UNIVERSITY OF JOHANNESBURG

PROGRAM	:	*BIOKINETICS*
SUBJECT	:	**ANATOMY AND PHYSIOLOGY I**
CODE	:	**AAP01Y1**
DATE	:	JANUARY SUPPLEMENTARY EXAMINATION JANUARY 2017
DURATION	:	180 MINUTES
WEIGHT	:	50 : 50
TOTAL MARKS	:	50

EXAMINERS	:	I. PATEL E. SWANEPOEL B. THOMAS N. XHAKAZA
MODERATORS	:	P. NKOMOZEPI
NUMBER OF PAGES	:	16 PAGES

INSTRUCTIONS	:	QUESTION PAPER MUST BE HANDED IN

REQUIREMENTS	:	1 X MULTIPLE CHOICE ANSWER SHEET 4 X EXAMINATION SCRIPTS

INSTRUCTIONS TO CANDIDATES:

1. THIS PAPER CONSISTS OF 5 SECTIONS.
2. SECTION A MUST BE COMPLETED ON THE MULTIPLE CHOICE ANSWER SHEET PROVIDED.
3. SECTIONS B TO E MUST EACH BE ANSWERED IN A SEPARATE EXAMINATION SCRIPT PROVIDED.
4. MARK ALLOCATION FOR SECTION A: 1 MARK PER QUESTION.
5. MARK ALLOCATION FOR SECTIONS B TO E: ½ MARK PER FACT UNLESS INDICATED OTHERWISE.
6. THIS QUESTION PAPER MUST BE RETURNED WITH ALL YOUR EXAMINATION ANSWER SCRIPTS.

SECTION A: MULTIPLE CHOICE QUESTIONS

Multiple choice question available on request

SECTION A SUBTOTAL: 40

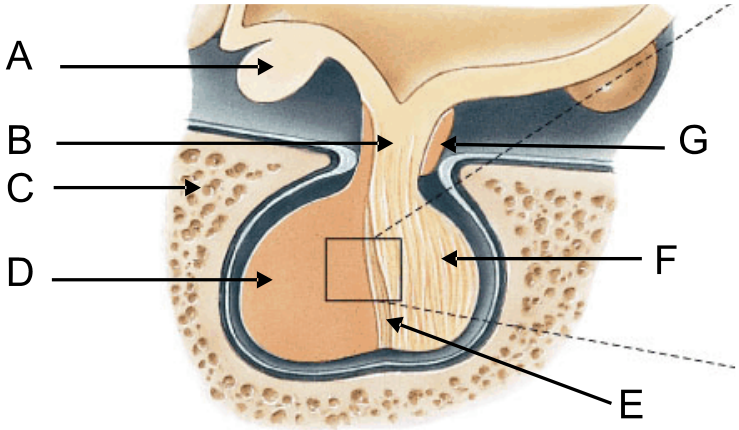
SECTION B: ANATOMY (E. Swanepoel)

(Endocrine system, Senses, Cardiovascular system and Urinary system)

QUESTION 1

Refer to Figure 1 and answer the following questions:

FIGURE 1



1.1 Give an appropriate heading for this diagram. (1)

1.2 Provide labels for structures A to G. (3½)

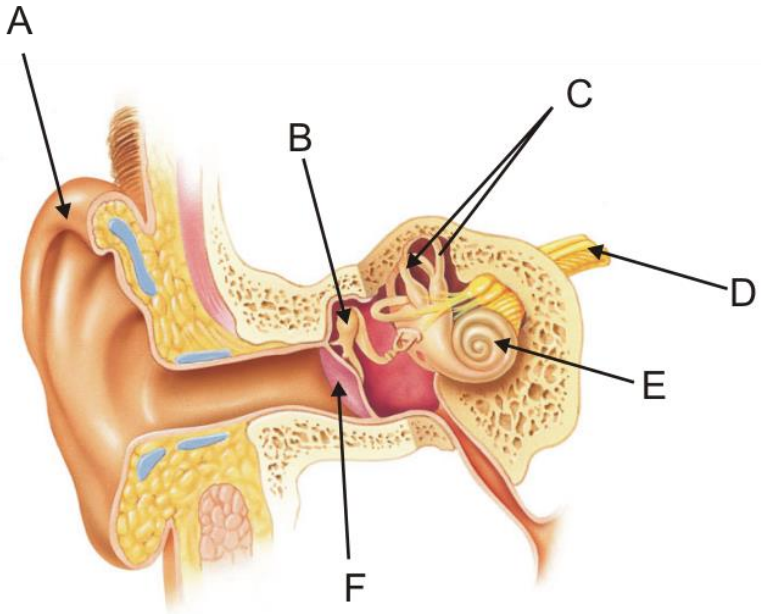
1.3 Name the tract that the axons in area F are linked to. (½)

[5]

QUESTION 2

Refer to Figure 2 and answer the following questions:

FIGURE 2



2.1 Provide labels for structures A to F. (3)

2.2 Name the two muscles associated with structure F. Include in your answer the function of each. (2)

[5]

QUESTION 3

3.1 Describe the macroscopic anatomy and associated openings of the Right atrium. (4½)

3.2 Describe the difference between the right and left ventricular walls. Also include in your answer the reason for this difference. (1½)

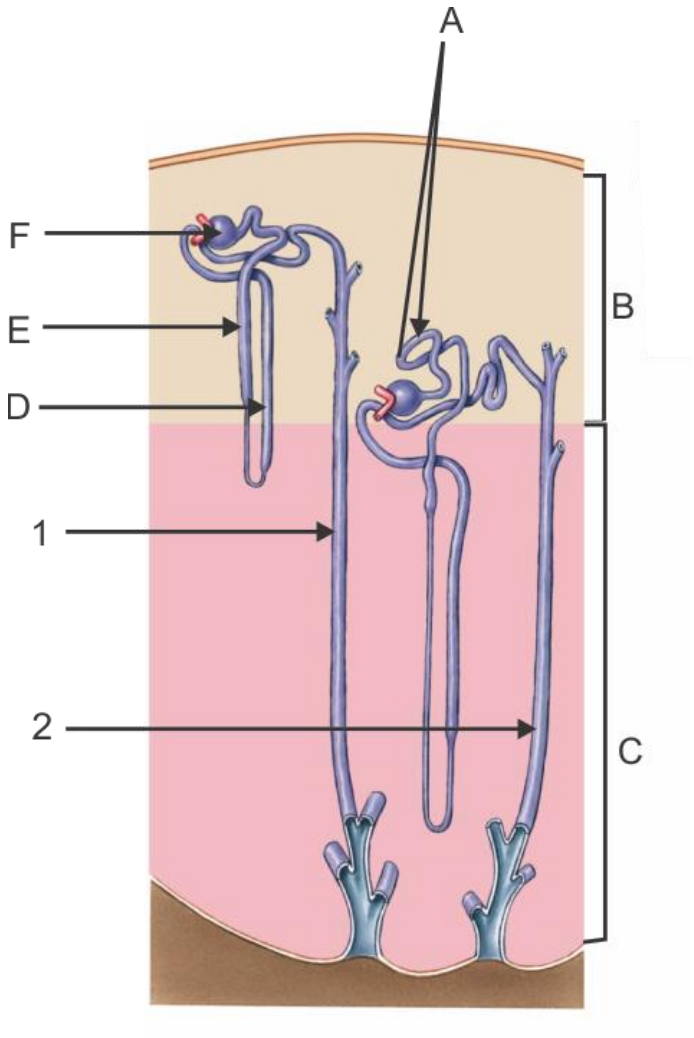
3.3 Describe the location of the "four corners" of the heart as seen on the anterior view of the thorax. (4)

[10]

QUESTION 4

Refer to Figure 3 and answer the following questions:

FIGURE 3



4.1 Provide labels for structures A to F. (3)

4.2 Name nephrons 1 and 2 respectively. (1)

4.3 Contrast (differences) the anatomy of nephrons 1 and 2. (3)

[7]

SECTION B SUBTOTAL: 27

SECTION C: ANATOMY (N. Xhakaza)

(Nervous system, Respiratory system and Muscles)

QUESTION 1

1.1 List and describe the function of the fibres of white mater of the cerebral hemispheres giving one example of each. (4)

1.2 Describe the connection of the cerebellum to the different parts of the brain stem. (4)

[8]

QUESTION 2

Name the lobes of the brain separated by the following sulci:

2.1 Lateral sulcus (1)

2.2 Parieto-occipital sulcus (1)

2.3 Central sulcus (1)

[3]

QUESTION 3

Write a short note on the gross anatomical structure of the right lung. **[7]**

QUESTION 4

4.1 Name the six extrinsic muscles of the eyeball. (3)

4.2 Give a brief summary of the innervation of the muscles in 4.1 above. (2)

[5]

SECTION C SUBTOTAL: 23

SECTION D: PHYSIOLOGY (I. Patel)

(Chemistry, Cell Osseous tissue, Skin, Nervous system, Endocrine system and Senses)

QUESTION 1: Intro to Physiology

DRAW a flow diagram to illustrate how homeostatic regulation rectifies an **INCREASE** in body temperature. Name this type of control mechanism and ensure that you indicate what the stimulus, receptor, control centre, effector, and response are in this particular example. **[5]**

QUESTION 2: Chemistry

Explain the four properties of water that illustrate its biological importance to humans. **[4]**

QUESTION 3: Cell

Select the correct term (regarding protein synthesis) in Column B that corresponds with the description in Column A. You need only provide the question number together with the corresponding answer. **[3]**

Column A		Column B
3.1	The 1st phase of protein synthesis that occurs in the nucleus	A. Endoplasmic reticulum
3.2	This enzyme attaches free nucleotides to the DNA template strand	B. Transcription
3.3	This product of the first phase is a copy of a portion of DNA	C. Translocation
3.4	The 2nd phase of protein synthesis that occurs in the cytoplasm	D. RNA polymerase
3.5	The intracellular organelle on which proteins are assembled	E. rRNA
3.6	The small molecules that attach amino acids to the copy of DNA	F. mRNA
		G. Translation
		H. Golgi apparatus
		I. Ribosome
		J. tRNA

QUESTION 4: Nervous System

Using the stretch reflex as an example, create a flow diagram describing a simple reflex arc. **[5]**

[Start with: **Stimulus (muscle stretch)** → Continue flow diagram]

QUESTION 5: Endocrine System

Complete the following table by writing the question number and corresponding answer in your answer book. **[8]**

Secreted from:	Hormone:	Hormonal Effects:
Posterior pituitary	5.1 (½)	Stimulates contractions of the uterus during child birth & milk ejection in nursing mothers
Adrenal cortex	Aldosterone	5.2 (1) TWO functions
5.3 (½)	5.4 (½)	Stimulates ovulation, and progesterone secretion in females and testosterone secretion in males
Anterior pituitary	5.5 (½)	Stimulates development of mammary glands & milk production
Thyroid gland	5.6 (½)	5.7 (1½) THREE functions
5.8 (½)	5.9 (½)	Helps establish the body's circadian rhythm
Anterior pituitary	5.10 (½)	Growth, protein synthesis, lipolysis
5.11(½)	ADH	5.12 (1) TWO functions

SECTION C SUBTOTAL: 25

SECTION E: PHYSIOLOGY (B. Thomas)

(Muscle, Blood, Cardiovascular system, Respiratory system and Urinary system

QUESTION 1: Muscle

Discuss, in detail, the steps that end muscle contraction and thereby result in muscle relaxation. **[5]**

QUESTION 2: Blood

2.1 Describe the common pathway of the coagulation phase of hemostasis. (3)

2.2 Discuss the process of fibrinolysis. (2)

[5]

QUESTION 3: Cardiovascular system

3.1 List the **three** waves of an electrocardiogram (ECG) and name the **electrical event** associated with each wave. (3)

3.2 Discuss the pressure changes that occur during **isovolumetric ventricular contraction**. Remember to mention the valves in your answer. (2)

[5]

QUESTION 4: Respiratory system

Describe, in detail, how carbon dioxide is transported in the blood. **[5]**

QUESTION 5: Urinary system

5.1 Calculate the filtration pressure at the renal corpuscle if the glomerular hydrostatic pressure is 60 mmHg, the capsular hydrostatic pressure is 15 mmHg, and the blood colloid osmotic pressure is 20 mmHg. (Show all formulae and units). (3)

5.2.1 Define the term glomerular filtration rate (GFR). (½)

5.2.2 Describe the autoregulation of GFR that occurs in response to a **decrease** in glomerular blood pressure. (1½)

[5]

SECTION E SUBTOTAL: 25

TOTAL MARKS: 140