FACULTY OF SCIENCE

BOTANY AND PLANT BIOTECHNOLOGY DEPARTMENT

LSFT0B3

LIFE SCIENCE 3B FET

APK CAMPUS

SEMESTER TEST 2(UNITS:4-6)

MEMORANDUM

25 October 2019

DATE:	**25 October 2019**
SESSION:	**9:40-11:15**
ASSESSOR:	**MS J. WILLIAMSON**
INTERNAL MODERATOR:	**DR H-A BYTH-ILLING**
EXTERNAL MODERATOR:	**PROF G LAUTENBACH**
DURATION:	**1½ HOURS**
TOTAL MARKS:	**90**

NUMBER OF PAGES: 10PAGES

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 **[10]**

Choose the answer 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 increases basal metabolic rate in the body?

A. <u>Thyroid Hormone</u>
B. Parathyroid Hormone
C. Secretin
D. Glucagon

1.2 Growth factors are chemical agents released in small amounts that act locally on neighbouring cells. Which of the following best describes the function of growth factors?

A. <u>Endocrine function</u>
B. Autocrine function
C. Paracrine function
D. None of the above

1.3 Chemical messengers secreted by ductless glands are called_____

A. Lymph
B. Platelets
C. Plasma
D. <u>Hormones</u>

1.4 Which of these statement is INCORRECT regarding the function of hormones?

A. Reproduction and sexual differentiation
B. Maintenance of internal environment
C. <u>Maintain body temperature</u>
D. Development and growth

1.5 Name the hormone which takes part in the release of FSH and LH from the anterior pituitary.

A. Growth hormone
B. <u>GnRH</u>
C. Somatostatin
D. TRH

1.6 Growth regulators, which control plant growth and development are called_____

A. Secondary metabolites
B. Macro element
C. Nonessential elements
D. Phytohormones

1.7 Mark the one, which is NOT a physiological effect of auxin?

A. Cell elongation
B. Stem elongation
C. Cell differentiation
D. Rooting

1.8 Which of the following plant hormones is responsible for seed germination?

A. Auxin
B. Gibberellin
C. Ethylene
D. Abscisic acid

1.9 Which of the following plant hormone causes a delay in leaf senescence?

A. Abscisic acid
B. Ethylene
C. Auxin
D. Cytokines

1.10 Name the stress hormone of the plant.

A. Brassinosteroid
B. Abscisic acid
C. Cytokines
D. Ethylene

QUESTION 2 **[10]**

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 The target tissue of ACTH. **Adrenal cortex**

2.2 The hormone responsible for stimulating contractions of the uterus. **Oxytocin**

2.3 The level of this mineral is controlled by the parathyroid hormone. **Calcium**

2.4 Symptoms of this endocrine disease include frequent urination and excessive thirst. **Diabetes mellitus**

2.5 The bridge between the two lobes of the thyroid gland. **Isthmus**

2.6 A pathogen that may harm but does not kill the host plant.**Avirulent**

2.7 Proteins that help protect other proteins from heat stress. **Heat shock proteins**

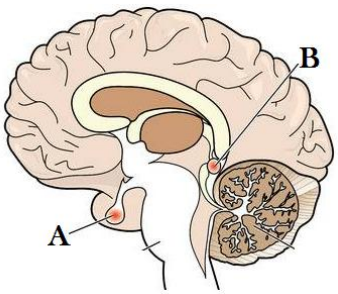
2.8 Plants that flower when a light period is shorter than a critical length. **Short-day plants**

2.9 Cycles that are about 24 hours long and are governed by an internal "clock" of a plant. **Circadian rhythms**

2.10 Plant hormones, which are chemically similar to the sex hormones of animals.**Brassinosteroids**

QUESTION 3 **[25]**

Study the following diagrams and answer the questions that follow.



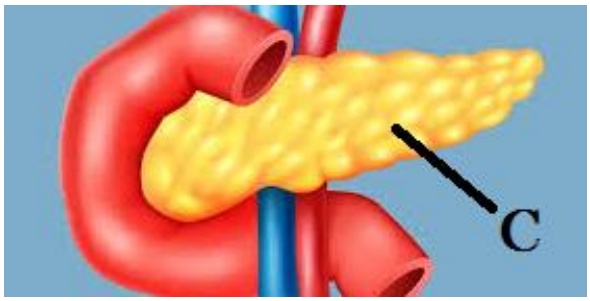
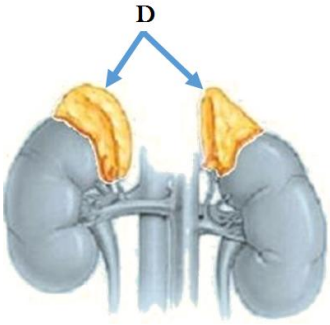


Diagram X **Diagram Y**



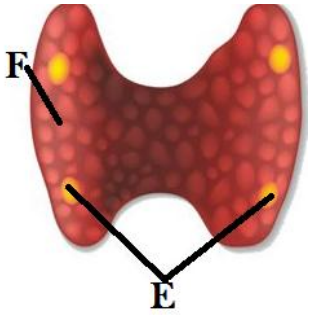


Diagram Z **Diagram II**

3.1 Identify the glands in each diagram. (Give the label letter and name of the gland) (6)

- **Diagram X – A – Pituitary gland, B – Pineal gland**
- **Diagram Y – C – Pancreas**
- **Diagram Z – D – Adrenal gland**
- **Diagram II – E – Parathyroid gland, F – Thyroid gland**

3.2 What hormone is produced by gland E? Give the functions of this hormones. (5)

- **Secretes the hormone: Parathyroid Hormone (PTH)**
- **PTH corrects a low blood calcium level**
- **PTH promotes the release of calcium by the bones**
- **PTH promotes the reabsorption of calcium from the kidneys**
- **PTH brings about the activation of Vitamin D.**

3.3 Which of the glands in the diagrams secrete hormones, which work antagonistic of one another? Give the names of the glands and the hormones they secrete. (7)

- **Pancreas – Insulin and glucagon which work antagonistic of one another**
- **Thyroid gland – produce calcitonin which work antagonistic of parathyroid hormone produced by theparathyroid gland.**

3.4 Briefly discuss the antagonistic functions of the hormones answered in question 3.3.

(14 x ½ = 7)

- **Calcitonin and PTH are antagonistic - They work together to regulate the blood calcium level.**
- **When the blood calcium level is high – the thyroid gland secretes calcitonin.**
- **To stimulate the bones to absorb calcium from the blood.**
- **When the blood calcium level is low – the parathyroid gland releases PTH**
- **To stimulate the bones to release calcium into the bloodstream**
- ✓ **If blood sugar (glucose) level is high.**
- ✓ **Insulin is secreted.**
- ✓ **Insulin stimulates the uptake of glucose by the cells (liver, muscle and adipose)**
- ✓ **In the liver and muscles it is stored as glycogen.**
- ✓ **Therefore insulin lowers the blood sugar level.**
- ✓ **When the blood sugar level is low.**
- ✓ **Glucagon is secreted into the blood.**
- ✓ **Glucagon stimulates the liver cells to convert glycogen into glucose for energy production.**
- ✓ **Therefore glucagon raises the blood sugar level.**

QUESTION 4 **[25]**

4.1. Briefly discuss the defence systems used by plants against herbivory. Include a definition of herbivory. (5)

- **Herbivory, animals eating plants, is a stress that plants face in any ecosystem,**
- **Plants counter excessive herbivory with physical defences such as thorns**
- **and chemical defences such as distasteful**
- **or toxic compounds**
- **Some plants even "recruit" predatory animals that help defend against specific herbivores.**

4.2 How do plants deal with drought related environmental stress? (5)

- **During drought, plants reduce transpiration by closing stomata,**
- **slowing leaf growth,**
- **and reducing exposed surface area**
- **Growth of shallow roots is inhibited,**
- **while deeper roots continue to grow.**

4.3 Distinguish between phototropism and photoperiodism. (4)

- **In phototropism a plant bends or grows directionally in response to light. Shoots usually move towards the light; roots usually move away from it.**
- **In photoperiodism flowering and other developmental processes are regulated in response to the photoperiod, or day length.**

4.4 How do red light and far red light differ with regard to germination of plant seeds? (2)

- **Red light increased germination,**
- **while far-red light inhibited germination.**

4.5 Which photoreceptors are responsible for the effects of the different red lights in question 4.4? (1)

Phytochromes

4.6 Which plant hormone is responsible for fruit ripening? (1)

Ethylene

4.7 Briefly mention the other effects of the hormone answered in question 4.6. (3)

- **Also responds to**
  - **mechanical stress,**
  - **senescence,**
  - **leaf abscission,**

4.8 Describe to role of auxins in cell elongation. (8 x ½ = 4)

- **According to the acid growth hypothesis,**
- **auxin stimulates proton pumps**
- **in the plasma membrane.**
- **The proton pumps lower the pH in the cell wall,**
- **activating expansins,**
- **enzymes that loosen the wall's fabric.**
- **With the cellulose loosened,**

- **the cell can elongate.**

QUESTION 5 **[20]**

5.1 Name the chosen theme for your Unit 6. (2)

Appropriate (1) Theme not done in LS1 and LS2(1)

5.2 What are the learning outcomes of your Unit 6? (What should the students know after completion of the unit?) (10)

Must be applicable to theme and set out in point form

5.3 Explain the aim and materials and methods for the practical you have designed for your Unit 6. (8)

Aim (2) Materials and Methods (6)

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