

P530/1

BIOLOGY

Paper 1

AUGUST, 2019



JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2019

BIOLOGY

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer all questions in both sections A and B.

SECTION A:

Answers to this section must be written in the answer sheet provided at the end of this section.

SECTION B:

Answers to this section should be written in the spaces provided and not anywhere else.

No additional sheets of paper should be inserted in this booklet.

For Examiner’s Use Only

|  |  |  |
| --- | --- | --- |
| SECTION |  | MARKS |
| Section A: | 1 – 40 |  |
| Section B: | 41 |  |
|  | 42 |  |
|  | 43 |  |
|  | 44 |  |
|  | 45 |  |
|  | 46 |  |
| TOTAL |  |  |

SECTION A (40MARKS)

1. Which of the following plant hormones is synthesized in chloroplast and inhibits plant growth?
2. Auxins
3. Abscisic acid
4. Gibberellins
5. Cytokinins
6. Which of the following is not an adaptation of slow-twitch fibres?
7. large store of high energy compound creatine phosphate
8. large store of myoglobin
9. supply of glycogen
10. rich supply of blood vessels to deliver oxygen and glucose
11. The type of learning that prevents animals form responding repeatedly to releasers that lead nowhere is

A. Imprinting

B. Insight

C. Habituation

D. Conditioning

1. Dark adaptation involves

A. Regeneration of lodospin

B. Regeneration of rhodospin

C. break down of lodospin

C. Breakdown of rhodospin

1. Crossing over is the exchange of parts between

A. Non homologous Chromosomes

B. non sister Chromatids

C. sister chromatids

D. Homologous chromosomes

1. The diagram below shows a structure of a

**OH**

**OH**

**OH**

**CH2OH**

**C**

**C**

**C**

**C**

**O**

**H**

**H**

**H**

**H**

A. Ribose

B. Fructose

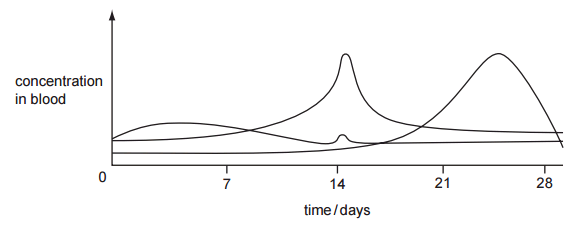
C. Glucose

D. Deoxyribose

1. What is the direct and immediate effect on the kidney when there is decrease in blood volume in the human body?
2. Release of ADH
3. Release of aldosterone hormone
4. Release of renin enzyme
5. Release of calcitonin
6. The phylogenetic approach to classification is used because it groups together all animals that show
7. analogous structures
8. homologous structures
9. convergent evolution
10. adaptive radiation
11. What is the functional unit of translocation in the phloem tissue?
12. Vessel element
13. Tracheid cell
14. Companion cell

D. Sieve tube element

1. The graph shows the concentration in the blood of three of the four hormones FSH, LH, oestrogen and progesterone



Which hormone is not shown?

A. Follicle stimulating homone

B. Lutenizing hormone

C. Oestrogen

D. Progesterone

1. Removal of medulla oblongata results in

A. voluntary movement ceasing

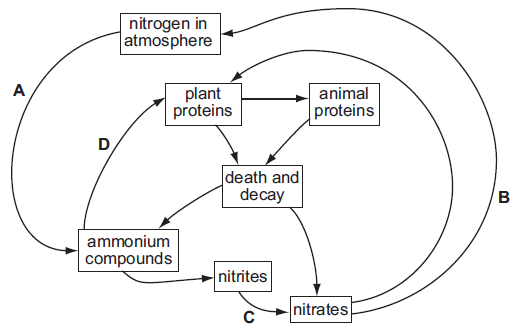
B. Involuntary movement ceasing

C. Loss of memory

D. Loss of orientation

1. The diagram shows a simplified nitrogen cycle.

Which arrow represents the activity of Nitrobacter bacteria?



1. Which of the following are not conjugated proteins?

A. Porphyrins B. Mucus

C. egg yolk D. Egg albumen

1. In DNA replication process, the unwinding of the DNA double helix requires the enzyme

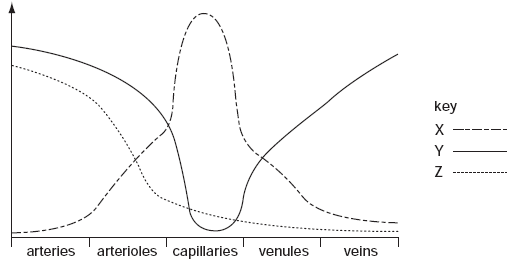
A. RNA polymerase

B. DNA ligase

C. Helicase

D. DNA polymerase

1. Which one of the following describes what happens at the tip of a newly formed amoeboid pseudopodium?
2. Gel ectoplasm changes to sol endoplasm
3. Gel endoplasm changes to sol ectoplasm
4. Sol ectoplasm changes to gel endoplasm
5. Sol endoplasm changes to gel ectoplasm
6. Some organisms increases in population when their age ratio stabilizes at optimal environment conditions. This is an example of.
7. Biotic potential
8. Balance in nature
9. Carrying capacity
10. Population density
11. The graph represents data on blood flow and blood vessels



Which row correctly identifies the curves?

|  |  |  |  |
| --- | --- | --- | --- |
|  | Velocity of blood flow | Pressure of blood flow | Total cross sectional area |
| A  B  C  D | X  X  Y  Z | Y  Z  Z  X | Z  Y  X  Y |

1. Which of the following is a post-zygotic isolatingmechanism during speciation?
2. Behavioural isolation
3. Hybrid breakdown
4. Temporal isolation
5. Gamete incompatibility
6. A human gene is 27 500 base pairs long. In this section of double‑stranded DNA there are 5050 nucleotides containing the base cytosine.

How many nucleotides in this gene contain the base adenine?

1. 8702 B. 8 000 C. 22 950 D. 45 900
2. Which one of the following occurs in a mammal when its thermorgulatory center detects a higher temperature of blood than normal?
3. Contraction of hair erector muscles
4. Release of throxine and adrenaline
5. Increase in vasoconstriction
6. Decrease in metabolic activity
7. The non-enzymatic components of intestinal juice are secreted by cells in

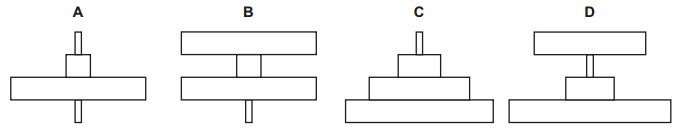
A. Crypts of lieberkuhn B. Brunner’s glands

C. Gastric glands D. walls of the ileum

1. The diagram shows a food chain.

Grass → rabbit → fox → flea

Which pyramid of numbers matches this food chain?



1. During the cardiac cycle, the movement of the valves cause sounds that can be heard using a stethoscope.

What causes the first sound after atrial systole in the cardiac cycle?

1 closing of the atrioventricular valves

2 opening of the semilunar valves

3 closing of the semilunar valves

A 1 and 2 B 1 and 3 C 1 only D 3 only

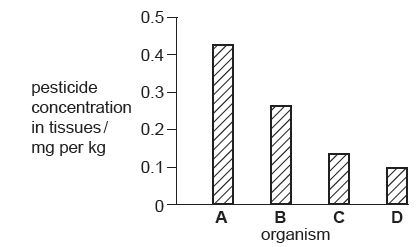
1. Some endotherms are known to undergo a period of long sleep in cold climate. This is called
2. Dormancy
3. Hibernation
4. Aestivation
5. Diapause
6. What would be the phenotypes of children born of a colour blind man and normal woman?
7. All normal
8. Only girls normal
9. Only boys colour blind
10. All colour blind
11. Which of the following arthropods breathe by lung books or trachea?
12. Insects
13. Diplopods
14. Crustaceans
15. Arachnids
16. In an attempt to estimate the Nile perch in a small man-made lake, 525 Nile perches were netted, marked and released. Two weeks later 883 Nile perches were netted with no mark and 120 had been marked. What was the estimated size of the Nile perch population?
17. 4389 B. 4855 C. 1528 D. 3863
18. Which one of the following results when a gamete with non-disjunction is fertilized?
19. Duplication
20. Translocation
21. Monosomy
22. Polyploidy
23. If one in 25000 in a population of kakira sub county is an albino. What is the frequency of carriers of albinism in kakira Sub County?

A. 98.7% B. 99.4% C. 1.25% D. 6.3%

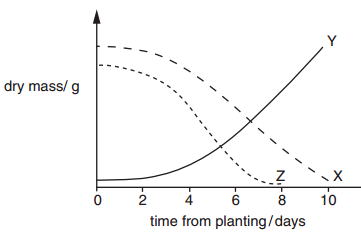
1. The concentration of a pesticide was measured in the tissues of organisms in the following food chain.

Plants small fish large fish bird of prey

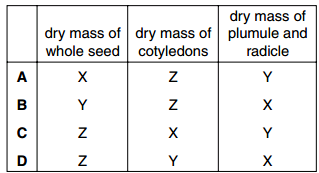
Which organism on the bar chart is the large fish?



1. The graph shows the changes in dry mass of a whole germinating seed, the cotyledons of the same seed, and the plumule and radicle of the seed.

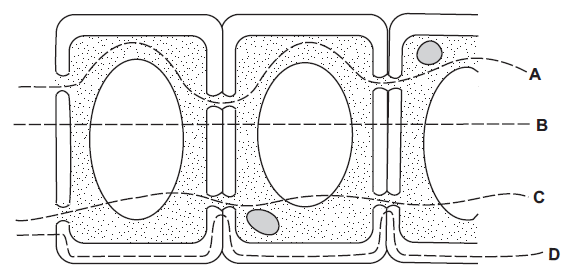


What do the three curves, X, Y and Z, represent?

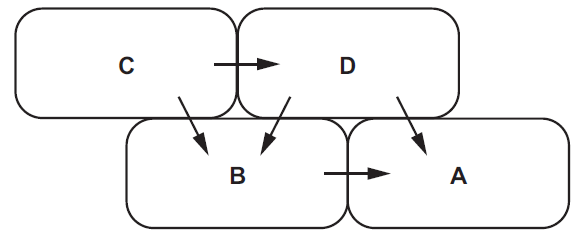


1. The larvae of ***Fasciola hepatica*** that are ciliate and free-swimming are called
2. Miracidia B. Cercaria C. Redia D. Sporocyst
3. Which one of the following mineral nutrients are constituents of chlorophyll?
4. Potassium and sulphur
5. Calcium and phosphorus
6. Zinc and copper
7. Nitrogen and magnesium
8. Which one of the following is not a transmitter substance?
9. Acetylcholine
10. Cholinesterase
11. Atropine
12. Noradrenaline
13. The diagram shows some adjacent cells from the root of a plant.

Which one of the following is the apoplast pathway of water movement?



1. Populations of a given species could only evolve into two distinct species if they were subjected to
2. Geographical isolation
3. Disruptive selection
4. Genetic isolation
5. Directional selection
6. The reaction rate of salivary amylase with starch decreases as the concentration of chloride ions is reduced. Which of the following describes the role of the chloride ions
7. Cofactor
8. Competitive inhibitor
9. Coenzyme
10. Allosteric inhibitors
11. The diagram shows the net movement of water by osmosis between four adjacent cells. Which cell has the highest water potential?



1. In the gastric glands, the digestive enzymes and hydrochloric acid are produced by the following cells respectively.
2. Oxyntic cells and peptic cells
3. Kupffer cells and oxyntic cells
4. Kupffer cells and peptic cells
5. Peptic cells and oxyntic cells.
6. In the life cycle of bryophytes, which of these is not a haploid structure?
7. Sporophyte
8. Protenema
9. Gametophyte
10. Antheridium

**SECTION B ( 60 MARKS)**

1. (a) Every year the Ugandan government recommends that vulnerable members of the public are vaccinated against influenza (flu) virus

(i) State two groups of people that the government would consider to be vulnerable (2 marks)

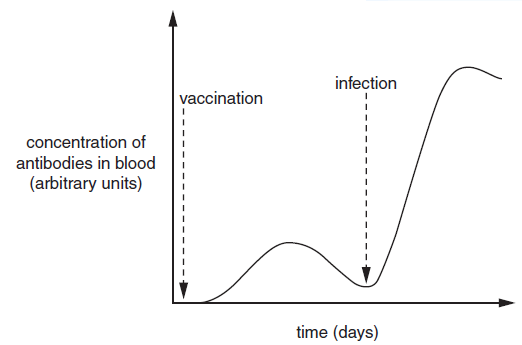
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(ii) Suggest why the influenza vaccine has to be changed each year

(2 marks)

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(b) The graph below shows the concentration of antibodies in a patient’s blood stream following an influenza vaccination and the an infection by influenza virus



(i) Using information from the graph, state two differences between primary and secondary immune responses. (2 marks)

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(ii) Explain the differences between primary and secondary responses

(2 marks)

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(iii) Memory cells are produced when a patient is vaccinated against influenza. Describe the role of these memory cells when the influenza virus enters the body. ( 3marks)

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1. (a) An enzyme, such as amylase, has a specific 3-dimensional shape.

Explain how DNA structure determines the specific shape of enzymes.

*(*5 marks*)*

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(b) Give three differences between starch molecules and cellulose molecules

(3marks)

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(c) Describe two adaptations of starch to its storage function (2marks)

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1. (a) Describe the cohesion-tension theory of water transport in the xylem. (5 marks)

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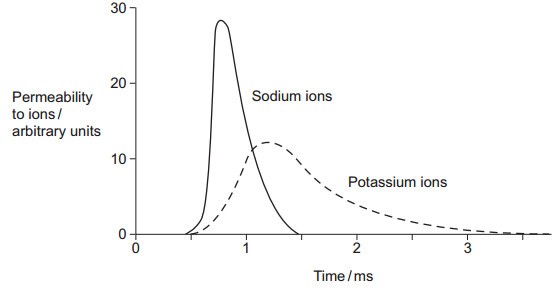
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(b) Explain the adaptations of xylem tissue to its functions of water transport (5 marks)

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1. The graph in figure shows changes in permeability of the membrane to sodium ions (Na+) and to potassium ions (K+) during a single action potential.



1. Explain the shape of the curve for sodium ions between 0.5 ms and 0.7 ms.

(2 marks)

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1. During an action potential, the membrane potential rises to +40 mV and then falls. Use information from the graph to explain the fall in membrane potential. (2 marks)

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(c ) If the permeability of the axon membrane to sodium and potassium ions increased simultaneously, what effect would this have on the action potential? (2 marks)

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1. After exercise, some ATP is used to re-establish the resting potential in axons. Explain how the resting potential is re-established. (2 marks)

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1. Explain the role axon diameter in the transmission of nerve impulses. (2 marks)

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1. (a) Describe three structural differences between a human sperm cell and human egg cell. *(3 marks)*

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(b) Describe the event that occur inside an egg cell immediately the sperm cell nucleus has entered it. *(2 marks)*

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(c) The table below shows the concentration of progesterone hormone during the first 32 weeks of pregnancy

|  |  |
| --- | --- |
| Time/weeks | Concentration of progesterone in blood/ arbitrary units |
| 0 | 7 |
| 4 | 8 |
| 8 | 9 |
| 16 | 11 |
| 24 | 15 |
| 32 | 30 |

1. Describe the changes in concentration of progesterone hormone during the first 32 weeks of pregnancy. *(2 marks)*

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1. Suggest why this is important that these changes occur during pregnancy. *(3 marks)*

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1. In sweet potatoes, flower colour is controlled by two genes, **A/a** and **B/b**. The genes are on different pairs of chromosomes.

Allele **A** produces blue anthocyanin pigment in flowers. Allele **B** has no effect by its self but changes the blue flower colour to purple flower colour. Alleles **a** and**b** have no effect on flower colour. In absence of anthocyanin pigment the flowers are white

1. State the flower colour of sweet potatoes with the following genotypes

(1 mark)

**Aabb**………………………………………………………………………………..

**aaBB**……………………………………………………………………………….

1. Suggest how allele **B** may alter the expression of allele **A** (2marks)

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1. Plants with the genotype **AAbb** and **aaBB** were cross pollinated and the resulting **F1** offspring were interbred to produce **F2** offspring. Use a genetic diagram to determine the phenotypic ratio of **F2** generation. (7 marks)

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