P530/2
BIOLOGY
THEORY
Paper 2
18 July 2022
2 ½ hours

ENTEBBE JOINT EXAMINATION BUREAU

Uganda Advanced Certificate of Education

BIOLOGY THEORY

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of two Sections: **A** *and* **B**.

Attempt question **one** *in* **Section A** *and any* **three** *questions from* **Section B**.

Candidates are advised to read questions carefully, organize their answers and present them precisely and logically.

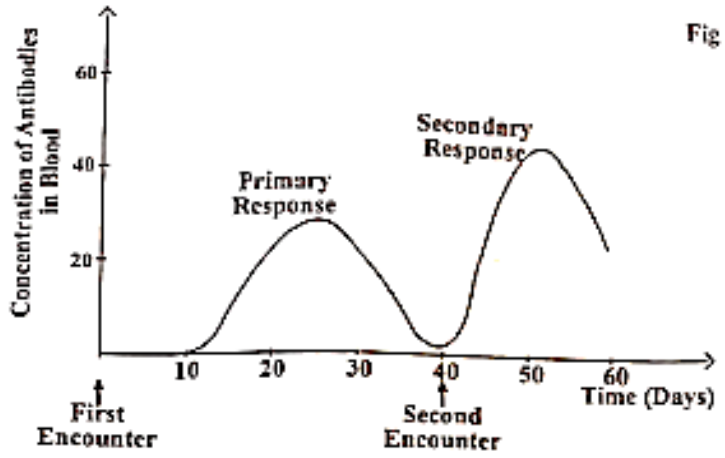
Illustrate whenever necessary with well labeled diagrams.

Any extra questions **shall not** *be assessed.*

SECTION A (40 MARKS)

1. (a) Figure 1 below shows the concentration of an individual after the first encounter with the diseases *(pathogen)* and then the second encounter on the 40th day in a period of 60 days.

Fig 1



(i) Describe the trends of the graph. *(02 marks)*

(ii) Explain primary and secondary response using the above graph. *(06 marks)*

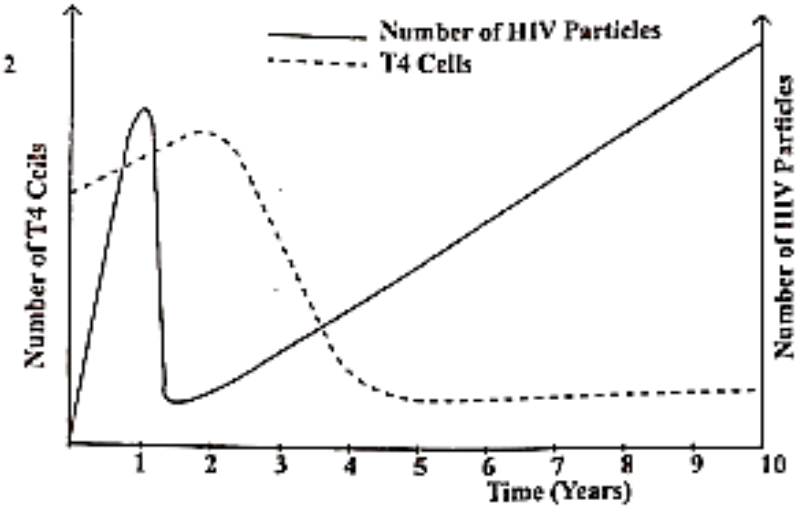
(iii) Give the advantage of response in immunization and use of several doses of a vaccine. *(02 marks)*

(b) (i) With a labeled diagram, describe the structure of an antibody. *(04 marks)*

(ii) Describe the ways in which antibodies combat disease-causing pathogens. *(05 marks)*

(c) Figure 2 below shows the relationship between HIV particles and T_4 cells in the human body in a period of 10 years.

Fig 2



(i) Compare the number of T_4 cells and the number of HIV particles. *(05 marks)*

(ii) Examine the relationship between T_4 cells and the number of HIV particles. *(09 marks)*

(iii) Explain the increase in attack by opportunistic diseases collectively known as AIDS in the later stages of HIV infection. *(04 marks)*

(iv) Describe ways of reducing HIV particles in the body. *(03 marks)*

SECTION B (60 MARKS)

2. (a) Using an example in each case, describe how each of the following is adapted to locomotion. *(10 marks)*

(i) terrestrial animal.
(ii) bird.

(b) Using an example, describe the action of fright in a small fast-moving insect. *(10 marks)*

3. (a) Describe the adaptations of mammals to fertilization and survival of their off springs. *(12 marks)*

(b) Examine the role of hormones in spermatogenesis in males. *(08 marks)*

4. (a) Show how each of the following influences evolution of new species.

(i) Type of pollination *(04 marks)*

(ii) Multitudes of species *(02 marks)*

(iii) Inbreeding *(02 marks)*

(b) Explain the following:

(i) regular use of antibiotics leads to bacteria resistance, *(06 marks)*

(ii) prevalence of sickle cell anaemia trait in the tropics is an advantage to malaria. *(06 marks)*

5. (a) Describe secondary growth in vascular tissues. *(10 marks)*

(b) Write the differences between xylem vessels and phloem sieve tubes. *(04 marks)*

(c) Briefly describe the evidence used to show that translocation of food occurs in the phloem tissue. *(06 marks)*

6. (a) What is meant by the term **epistasis**? *(02 marks)*

(b) A walnut-combed rooster was mated with three hens. *Hen A*, which is pea-combed, produced offspring in a ratio of 3 walnuts: pea combs: 1 rose comb: 1 single comb. *Hen B*, which is walnut-combed, produced offspring in the ratio of 3 walnut combs: 1 rose comb. *Hen C*, which is walnut-combed, has only walnut-combed offspring. Determine the genotypes of the three hens *A*, *B* and *C* and that of the walnut-combed rooster. Show your working. *(12 marks)*

(c) Both haemophilia and colour blindness are transmitted in the same way.

(i) What are the effects of each disease? *(03 marks)*

(ii) Explain why there are more colour blind individuals than haemophiliacs among the population in spite of a similar way of transmission. *(03 marks)*

P530/2
BIOLOGY
(Theory)
Paper 2
AUGUST, 2022
2 ½ hours

JINJA JOINT EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS – AUGUST, 2022

BIOLOGY

(THEORY)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer question ONE in section A plus three others from section B.

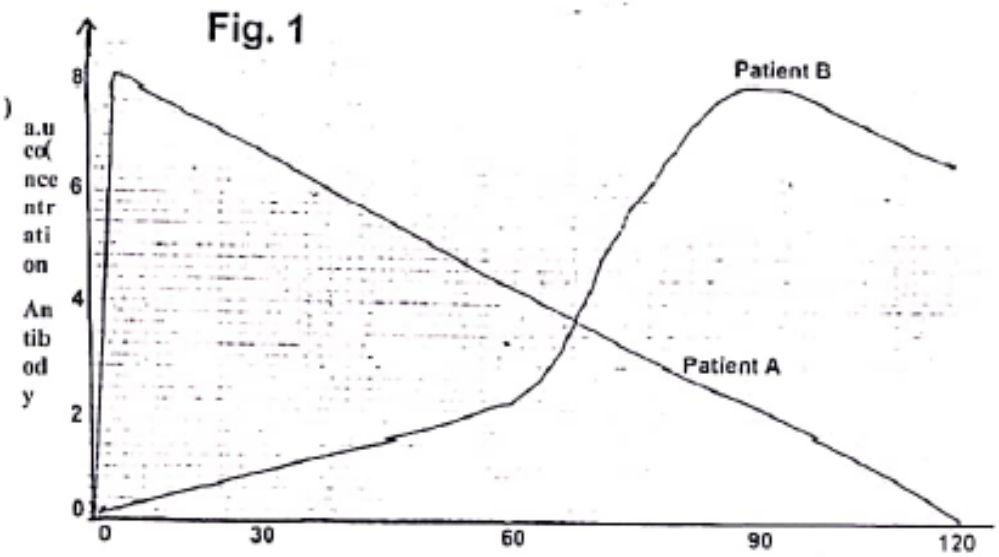
Candidates are advised to read questions carefully, organize their answers and present them precisely and logically.

Illustrate, whenever necessary, with well labelled diagrams.

SECTION A (40MARKS)

1. (a). The graph below in Figure 1 below shows how the concentration of the antibody varied in each of the two patients after immunizing them with different vaccine against a pathogenic microbe.

Fig 1



(i). Describe the variation of the antibody concentration with time in the patients immediately after their immunization. (07marks)

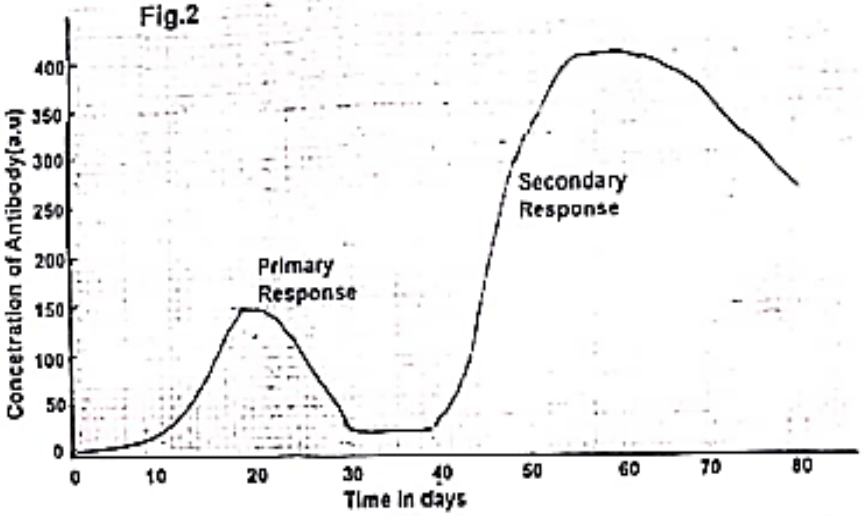
(ii). Explain the differences in the way antibody concentration changed immediately after the immunization of the patients. (12 marks)

(iii). Discuss the advantages of immunizing the infected individuals using the vaccines administered to each of patient A and patient B (07 marks)

(b). The graph in **Figure 2** shows how the antibody concentration varies with time in

days in the first and second infections by the same pathogens.

Fig.2



(i). Explain the differences in the response to infections by the same pathogens indicated in fig 2. above. (06Mark)

(ii). Describe how the antibodies produced in response to infections may destroy the pathogens. (04 marks)

(c). Suggest why it is advantageous to be exposed to mild infections of the pathogenic microbes such as corona virus. (04marks)

SECTIONB B (60MARKS)

2. (a). Explain the evolutionary significance of the processes that bring pollens and stigma together in terrestrial flowering plant species. (08marks)

(b). Outline structural and physiological features of flowering plants that eliminate the disadvantages of inbreeding in crops. (06marks)

(c). Suggest why farmers would prefer using seeds in crop propagation over other planting materials. (06marks)

3. (a). What is meant by

(i). Species (02marks)

(ii). Species extinctions and (01Mark)

(iii). Pests resurgence? (01marks)

(b). (i). Outline human activities that may lead to extinction of the species. (04marks)

(ii). Explain how man has contributed to the formation of new species. (06marks)

(c). Describe the evolutionary effects of the following.

(i). Predation (03 marks)

(ii). Migration (03 marks)

4. (a). Describe how the epithelial tissue is suited for the function of.

(i). Protection (04marks)

(ii). Gaseous exchanged and absorption of food. (08marks)

(b). How are the requirements for efficient gaseous exchange fulfilled in the mammalian lungs and gills in fish? (08marks)

5. Explain what is meant by genetic disorder. (02marks)

(b) Explain how a small difference in the base sequence of DNA can lead to a large difference in the structure of a protein produced such as hemoglobin (06marks)

(c).(i). If two people with sickle cell trait marry, what are the chances that their first child will have sickle cell anaemia? (06marks)

(ii). Explain why despite of strong selection pressure against people with sickle cell anaemia, the sickle allele is not easily eliminated in human populations. (06marks)

6. (a). State the functions of water absorbed into plants. (04marks)

(b). Explain

(i). the ways in which the soil temperature and humidity of air surrounding leaves affect absorption by the roots. (05marks)

(ii). how the leaf structure is suited for transpiration? (06marks)

(c). Compare transpiration and sweating in mammals. (05marks)

P530/2
BIOLOGY
(Theory)
Paper 2
July/ Aug: 2022
2 ½ hours

MMM JOINT MOCK EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
(THEORY)
Paper 2

2 hours 30 minutes

INSTRCUCTIONS TO CANDIDATES:

This paper consists of **six** *questions.*

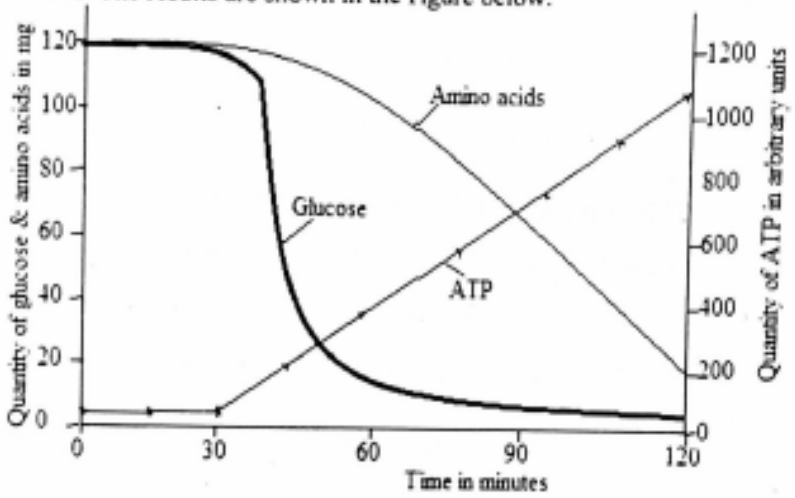
Answer question **one** *in section* **A** *plus* **three** *others from section* **B**.

Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustration with well labeled diagrams where necessary.

Turn Over

SECTION A (40 MARKS)

1. An experiment was carried out using mitochondria isolated from muscle cells of a mammal. The mitochondria were placed in a buffer solution into which similar quantities of glucose and amino acids had been added. The variation in the quantity of glucose, amino acids and ATP liberated were monitored for a period of 2 hours. The results are shown in the figure below.



(a) Explain the variation in the quantity of:
- (i) Glucose; *(08 marks)*
- (ii) Amino acids *(06 marks)*
- (iii) ATP *(05 marks)*

(b) Explain why:
- (i) the experiment was carried out using a buffer solution. *(03 marks)*
- (ii) quantity of glucose and amino acids were maintained at the beginning of the experiment. *(02 marks)*
- (iii) the amount of glucose or amino acids does not reduce to zero. *(02 marks)*

(c) Calculate the rate of depletion of each substance. *(03 marks)*

(d) Giving reasons, predict the likely changes if the experiment was allowed to run for another two hours. *(06 marks)*

(e) (i) Suggest why the quantity of ATP does not begin from zero. *(02 marks)*
(ii) How is the mitochondrion modified to suit to its functions? *(03 marks)*

SECTION B (60 MARKS)

2 (a) Explain how the environment may influence the process of natural selection. *(10 marks)*

(b) Explain how the following may have similar effects to natural selection in nature:
(ii) founder effect;

(ii) genetic drift;

(iii) predator-prey interaction. *(10 marks)*

3 (a) Describe the adaptation of blood in terrestrial animals living in the following environmental conditions:
(i) Extreme oxygen tensions. *(08 marks)*

(ii) High altitude. *(04 marks)*

(b) Describe how carbon dioxide from the respiratory tissue is transported to the alveolus. *(08 marks)*

4 (a) Discuss reasons why animals have to move from one place to another. *(08 marks)*

(b) Describe how propulsion is achieved in:
(i) an earthworm. *(05 marks)*

(ii) a plantigrade bipod. *(05 marks)*

5 (a) Describe the features common to all nerve impulses. *(08 marks)*

(b) Explain how action potential and repolarization is achieved across membrane of a motor neuron. *(12 marks)*

6 (a) What is the importance of a larval stage in the life cycle of an organism? *(06 marks)*

(b) Describe the hormonal control of ecdysis and metamorphosis in insects. *(14 marks)*

END

SECTION A (60 MARKS)

1. The graphs in figure 1 below shows the rate of decomposition of discs of oak leaves in mesh bags of different sizes with time and the graph in figure 2 shows the rate of decomposition of the same plant material with depth below soil surface in a forest habitat. Study the graphs in the figures 1 and 2 and answer the questions that follow.

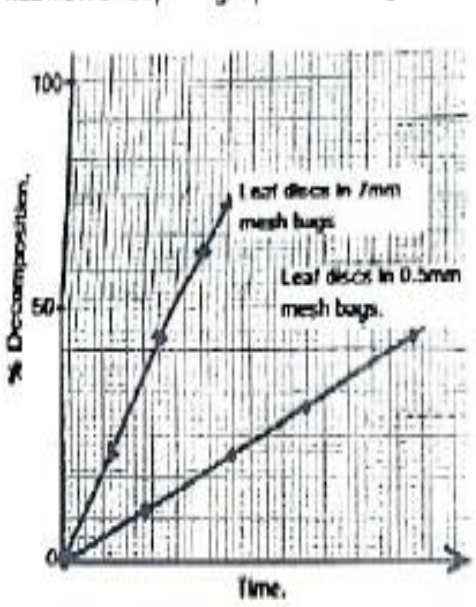


Fig.1

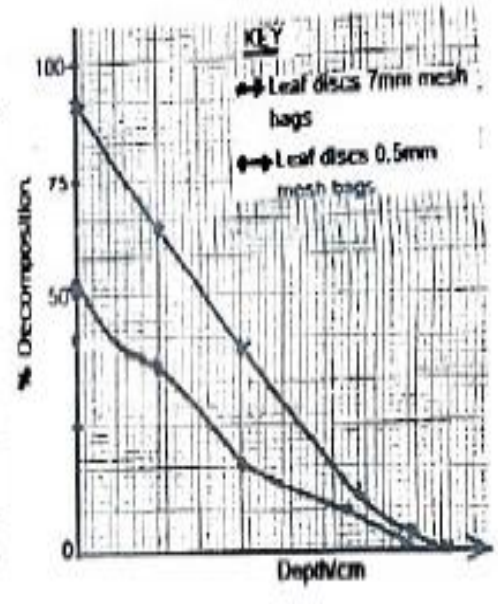


Fig.2

(a) Compare the percentage decomposition of leaf discs in mesh bags of 7mm and 0.5mm with time. (08 marks)

(b) Explain the ,

(i) Effect of mesh size on the percentage decomposition of the leaf discs. (10 marks)

(ii) The percentage decomposition of the leaf discs with depth in 7mm and 0.5mm mesh bags. (12 marks)

(c) Predict the change in the percentage decomposition of the leaf discs in both mesh bags if the experiment continued for some time and give reasons for your answers (04 marks)

(d) What are the ecological significance of leaf decomposition in a natural habitat. (06 marks)

SECTION B (60 MARKS)

2(a) Differentiate between Guttation and Transpiration. (05 marks)

(b) Account for the role played by energy inform of ATP molecules in biological processes taking place in flowering plants. (10 marks)

(c) How is the structure of the phloem adapted for transport of sugars (05 marks)

3. (a) Distinguish between the hormones insulin and glucagon (06 marks)

(b) Explain how mammalian kidneys regulate pH in blood and tissue fluids of a norm. (14 marks)

4. (a) Describe how the structure of each of the following carbohydrates suit their major roles,

(i) Cellulose (06 marks)

(ii) Starch. (06 marks)

(b) How do enzymes work to catalyze Biological reactions. (08 marks)

5 (a) Describe factors that limit recombination of genes. (06 marks)

(b) Explain how ,

(i) geographical Isolation leads to speciation. (08 marks)

(ii) vestigial organs provide support for organic evolution. (06 marks)

6 (a) By aid of a diagram, describe the structure of an areolar tissue. (06 marks)

(b) Describe the roles of areolar tissue in defence against infections. (05 marks)

(c) Explain how each of the following tissues are adapted for their roles

(i) Mesophyll cells. (04 marks)

(ii) Endodermis. (05 marks)

SECTION B (60 MARKS)

2 (a) What is meant by the term "Lethal Gene" (02 marks)

(b) Explain how lethal gene condition leads to evolution (07 marks)

(c) Chickens with shortened wings and legs are called Creepers. A cross between creepers produce creepers and normal winged chicken in the ratio of 2 : 1 respectively. Explain the results of a cross between a creeper and normal winged chicken which produced creepers and normal birds in equal proportion of 1 : 1 (11 marks)

3 (a) Describe,

(i) Processes which will lead to formation of Dipeptide in a cell (07 marks)

(ii) Physiological significance of monosaccharides to plants (05 marks)

(b) Explain the effect of changes in pH on the enzyme activity (08 marks)

4. (a) Differentiate between the hormones insulin and glucagon. (07 marks)

(b) Explain the large production of each of the following under certain conditions.

(i) Sweat on the skin surface (06 marks)

(ii) very dilute urine in very cold environment among mammals. (07 marks)

5. (a) Describe the structure of cardiac muscle. (05 marks)

(b) Account for,

(i) how cardiac muscles contraction is initiated, (06 marks)

(ii) Significance of alternate contraction and relaxation of smooth muscles in mammals (09 marks)

6. (a) What is meant by the term environmental degradation (02 marks)

(b) Explain the ecological impact of each of the following human activities,

(i) Use of polythene papers (06 marks)

(ii) Use of pesticides. (06 marks)

(c) What are the benefits of conserving nature. (06 marks)

P530/2
BIOLOGY
(*Theory*)
Paper 2
2 ½ Hours
August 2022

TORORO ARCHDIOCESE EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS 2022

BIOLOGY

(Theory)

Paper 2

2 Hours30 Minutes

INSTRUCTIONS TO CANDIDATES

*Answer question **one** in section **A**and**three** others from section **B**.*

Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically using well labeled diagrams wherever necessary.

SECTION A – 40 MARKS

Question 1 is compulsory.

1. Three species of the genus Lolium, **A, B, C** and a **hybrid** between two of them were tested for their flowering requirements. All the strains were grown under controlled conditions (23^0C day temperature; 17^0C night temperature; long photoperiods). Sample plants of each strain were then subjected to different periods of time at 4^0Cbefore being returned to the original conditions. The results of the experiment are shown in Figure 1 below. **Strain A** of Lolium did not flower at week O (zero) at 4^0C

The graph below represents results of a study on flowering requirements for three species of genus lolium and a **hybrid** between two of them. The number of days which elapsed between the end of the cold treatment and the onset of flowering were recorded after sample plants of each strain were subjected to different periods of time at 4^0C

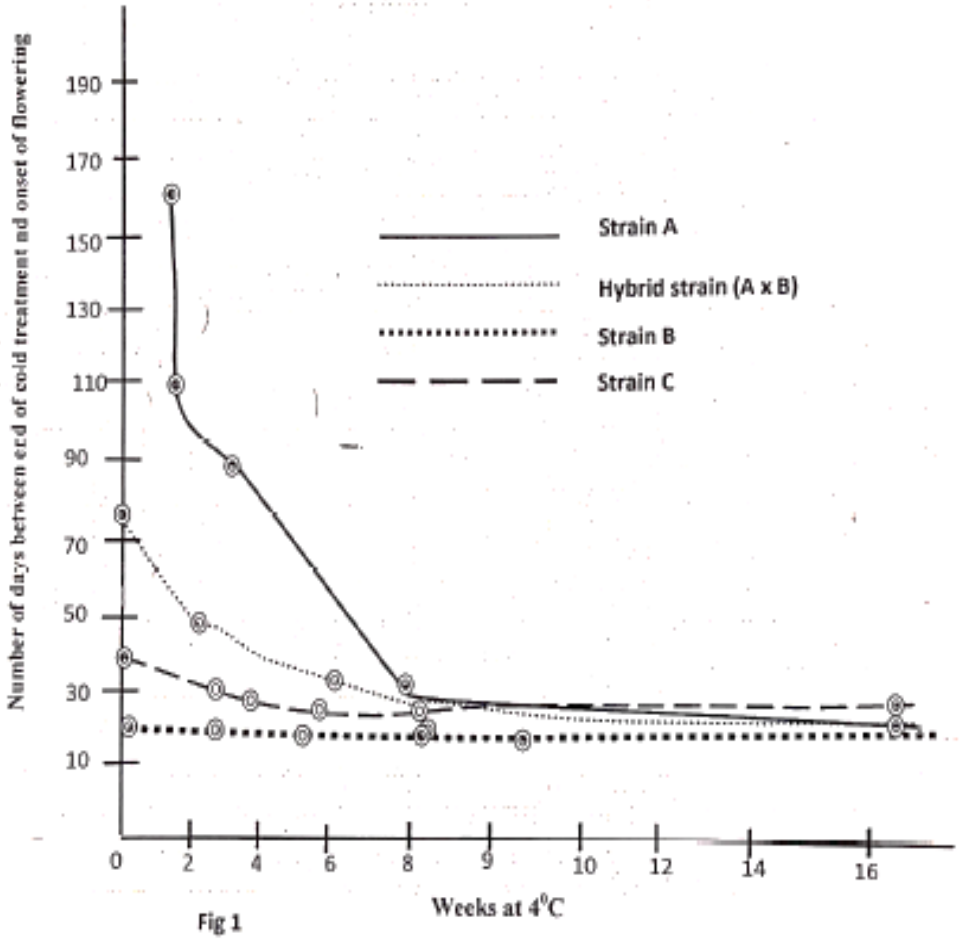


Fig 1

In another experiment, the effect of controlled periods of light and dark on the subsequent flowering behavior of cocklebur (xanthium strunarium) was studied. The results are shown in Table 1 below

Table 1.

Hours of alternating light and dark periods		Response
Light	Dark	
8	16	Flowering
8	16 with light flash in middle of dark period	No flowering
16	16	Flowering
16	8	No flowering
16	8 with dark flash in middle of light period	No flowering
8	8	No flowering
12	12	No flowering

(a) Describe the effect of increasing periods of cold treatment on the onset of flowering in each strain of Lolium. (8 marks)

(b)(i) Name the biological process being investigated as shown by results in figure 1 (1 mark)

(ii) What is the significance of this biological process to the life cycle of Lolium? (5 marks)

(c) (i) In table 1, is cocklebur a short day plant, a long day plant, or a day-neutral plant? (1 mark)

(ii) With reference to the data in the table, explain whether flowering is triggered by the length of the day or the length of the night. (8 marks)

(d)(i) Explain in terms of Pr and Pfr how phytochrome controls flowering in short day plants and long day plants (7 marks)

(ii) Explain why a light flash in the middle of the dark period interrupts flowering, but a dark flash in the middle of the light has no effect. (4 marks)

(iii) Would the effect of the light flash in the middle of the dark period depend on the wavelength? (1 mark)

(iv) What would be the effect of a flash of red light and a flash of blue light? (1 mark)

(v) Sketch an action spectrum for the response (2 marks)

(c) How do relative lengths of light and dark affect a named type of animal behavior? (2 marks)

SECTION B (60 Marks)

2. Many of the metabolic reactions that occur in organisms produce hydrogen ions which could change the PH of body fluids.

(a) (i) Name two substances or groups of substances which act as buffers in mammals (2 marks)

(ii) Describe how the kidney helps to maintain the PH of the blood at a constant level (8 marks)

(b) Explain how glucose is reabsorbed in the nephron. (5 marks)

(c) Explain how a high blood pressure can be so dangerous to the functioning of the kidney nephron (5 marks)

3. (a) Describe the path taken by water through an angiosperm plant, from the soil to the atmosphere (8 marks)

(b) Explain the mechanisms involved in this movement in terms of water potential (8 marks)

(c) Why do some plants in water logged soils fail to absorb water? (4 marks)

4. (a) Describe the structure of
   (i) Xylem (6 marks)
   (ii) Compact bone (7 marks)

(b) How is the structure of these tissues in (a) above is related to the functions they perform? (7 marks)

5. (a) Give an account of the production of gametes by the mammalian ovary. (8 marks)

(b) What events occur in the egg immediately following the entry of the spermatozoon? (6 marks)

(d) Explain how hormones interact to bring about ovulation (6 marks)

6. What are the ecological effects of the following:

   (i) Deforestation (12 marks)
   (ii) Discharge of raw sewage into a lake (8 marks)

END

P530/2

BIOLOGY (Theory)

PAPER 2

JULY/AUG 2022

2 ½ HOURS

ASSHU MBARARA JOINT MOCK EXAMINATIONS 2022

Uganda Advanced Certificate of Education

BIOLOGY

PAPER 2

2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

- *Answer question 1 from section A and any THREE questions from section B.*
- *Your answers must be well organized and illustrated with appropriate diagrams whenever necessary.*
- *Begin a fresh number on a new page.*

SECTION A (40 MARKS)

1. Figures 1 (a) and 1 (b) show the physiological changes that occur in a fruit as it ripens.

fig 1 (a)

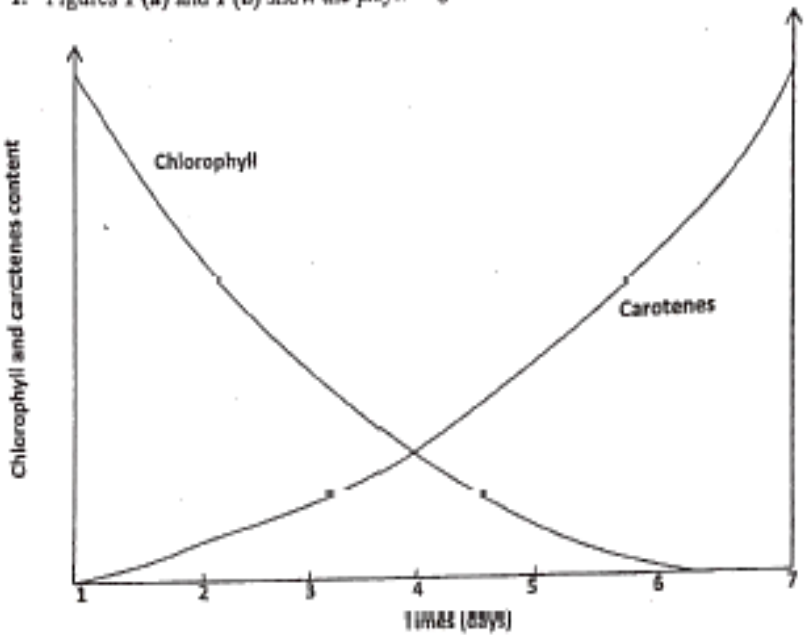
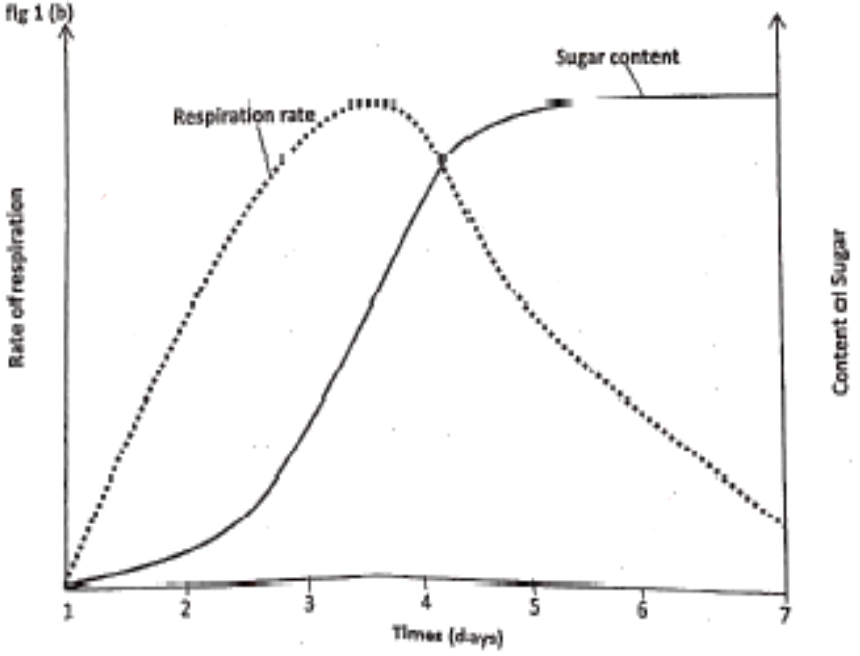


fig 1 (b)



1.(a) Describe how each of the following variables change with time (5 mks)

i) Respiratory rate

ii) Sugar content

(b) Explain the variation in each of the following (10 mks)

(i) Respiratory rate

(ii) Sugar content

(c) Explain the relationship between the content of chlorophyll of carotenes (6 mks)

(d) What is the ecological significance of each of the changes depicted on figure 1 (a) and (b) (5 mks)

(e) Outline other changes which occur in a fruit as it ripens. In each case give the importance of the change (4 mks)

(f) (i) What is abscission? (2 mks)

(ii) Describe the process of abscission in a fruit (8 mks)

SECTION B (60 MARKS)

2. (a) Describe how the changes in soil osmotic pressure can affect the mechanical support of a plant. (5 mks)

(b) Describe the mechanism of pressure flow hypothesis in the translocation of photosynthetic products. (15 mks)

3.(a) Discuss how meiosis leads to variation in a sexually reproducing organisms. (8 mks)

(b) Explain how each of the following leads to evolution of new species (8 mks)

(i) increased population size

(ii) selective breeding

(c) Describe how regular use of antibiotics can result into bacterial resistance (4 mks)

4.(a) What is meant by the menstrual cycle? (4 mks)

(b) How is the growth of graffian follicles in the ovary initiated and controlled? (16 mks)

5.(a) Compare the factors that control ventilation with those controlling heart rate in humans. (6 mks)

(b) Explain how the transmission of an impulse is inhibited across the synapse? (14 mks)

6.(a) Describe the process of locomotion without the use of muscles in organism. (12 mks)

(b) Describe the adaptations of birds for flight. (8 mks)

END

P530/2
BIOLOGY
(Theory)
PAPER 2
July/August
2½ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

BIOLOGY

(Theory)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

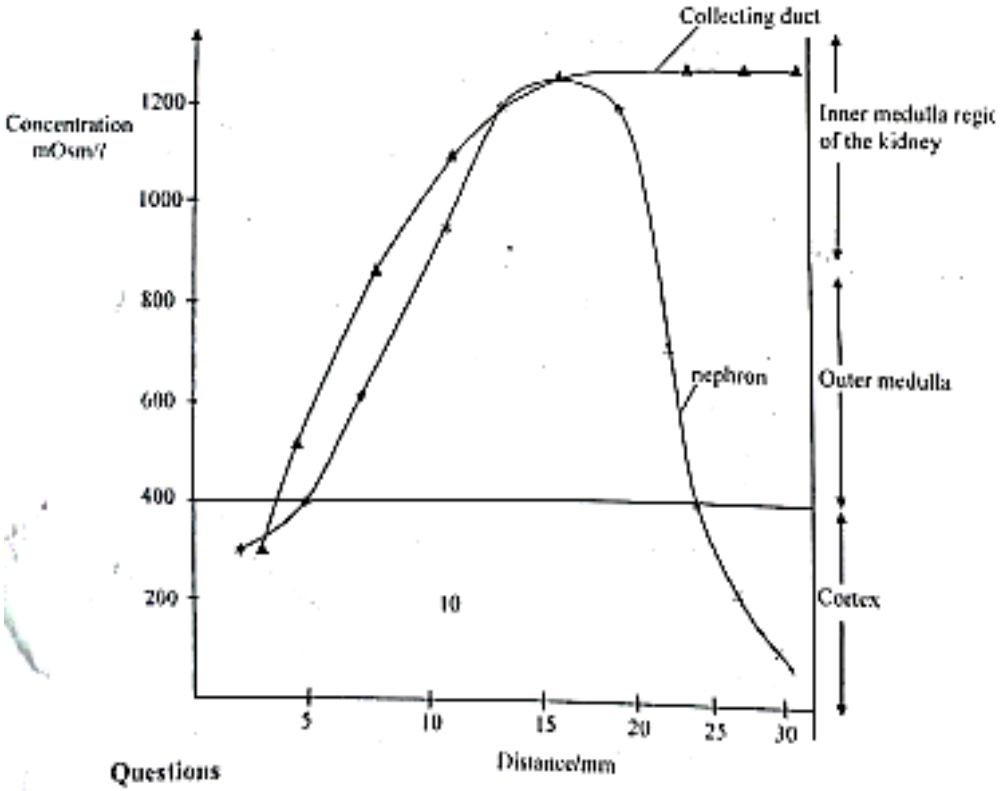
- *This paper consists of sections,* A *and* B.
- *Answer question* one *in section* A *plus* three *other questions from section* B.
- *Any additional question(s) answered will* not *be marked.*
- *Candidates are advised to read the questions carefully, organise their answers and present them precisely and logically.*
- *Illustrate with well labelled diagrams, wherever necessary.*

SECTION A (40 MARKS)

COMPULSORY QUESTION

1. Excretion of urea and other waste products is done by the nephron. The nephron transverses along the different regions of the kidney along which different substances like uren, water and salts i.e.(Na^+, Cl^- and K^+) are either added or removed depending on a variety of factors.

Fig 1.below; shows the variation of concentration within the glomerular filtrate along the nephron and the collecting duct. Study it carefully.



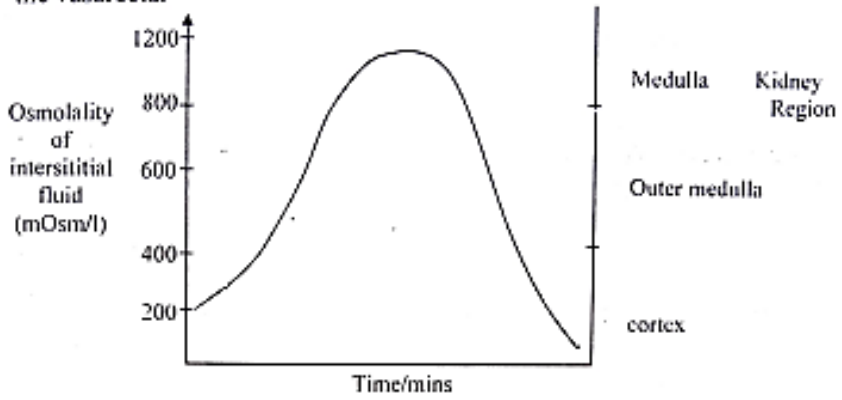
Questions

a) Describe the variation in concentration within the glomerular filtrate in the different regions of the kidney;
   (i) nephron (10 marks)
   (ii) collecting dust (6 marks)

b) Explain why the variation in concentrations within the glomerular filtrate in the different region of the kidney are as above in the;
   (i) nephron. (10 marks)
   (ii) collecting duct. (6 marks)

c) The vasarecta a blood vessel surrounding the nephron has both ascending and descending loops transversing the kidney.
The Osmolality of the interstitial fluid flowing per litre with in the vasarecta was measured at intervals.

Fig. 2 below, shows the Osmolality of interstitial fluid (mOsm/c) within the vasarecta.



(i) With reference to the curve for collecting duct fig. 1 and curve in fig. 2, state the similarities between the concentration in fluids flowing within the Vasa recta and the collecting duct. (3 marks)

(ii) Explain the observed similarities. (3 marks)

(iii) Mention any other function performed by the kidney apart from those discussed above. (2 marks)

SECTION B (60 MARKS)

Answer three questions from this section.

2. a) Write down the similarities and differences between angiosterms and gymnosperms. (8 marks)

b) i) Describe the life cycle of a virulent bacteriophage. (6 marks)
ii) List the importance of bacteria. (6 marks)

3. a) Describe the structure and function of the following tissues.
i) Areolar tissue. (8 marks)
ii) Striated muscle tissue. (8 marks)

b) How does the structure of proteins permit the wide variety of the functions of proteins? (4 marks)

4. a) What is meant by a receptor? (3 marks)

b) Describe the general features common to all receptors. (5 marks)

c) Using the mammalian ear as an example show how a receptor organ functions. (12 marks)

5. a) Describe the formation of vascular tissues in a herbaceous dicotyledonous stem. (12 marks)

b) i) What is linkage? (2 marks)

ii) A population of human beings will contain many more colour blind individuals than haemophilliacs although the genes are transmitted in the same way. Explain. (6 marks)

6. a) Discuss the different ways in which man has influenced natural habitats to suit his style of living. (12 marks)

b) What is the long term effect of the following?
i) Pesticide application. (4 marks)
ii) Global warming. (4 marks)

END

P530/2
BIOLOGY (Theory)
PAPER 2
July/August 2022
2 ½ Hours

KASSEC

KAYUNGA SECONDARY SCHOOLS EXAMINATIONS COMMITTEE (KASSEC)
JOINT MOCK EXAMINATIONS 2022
Uganda Advanced Certificate of Education
BIOLOGY
Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

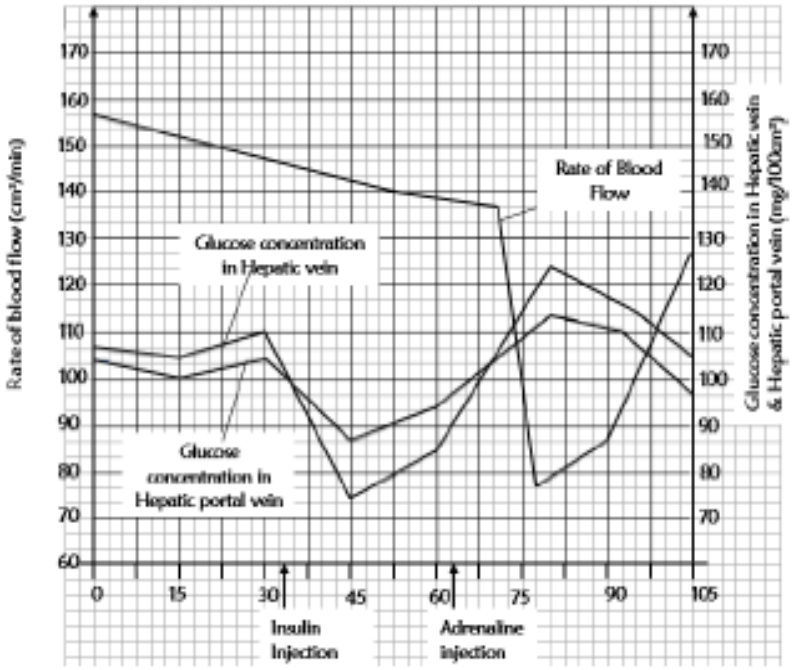
- *This paper consists of six questions.*
- *Answer question one in section **A** plus three others from section **B**.*
- *Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustrating with well labeled diagrams wherever necessary.*

Turn Over

SECTION A: 40 MARKS

1. In an experimental animal, the hepatic artery was ligatured and the rate of blood flow through the hepatic vein measured. The level of blood glucose in the hepatic vein and hepatic portal vein were measured at 15 minutes intervals.

   Presently insulin was injected and subsequently adrenaline. Use the graph to answer the questions that follow.



   a) Compare the levels of blood glucose in the hepatic vein and hepatic portal vein. **(07 marks)**

   b) Explain the effect of injection of each of the following hormones on the glucose concentration in the hepatic vein.
      (i) Insulin. **(06 marks)**
      (ii) Adrenaline. **(04 marks)**

   c) Explain the changes in glucose concentration in the hepatic vein between,
      (i) 65 and 105 minutes. **(06 marks)**
      (ii) 0 and 30 minutes. **(04 marks)**

   d) Explain the changes in the rate of blood flow
      (i) During the first 10 minutes after injection of adrenaline. **(05 marks)**
      (ii) Between 75 and 105 minutes. **(08 marks)**

SECTION B: 60 MARKS

(Attempt any three questions)

2. a) How does the structure of the plasma membrane relate to its role? **(09 marks)**
   b) Explain how each of the following occur across the cell membrane;
      (i) Active transport. **(06 marks)**
      (ii) Endocytosis. **(05 marks)**
3. a) Describe the mechanisms used for ventilating the gas exchange systems of;
      (i) Mammals. **(09 marks)**
      (ii) Bony fish. **(08 marks)**
   b) Explain how the direction of the flow of blood and the flow of water increase the efficiency of the gill plate as an exchange surface. **(03 marks)**
4. (a) What is meant by genetic recombination? **(04 marks)**
   b) Outline the conditions that limit the degree of recombination in animal populations. **(06 marks)**
   c) Explain how genetic recombination brings about variation. **(10 marks)**
5. a) Describe the methods of movement without the use of muscles in animals **(12 marks)**
   b) Explain the difference in energy expenditure of a running animal and an equal size fish specialized for swimming. **(08 marks)**
6. (a) Compare the action of auxins and gibberellins in higher plants. **(12 marks)**
   b) Outline the ecological significance of tropic responses in plants. **(08 marks)**

END

P530/2
BIOLOGY
Paper 2
August, 2022
2½ hrs

UNNASE MOCK EXAMINATIONS

Uganda Advanced Certificate of Education

BIOLOGY

PAPER 2

2HOURS 30MINUTES

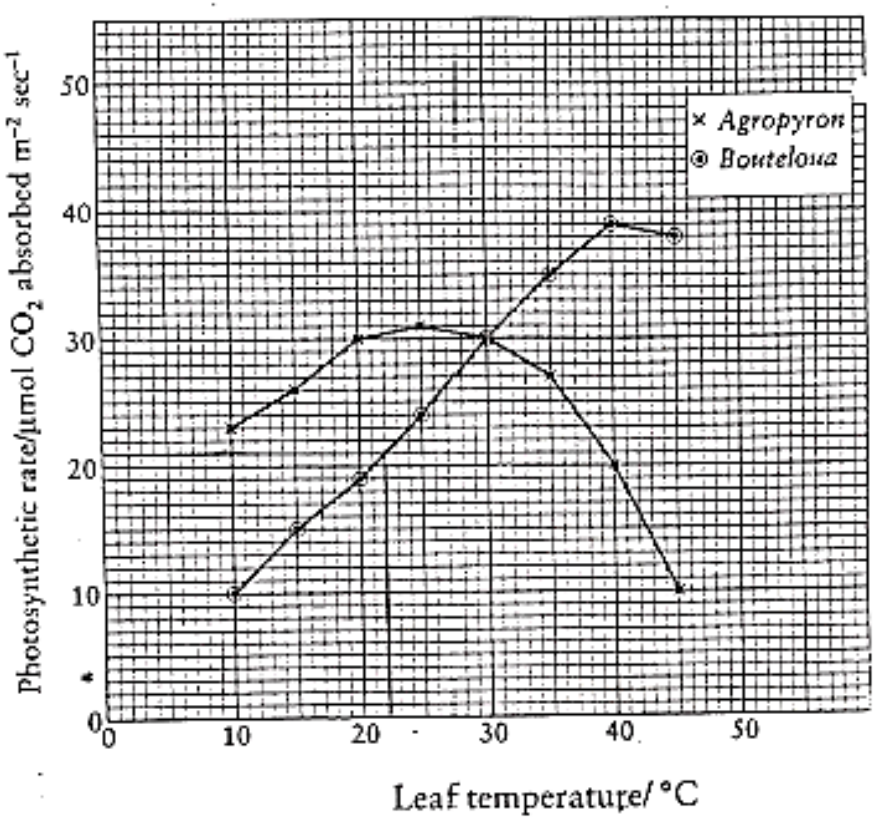
INSTRUCTIONS TO CANDIDATES

- *This paper consists of Sections* **A** *and* **B**.
- *Answer question* **one** *in section* **A** *plus* **three** *questions from Section* **B**.
- *Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically, illustrating with well labelled diagrams where necessary.*

SECTION A: (40 MARKS)

Question 1 is compulsory.

1. The graph below shows the effect of temperature on the rate of photosynthesis in two grasses, ***Agropyron*** and ***Bouteloua***



a) Compare the two curves. *(06 marks)*

b) Account for the rate of photosynthesis of ***Agropyron*** from:

(i) **10 - 25°C.** *(10 marks)*

(ii) **25 - 45°C.** *(04 marks)*

c) i) Describe the photosynthetic mechanism which is likely to occur in the cytoplasm of the mesophyll cells **of *Bouteloua*.** *(05 marks)*

ii) Explain the physiological significance of the mechanism described in (e) (i) above. *(04marks)*

d) Basing on the data provided, outline the physiological and ecological advantages of ***Bouteloua*** over ***Agropyron***. *(06 marks)*

e) What is meant by **CAM**. *(05 marks)*

SECTION B (60 MARKS)

2) a) Explain how variation in light intensity affects exchange of gases between the leaf cells and the atmosphere. *(10 marks)*

b) Describe how non specificity of photosynthetic enzymes affects productivity. *(10marks)*

3) a) Compare the spores of a moss plant with the pollen grains of

b) Explain how the formation of a seed in angiosperms has contributed to their evolutionary success. *(10 marks)*

4) a) Explain the glowing eyes of the cat at night, when shone with light. *(05 marks)*

b) Account for the sensitivity of rods towards light. (05 marks)

c) Describe the physiological behavior of a rod in darkness. *(10 marks)*

5) a) When inserted in a hypotonic solution Describe the changes in the:

i) pressure potential,

ii) water potential of the plasmolysed plant cell when inserted in a hypotonic solution. *(12 marks)*

b) Account for the negative water potential of any solutions. *(08 marks)*

6) In cats, short hair is dominant over long hair. The gene involved is autosomal. Another gene which is sex linked produces hair colour, its alleles produce black or white coat colour and the heterozygote combination produces tortoise shell coat colour.

a) If a long-haired black male is mated with a tortoise shelled female homozygous for short hair, what kind of off springs will be produced in F1? *(09 marks)*

b) i) If the F1 cats are allowed to interbreed freely among themselves, what are the chances of obtaining long haired males? *(07 marks)*

ii) Using specific examples, describe the common effects of mutations. *(04 marks)*

END

P530/2

BIOLOGY

(Theory)

Paper 2

July 2022

2½ Hours

UGANDA MUSLIMS TEACHERS' ASSOCIATION

UMTA JOINT MOCK EXAMINATIONS -2022

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY

(THEORY)

Paper 2

2 hours 30 minutes.

INSTRUCTIONS TO CANDIDATES:

This paper consists of six questions.

Answer question **one** in **section A** plus **three** others from **section B**.

Candidates are advised to read the questions carefully, organize their answers and present them precisely and logically with well labelled diagrams where necessary.

Candidates are also advised to write on the front page of the answer sheets used, their full name, index number and indicate the questions attempted in the their orders in a table as shown below,

Question					TOTAL (%)
Marks					

SECTION A (40 MARKS)

1. An experiment was conducted to investigate the uptake of nitrogen and the amount of nitrogen incorporated into organic compounds in groups of soya beans that belong to the family Papilionaceae (legumes). These plants possess root nodules containing Rhizobium bacteria.

In this investigation, different groups of the soya bean seedlings were grown under green houses (Glass houses).

The first group of the soya bean seedlings were grown in a glass house enriched with carbon dioxide.

The second group of the soya bean seedlings (control plants) were grown in glass house in a normal atmosphere of carbon dioxide.

After 25 days, the total amount of nitrogen incorporated into compounds in these plants were measured at intervals of time until the plants were 100 days old.

The results of the experiment is shown in the figure 1 below. Study it and answer the questions.

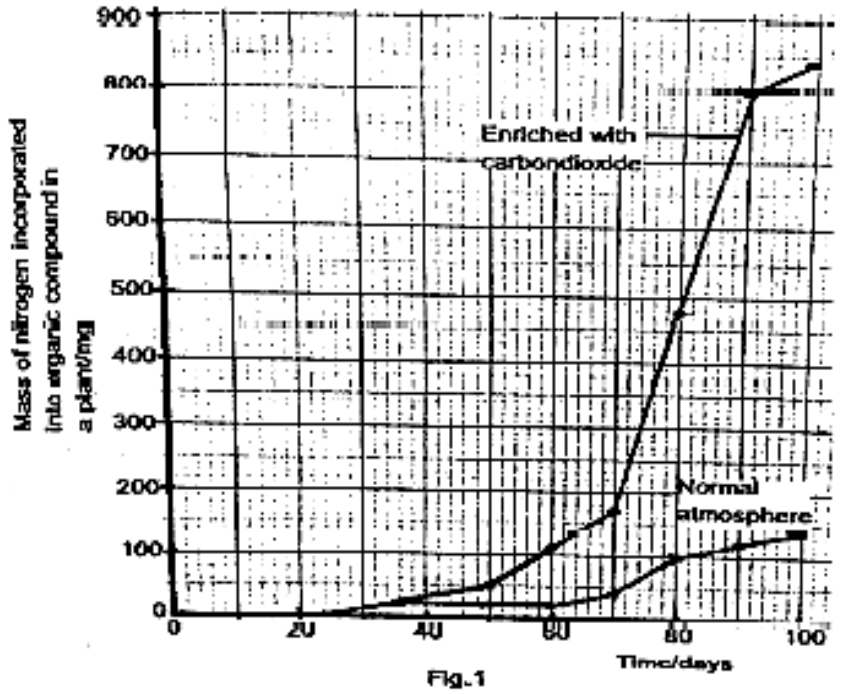


Fig.1

(a) Compare the mass of nitrogen incorporated into compounds in the first and second groups of the soya bean seedlings. (09 marks)

(b) Explain,

(i) The trend of the mass of nitrogen incorporated into organic compounds in the first group of the soya bean seedlings beyond 70 days (07 marks)

(ii) The difference in the mass of nitrogen incorporated into organic compounds in the first and second group of soya bean seedlings. (10 marks)

(c) Briefly describe how cells of the soya bean plants can obtain nitrogen that are incorporated into the organic compounds, from the,

(i) Soil (04 marks)

(ii) Atmosphere. (03 marks)

(d) Suggest why, it was necessary to,

(i) Grow the soya bean seedlings in green houses. (03 marks)

(ii) Conduct the investigation with the second group of soya bean seedlings. (02 marks)

(e) In what ways are activities in a green houses (Glass houses) similar to the global green house effect. (03 marks)

SECTION B (60 MARKS)

2. (a) State the significance of excretion in mammals. (04 marks)

(b) Describe physiological differences that exist in osmo-regulation between fresh water fish and marine bony fish. (07 marks)

(c) Account for the production of small quantities of hypertonic urine in mammals. (09 marks)

3. (a) Describe the roles played by different organelles in synthesis of glycol-proteins in the cell of living organisms. (09 marks)

(b) Discuss about the cell membrane, the existence of each of the following, its

(i) Fluid mosaic nature. (07 marks)

(ii) Bilayer. (04 marks)

4. (a) Give physiological events which will occur in menstrual cycle when fertilization does not succeed. (06 marks)

(b) Discuss series of processes that occur in menstrual cycle leading into the development of,

(i) Graafian follicle. (06 marks)

(ii) Corpus luteum. (08 marks)

5. (a) Compare directional and disruptive selections. (08 marks)

(b) Explain ,

(i) How comparative biochemistry provides evidence that support organic evolution. (06 marks)

(ii) The effect of base deletion mutation on the overall nature of protein molecules synthesized. (06 marks)

6. (a) How does structural arrangements of tissues in higher plants permit transport of materials. (08 marks)

(b) Explain how each of the following play roles in transport of water in plants,

(i) Particular plant tissues. (08 marks)

(ii) Environmental temperatures. (04 marks)

END

P530/2

Biology

(Theory)

Paper 2

July/Aug. 2022

2½ Hours

UGANDA TEACHERS' EDUCATION CONSULT (UTEC)

Uganda Advanced Certificate of Education

BIOLOGY
(Theory)

Paper 2

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of six *questions.*

Answer question **one** *in section* A *plus* **three** *others from section* B.

Candidates are advised to read the questions ***carefully****, organize their answers and present them* ***precisely*** *and* ***logically****, illustrating with well labelled diagrams where necessary.*

Turn Over

SECTION A (40 MARKS)

1. In an investigation, a diabetic and normal individual were given a similar amount of glucose solution at **7:00 am**. Figure **1** shows the blood glucose levels of a normal and a diabetic individual.

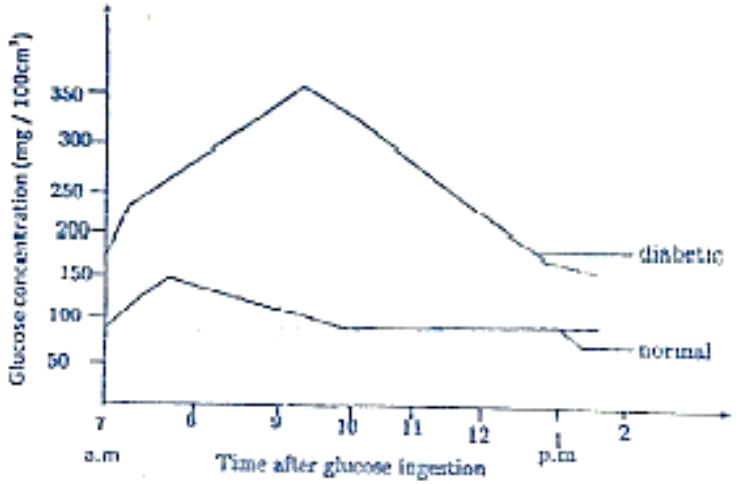


Fig.1

In another experiment, an individual was made to fast overnight and then ingested 75g of glucose. At an interval of 30minutes the concentration of glucose and insulin in blood were determined. Table **1** shows the results obtained.

Table1

Time/minutes	Mean concentrations	
	Glucose/nmoldm^{-3}	Insulin/μmoldm^{-3}
0	50	2.0
30	55	2.0
60	60	4.0
90	80	6.0
120	60	8.0
150	50	6.5
180	50	2.0

Use the information provided to answer questions that follow.

(a) Describe the effect of glucose ingestion on glucose levels in the following individuals.
(i) Diabetic.
(ii) Normal. (04marks)
(04marks)

(b) (i) Describe the differences in the glucose levels of diabetic and normal individuals. (04marks)

(ii) Explain the observed differences in the levels of glucose of the two Individuals. (06marks)

(c) Suggest and explain how the results of the experiment in figure I would be affected if the:
(i) Normal individual had ingested a starch solution instead of glucose solution. (05marks)

(ii) Diabetic individual was injected with insulin hormone before ingestion of the glucose solution. (03marks)

(d) (i) Describe the relationship between the concentration of glucose and insulin in tablet. (03marks)

(ii) Explain the relationship described in (d) (i) above. (04marks)

(e) From the results in table I above, explain the likely healthy condition of the individual. (04marks)

SECTION B (60MARKS)

Attempt any THREE *questions.*

2. (a) Explain how the following tissues are adapted for their function.
(i) Xylem vessels. (08marks)
(ii) Compact bone. (06marks)

(b) How is support achieved in herbaceous plants? (06marks)

3. (a) Describe the structure and formation of nucleic acids. (10marks)
(b) How is DNA involved in the synthesis of proteins in cells? (06marks)
(c) Explain the effect of temperature on the denaturation of enzymes. (04 marks)

4. (a) Differentiate between the circulatory system of fish and mammals. (05marks)

(b) Outline the events that lead to ventricular systole in mammals. (06marks)

(c) Explain each of the following observations:
(i) Endothermy requires a double circulatory system. (04marks)
(ii) Single circulation is not suitable for fresh water fish. (05marks)

5. (a) Explain the ecological impact of each of the following human activities.
(i) Use of pesticides. (07marks)
(ii) Drainage of nitrate into water bodies. (06marks)

(b) How can endangered species be conserved? (07marks)

6. (a) How is the loss of uterine lining prevented after conception in humans? (04marks)

(b) Explain the role of the placenta as a barrier and link between the foetus and the mother. (08marks)

(c) Describe the significance of developmental changes undergone by the mammalian foetus during pregnancy. (08marks)

END