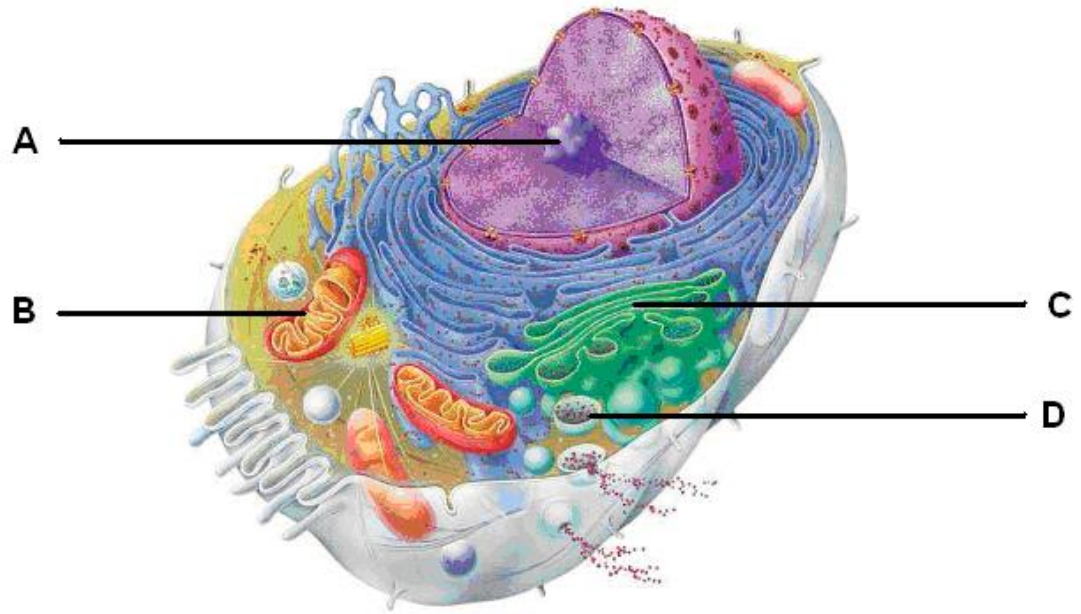
2.1.10 Consists of neutrons and protons

2.2 Name the **THREE** sub-atomic particles, and state the electrical charge of each. (6 x ½ = 3)

[8]

QUESTION THREE – THE CELL

3.1 Identify the organelles labelled A-D and provide **ONE** function of each. (8 x ½ = 4)



3.2 Identify **THREE** types of membrane proteins and provide one function of each.
(6 x ½ = 3)

3.3. Answer the following questions regarding protein synthesis. (4 x ½ = 2)

3.3.1. Name the process whereby mRNA is made from DNA

3.3.2. Name the enzyme that initiates transcription.

3.3.3. Where does transcription take place?

3.3.4. Name the structure on which translation take place.

[9]

QUESTION FOUR – BASIC TISSUE

4.1. List the **FOUR** types of basic tissue and in **ONE WORD** describe their function. (8 x ½ = 4)

4.2. **Fully** name the **specific** tissue type that: (10 x ½ = 5)

4.2.1. is made up of a single layer of flattened cells.

4.2.2. has osteocytes that sit inside cavities called lacunae.

4.2.3. forms tendons and ligaments.

4.2.4. forms the articular cartilage at synovial joints.

4.2.5. is found in lymph nodes, the spleen and the bone marrow.

4.2.6. have gap junctions and intercalated discs.

4.2.7. forms cushion-like discs between the vertebra.

4.2.8. contain fat cells that store lipids.

4.2.9. found covering the ovaries and lining duct of the kidney tubule.

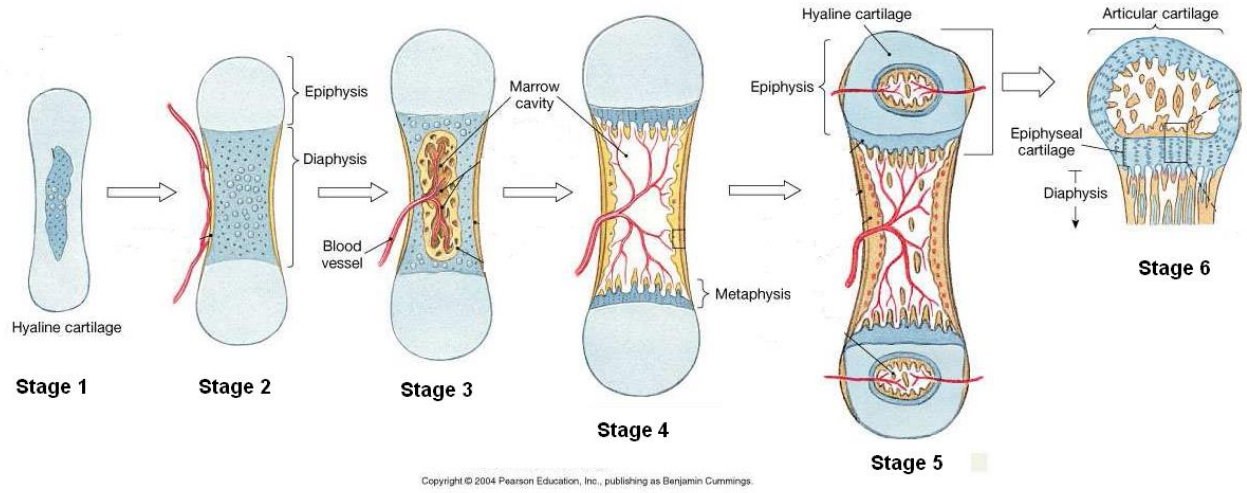
4.2.10. form a protective covering in the mouth, oesophagus and skin.

[9]

QUESTION FIVE – OSTEOLOGY

5.1. Name the **SIX** classes of bones found in the human body. (6 x ½ = 3)

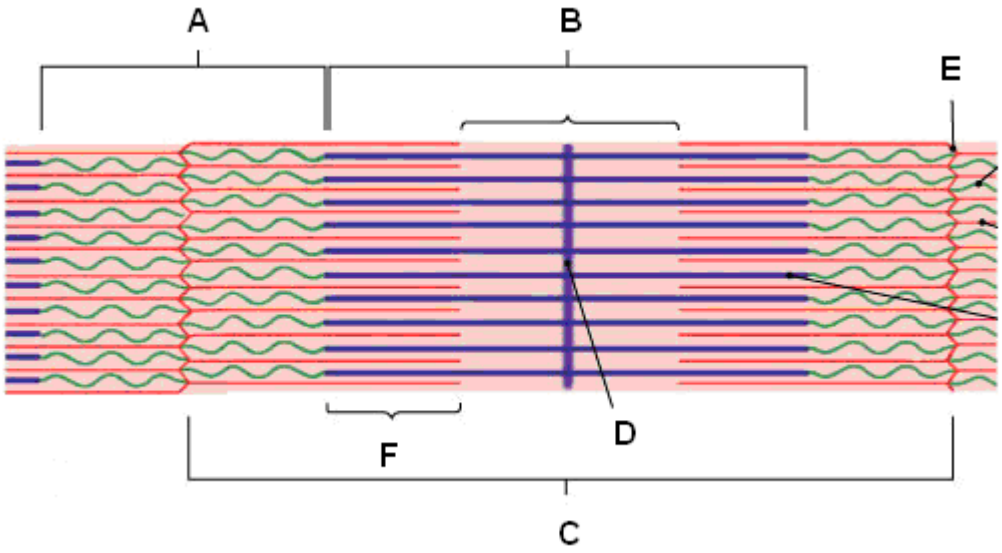
5.2. Provide a **brief** account for each stage of endochondral ossification in the diagram below. (12 x ½ = 6)



[9]

QUESTION SIX – THE MUSCULAR SYSTEM

6.1. Provide labels for structures A to F in the figure below. (6 x ½ = 3)



6.2 Describe the chronological sequence of the events at a neuromuscular junction. (Do not use abbreviations) (8 x ½ = 4)

6.3 List **FOUR** main characteristics of skeletal muscles. (4 x ½ = 2)

[9]

QUESTION SEVEN – THE INTEGUMENTRY SYSTEM

7.1. Name the **FIVE** layers of the epidermis starting with the layer closest to the dermis. (5 x ½ = 2½)

7.2. Provide **THREE** physiological reasons as to why skin color differs. (3 x ½ = 1½)

7.3. List any **TWO** functions for each of the following:

7.3.1. Epidermal cells (2 x ½ = 1)

7.3.2. Hair (2 x ½ = 1)

7.3.3. Sebaceous glands (2 x ½ = 1)

7.3.4. Sudoriferous glands (2 x ½ = 1)

7.3.5. Nails (2 x ½ = 1)

[9]

QUESTION EIGHT – THE ENDOCRINE SYSTEM

8.1. Name the **THREE** mechanisms that control hormone release. (3 x ½ = 1½)

8.2. Briefly discuss the mechanism of steroid hormone action. (5 x ½ = 2½)

8.3 Name the hormone (no abbreviations) that provides each of the following functions **and** the gland from which it is secreted.

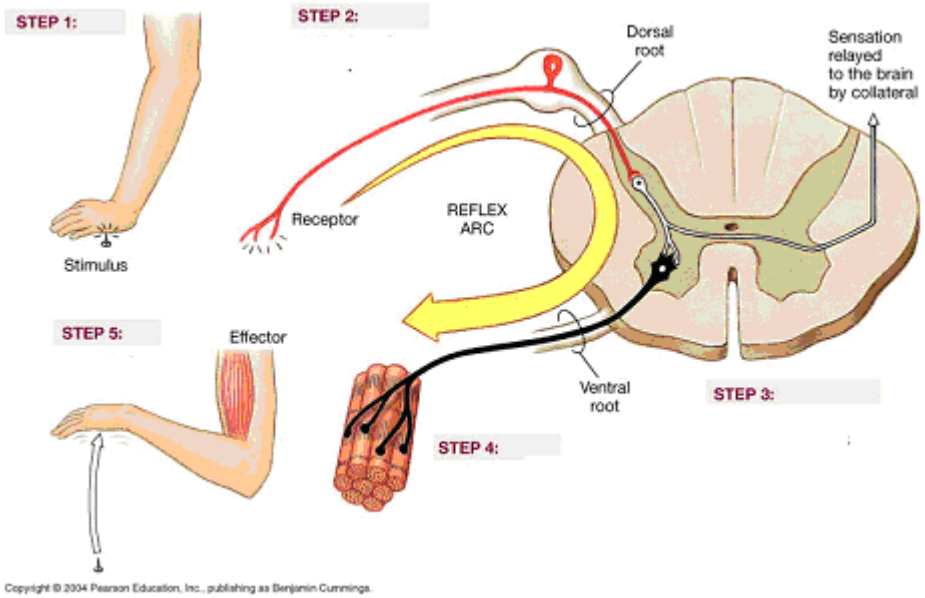
8.3.1 Stimulates sodium reabsorption in the renal tubules. (2 x ½ = 1)
8.3.2 Regulates breast milk production. (2 x ½ = 1)
8.3.3 Decreases the level of calcium in the blood. (2 x ½ = 1)
8.3.4 Mediate the endocrine response to short term stress. (2 x ½ = 1)
8.3.5 Allows glucose to cross the plasma membrane of cells. (2 x ½ = 1)

[9]

QUESTION NINE – THE NERVOUS SYSTEM

9.1. Describe the generation of an action potential. (8 x ½ = 4)

9.2. Provide labels for steps 1 to 5 in the diagram below. (5 x ½ = 2½)



9.3. ***Match the region of the brain in Column A to the correct term or description in Column B. You need only provide the question number and the letter of your chosen answer*.**

(7 x ½ = 3½)

Column A	Column B
9.3.1 Cerebellum	A. Contains the corpora quadrigemina and reflex centres for vision and hearing
9.3.2 Hypothalamus	B. Somatic sensations
9.3.3 Medulla oblongata	C. Motor commands and intellectual processing
9.3.4 Midbrain	D. Medial section of the brainstem that contains centres for the control of breathing
9.3.5 Pons	E. Provides involuntary coordination of body movements
9.3.6 Thalamus	F. Regulates body temperature and water balance
9.3.7 Frontal lobe	G. Regulates heart rate and blood pressure
	H. Serves as a relay station for sensory information
	I. Auditory (hearing) and olfaction (smell)

[10]

QUESTION TEN – THE SENSES

10.1. Distinguish between tonic and phasic receptors and give **ONE** example of each. (6 x ½ = 3)

10.2. Name the **TWO** photoreceptors in the eye and provide **ONE** function of each. (4 x ½ = 2)

10.3. Explain the mechanism by which an odorous particle depolarizes an olfactory receptor cell. (8 x ½ = 4)

[9]

SUBTOTAL SECTION B: 90

GRAND TOTAL: 130