FACULTY OF SCIENCE

DEPARTMENT BIOCHEMISTRY

LS3BFET / LSFT0B3

LIFE SCIENCE 3B FET

APK CAMPUS

NOVEMBER EXAM (UNITS: 1-6)

4 NOVEMBER 2015

DATE:	**4 NOVEMBER 2015**
SESSION:	**8H30-11H30**
ASSESSOR:	**MS J. WILLIAMSON**
INTERNAL MODERATOR:	**DR. A. NEL**
EXTERNAL MODERATOR:	**PROF. J. DE BEER**
DURATION:	**3 HOURS**
TOTAL MARKS:	**150**

NUMBER OF PAGES: 11 PAGES

Please read the following instructions carefully

1. Answer all the questions in the question paper
2. Answer ALL of the questions in the test book.
3. Work neatly.
4. Read your questions carefully.
5. Good Luck

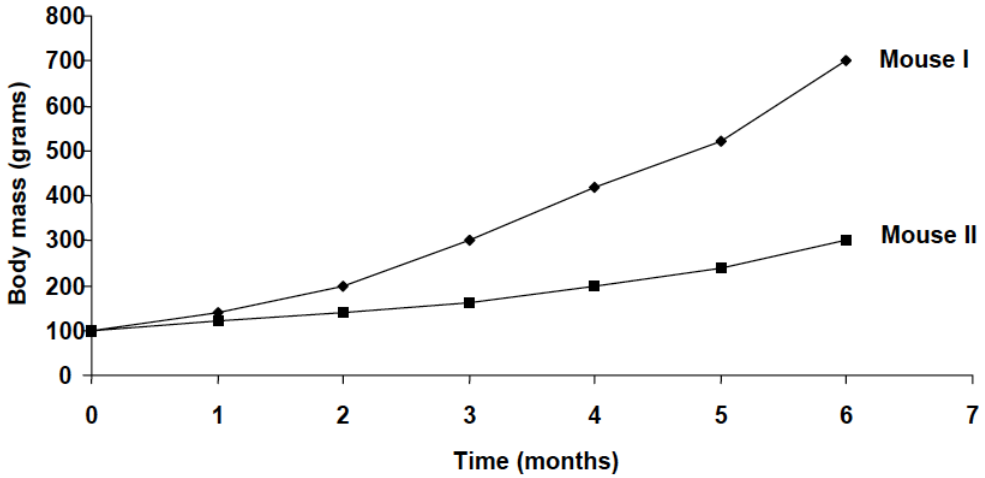
QUESTION 1 **[15]**

Choose the alternative that best completes the statement or answers the question. Only write down the correct letter next to the appropriate question number.

1.1 Which hormone is correctly paired with its function?

A. Parathyroid hormone – lowers blood calcium
B. Glucocorticoids – decrease blood glucose
C. Norepinephrine – reduce heart rate
D. Melatonin – promotes sleep
E. Aldosterone – increases sodium excretion by kidneys

1.2 This graph shows the change in mass of two young mice from the same litter over time. One (1) of the two (2) mice was injected with a substance secreted by an endocrine gland. Which mouse was injected?



A. mouse I
B. mouse II

1.3 Which of the following statements about hormones is incorrect?

A. They are produced by endocrine glands.

B. They are modified amino acids, peptides, or steroid molecules.

C. They are carried by the circulatory system.

D. They are used to communicate between different organisms.

E. They elicit specific biological responses from target cells.

1.4 According to the acid growth hypothesis, what is the correct sequence in which the following events leading to auxin-induced cell elongation occur?

1. Cross-links between cellulose microfibrils and polysaccharides of the cell wall are enzymatically broken.
2. Increased turgor pressure of cell cytoplasm expands the cell.
3. Proton pumps move H+ into the cell wall.

A. 1, 2, 3

B. 3, 2, 1

C. 1, 3, 2

D. 3, 1, 2

E. 2, 3, 1

1.5 A patch of soil contains ungerminated seeds. If this patch gets covered by a newly laid concrete sidewalk, then which of these phenomena will the seedlings under the sidewalk exhibit if they germinate, and which hormone accounts for this phenomenon?

A. Triple response; ethylene

B. Seed dormancy; abscisic acid

C. Anti-aging effects; cytokines

D. Anti-aging effects; abscisic acid

E. Triple response; brassinosteroids

1.6 Circadian rhythms, seasonal rhythms, and seedling germination are most strongly influenced by a molecular switching mechanism that involves a phytochrome sensitive to both _____

A. violet light and ultraviolet light.

B. infrared radiation and red light.

C. red light and far-red light.

D. blue light and red light.

E. geomagnetism and cosmic radiation.

1.7 Where in the spinal cord are myelinated axons most likely to be found, and what trait of these axons makes their myelination important?

A. Lining the central canal; these axons are relatively wide.

B. Inner layer; these axons are relatively long.

C. Inner layer; these axons are relatively wide.

D. Outer layer; these axons are relatively short.

E. Outer layer; these axons are relatively long.

1.8 Inebriated people have difficulty touching their noses with their eyes closed. Which part of the brain has been most impaired to bring about this difficulty?

A. Hypothalamus

B. Cerebellum

C. Cerebral cortex

D. Broca's area

E. Limbic system

1.9 Which of the following contains regions that help regulate hunger and thirst?

A. Cerebrum

B. Cerebellum

C. Thalamus

D. Hypothalamus

E. Medulla oblongata

1.10 Which of the following is not a type of sensory receptor?

A. Mechanoreceptor

B. Chemoreceptor

C. Electromagnetic receptor

D. Chermoreceptor

E. All of the above are types of sensory receptors.

1.11 Which of the following is an incorrect statement about the vertebrate eye?

A. The vitreous humour regulates the amount of light entering the pupil.

B. The transparent cornea is an extension of the sclera.

C. The fovea is the centre of the visual field and contains only cones.

D. The ciliary muscle functions in accommodation.

E. The retina lies just inside the choroid and contains the photoreceptor cells.

1.12 Why are we able to differentiate tastes and smells?

A. The action potentials initiated by taste receptors are transmitted to a separate region of the brain than those initiated by receptors for smell.

B. The sensory region of the cerebral cortex distinguishes something we taste from something we smell by the difference in the action potential.

C. The brain distinguishes between taste, arising from interoreceptors, from smell arising from exteroreceptors.

D. Because we are able to see what we are tasting, the brain uses this information to distinguish taste from smell.

E. Taste receptors are able to detect fewer molecules of the stimulus, which means these receptors will initiate a receptor potential before smell receptors do.

1.13 What is the proper order of these structures, from most inclusive to least inclusive?

1. inner ear
2. tectorial membrane
3. organ of Corti
4. cochlea

A. 4, 1, 3, 2

B. 1, 4, 3, 2

C. 4, 1, 2, 3

D. 1, 4, 2, 3

E. 4, 2, 1, 3

1.14 The function of the basilar membrane is to _____

A. transmit vibrations from the tympanic membrane to the oval window.

B. vibrate up and down in response to the fluid pressure waves in the vestibular canal.

C. vibrate in response to moving air reaching the outer ear.

D. create pressure waves in the perilymph (fluid inside the cochlea).

1.15 What portion of the brain has neurons that receive action potentials from chemoreceptor cells in the nose?

A. gustatory complex

B. anterior hypothalamus

C. olfactory bulb

D. occipital lobe

E. posterior pituitary

QUESTION 2 **[15]**

Give the correct biological term for each of the following definitions. Only write down the correct term next to the appropriate question number.

2.1 Glands with ducts which secrete chemicals into these ducts.

2.2 Scientific name for the posterior hypothesis.

2.3 Disorder caused by the lack of Iodine in the diet.

2.4 The structure which moves plant hormones from the basal end of one cell into the apical end of the neighbouring cell.

2.5 The programmed death of plant cells or organs.

2.6 Effects of light on plant morphology.

2.7 Bundles that consist of the axons of multiple neurons.

2.8 The clustering of sensory organs at the front end of the body.

2.9 Segmentally arranged clusters of neurons.

2.10 Structures which respond to heat or cold and help to regulate body temperature by signalling both surface and body core temperature.

2.11 The sensory cutaneous mechanoreceptors in the skin which are sensitive to sustained touch and pressure.

2.12 The structures in the human eye which keeps the lens in place.

2.13 The substance which help guard the ear against foreign material and insects.

2.14 The middle bony ossicle.

2.15 The top canal of the cochlea, filled with perilymph.

QUESTION 3 **[20]**

3.1 Study the following diagrams and answer the questions that follow.

Diagram A

Diagram B

Diagram C

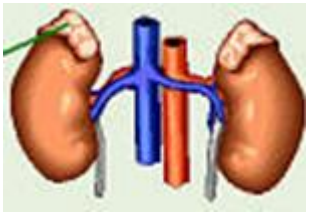


Diagram D

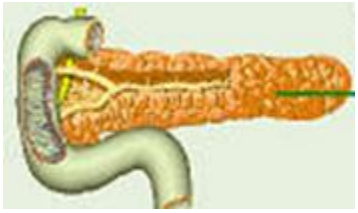


Diagram E

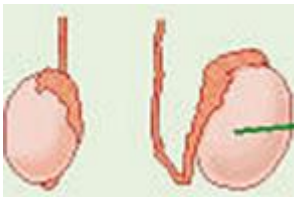
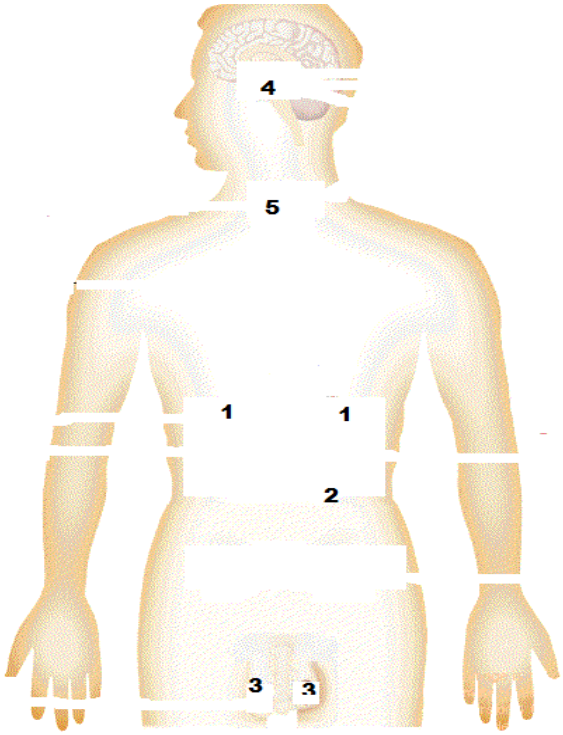


Diagram F



3.1.1 Match the structures represented by diagrams A-E with the locations 1-5 in diagram F. Supply the name of the structures represented by diagrams A-E. (10)

3.1.2 Name the hormones which will be produce during the following situations. Supply the letter of the diagram of the structure which produce these hormones. (5)

a. When a person has too little sugar in his bloodstream.

b. When a man loses excess hair.

c. Leads to the build-up of melanin.

d. Enables a person to do strenuous exercise

e. Cause a person to look like the person in the diagram below.

3.2 If a person shows the following symptoms, what disease is he suffering from: (5)

3.2.1 Normal proportions but small stature.

3.2.2 Body is short and stocky with mental retardation.

3.2.3 Insufficient PTH secreted.

3.2.4 Excess cortisol in blood and sub-cutaneous fat deposits.

3.2.5 Islets of Langerhans are damaged.

QUESTION 4 **[19]**

Discuss the plant hormone Auxin. (19)

QUESTION 5 **[25]**

5.1 Discuss the practical you have designed for your Unit 6. (Question or assignment given to students and memo of practical report – aim, introduction, materials and methods, results, discussion) (15)

5.2 Draw and label one of the structures that form part of your Unit 6. (4)

5.3 Set a small test of 10 marks with answers on your Unit 6. (6)

Test correct, clear, accurate with memo

QUESTION 6 **[19]**

John was walking around a big boma fire, adding wood to enhance the flames. He then accidently stepped onto a hot coal and instantaneously lift his foot. Name and explain the physiological process that caused John to lift his foot rapidly to avoid any serious damage to his foot. Include a diagram to add to your explanation. (19)

QUESTION 7 **[19]**

7.1 Complete the following table. Only write down the correct answer next to the appropriate question number in your answer book. (15)

Eye part	Functions	Explain structure/ consistency
Vitreous humour	7.1.1 7.1.2	7.1.3
7.1.4	Transmits impulses to the brain	-
7.1.5	7.1.6	White outer layer
7.1.7	7.1.8	Front transparent part of eye.

Choroid	7.1.9 7.1.12	7.1.10 7.1.11
Iris	7.1.13 7.1.14	7.1.15

7.2 Explain how a person's eye changes from reading a book to staring at the sunrise.

(8 x ½=4)

QUESTION 8 **[19]**

Draw and label the entire internal and external structure of the human ear, with the cochlea rolled out. Make sure you include all the internal detail. (19)

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