THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/1 **BIOLOGY 1**

(For Both School and Private Candidates)

Time: 3 Hours **Year: 2022**

Instructions

1. This paper consists of sections A and B with a total of **ten (10)** questions.
2. Answer **all** questions in section A and **two (2)** questions from section B.
3. Section A carries **seventy (70)** marks and section B carries **thirty (30)** marks.
4. Except for diagrams which must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

SECTION A (70 Marks)

Answer **all** questions in this section. Each question carries **ten (10)** marks.

1. (a) A scientist placed 2 cm^3 of starch solution in a test tube followed by 2 cm^3 of saliva which was boiled to 75 ^0C. He then carried out starch test and observed a positive result. Briefly explain the observation.

   (b) Eukaryotes have cells with organelles bound by membrane(s). Why is it advantageous for the organelles to be bound by the membrane(s)? Give three points.

2. (a) A biologist found some new insects which were supposed to be placed in the taxa. Among the tools which a biologist demanded for this work was a biological key. Why do you think a biologist needed a biological key? Give one point.

   (b) Suppose that you have been assigned to construct a Dichotomous Key;
   (i) Describe the procedure you would follow.
   (ii) How would you use the key constructed to classify the organisms?

3. (a) What would happen to an organism if its nervous system is severely damaged? Give four points.

   (b) Figure 1 is a part of a neuron. Study it carefully and then answer the questions that follow:

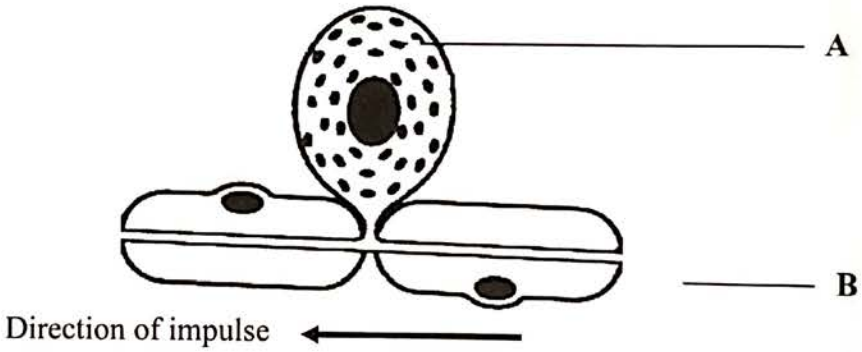


Figure 1

   (i) Identify the type of neuron presented in Figure 1.
   (ii) Which feature has helped you to make identification in (b) (i)?
   (iii) What would happen to the neuron if each of the parts labeled **A** and **B** is severely damaged? Give two points for each.

4. (a) The first process of photosynthesis involves trapping of light energy from the sun and then collecting it to the photosystems. How does this process takes place?

   (b) Explain how electron transport takes place in the photosystems I (PSI) and II (PSII).

5. (a) Why is it necessary for a respiratory surface to have each of the following features?
   (i) Large surface area to volume ratio
   (ii) Moist surface
   (iii) Thin membrane
   (iv) Permeable membrane

   (b) Glycolysis leads to the formation of pyruvic acid. How is the pyruvic acid converted to ethanol? Explain by giving two points.

6. (a) What would happen to a cell if its membrane lacks antigens? Give two points.

   (b) In what ways is water important to plants? Give four points.

7. Figure 2 represents a vertical section through an angiosperm ovary at the beginning of fertilization. Study it carefully and then answer the questions that follow:

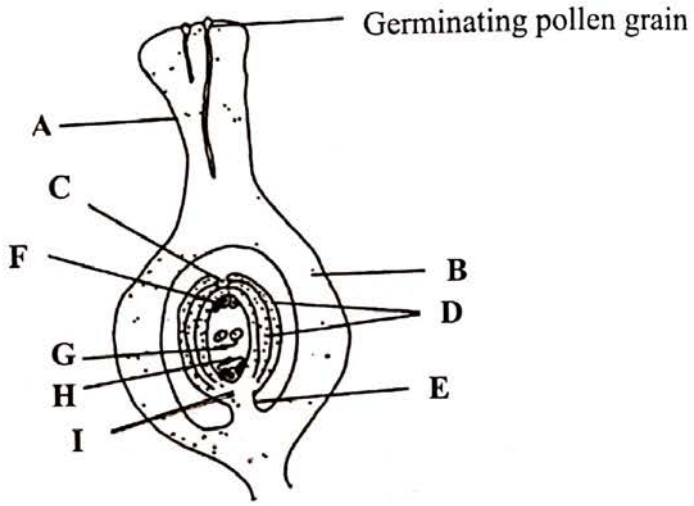


Figure 2

   (a) Using the given labels:
   (i) list in correct order the parts of the ovary through which the pollen tube must grow in order to reach the embryo sac.
   (ii) identify a part which performs similar function as the umbilical cord in human being.

   (b) If fertilization occurs successful:
   (i) which part of the seed/fruit would develop from each of the parts labelled **B**, **D**, **G** and **F**?
   (ii) what will be the fate of each of the parts labelled **A** and **I**?

SECTION B (30 Marks)

Answer **two (2)** questions from this section. Each question carries **fifteen (15)** marks.

8. The release of energy from a glucose molecule occurs in three stages namely; glycolysis, Krebs' cycle and electron transport chain. Identify two essential features of each stage and explain how electron transport chain occurs in aerobic respiration.

9. Why should a mammalian placenta be formed immediately after implantation? Explain by giving six points.

10. Oxygen taken in through human nose enters the lungs and then it is transported to all parts of the body. Describe three ways in which oxygen is transported in human body.

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/2

BIOLOGY 2
(For Both School and Private Candidates)

Time: 3 Hours **Year: 2022**

Instructions

1. This paper consists of **six (6)** questions.
2. Answer **five (5)** questions.
3. Each question carries **twenty (20)** marks.
4. Except for diagrams that must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

1. (a) In five points, describe the structural similarities and differences between the bodies of birds and mammals.

   (b) Explain how amphibians adapt to their environments.

2. Describe the process of osmoregulation by Anti Diuretic Hormone in human body.

3. (a) Explain internal and external factors that affect seed germination. Give three points in each.

   (b) With the aid of a diagram, describe five events which occur during telophase stage of mitosis.

4. A cross between pure yellow testa and green testa bean seeds produced yellow testa seeds in F_1. On selfing the F_1 plants, F_2 had the phenotypes shown in the following Table:

F_2 Phenotype	Number
Yellow testa	836
Red testa	212
Green testa	72

   Carry out genetic crosses to show the phenotypes and genotypes of F_1 and F_2.

5. (a) Briefly describe four theories of origin of life.

   (b) Outline strengths and weaknesses of each of the theories described in 5(a).

6. (a) Giving an example in each, describe the interdependence of the following groups of organisms in the ecosystem:
   (i) Detritivores and decomposer.
   (ii) Producers and consumers.
   (iii) Food chain and food wed.

   (b) In five points, explain how energy flows within an ecosystem.

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

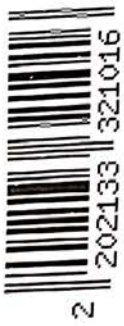
133/3A

BIOLOGY 3A
(ACTUAL PRACTICAL A)
(For Both School and Private Candidates)

Time: 3:20 Hours **Year: 2022**

Instructions

1. This paper consists of **three (3)** questions.
2. Answer **all** questions.
3. Question one (1) carries **twenty (20)** marks and the other two (2) carry **fifteen (15)** marks each.
4. Except for diagrams which must be drawn in pencil, all writing should be in blue or black ink.
5. Cellular phones and any unauthorised materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).



1. You have been provided with specimen S_1. Dissect the specimen in a usual way to fully display the *viscera in situ*.

(a) Draw a neat diagram of your dissection and label ten parts.

Leave your dissection properly displayed for assessment.

(b) (i) What are the associate organs of the digestive system present in the specimen?
(ii) Which digestive role is played by each of the associate organs identified in (b)(i)?
(iii) How does each of the associate organ identified in (b)(i) adapted to perform it digestive role in the specimen?
(iv) How does each associate organ identified in (b)(i) adapted to regulate sugar in the body of the specimen?

2. You have been provided with 5 cm^3 of fresh liver, water and the chemical reagents, use them to perform procedures (i) and (ii) and then answer the questions that follow:

Procedures

(i) Cut the 3 cm^3 of the liver into small pieces, then crush it to paste by using a mortar and pestle provided. Add a little amount of water into the paste, mix well and label it as **liver solution**.
(ii) Put the remaining 2 cm^3 of a liver into a test tube, add 3 drops of solution **X** in the test tube. Observe the results.

Questions

(a) Using the chemical reagents provided, carry out biochemical test to identify the food substances present in the **liver solution**. Tabulate your results as showing in the following table:

Food tested	Procedure	Observation	Inference

(b) What is a name of solution **X**?

(c) With the aid of the chemical formula, illustrate the reaction led to the observation made in procedure (ii).

(d) How can one set a control experiment for the reaction presented in (c)?

3. You have been provided with specimens A_1, A_2 and A_3.
(a) Suggest four organisms from which the specimen A_3 must have been taken.

(b) Carefully observe the specimens A_1 and A_2.
(i) What is the Kingdom and Phylum of specimen A_2.
(ii) What observable features in each of the specimens A_1 and A_2 represent their respective Class level? Give four points.

(c) What are the functions of specimen A_3 to the organism from which it was taken? Give three functions.

THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

ADVANCED CERTIFICATE OF SECONDARY EDUCATION

EXAMINATION

133/3B **BIOLOGY 3B**

(ACTUAL PRACTICAL B)

(For Both School and Private candidates)

Time: 3:20 Hours **Year: 2022**

Instructions

1. This paper consists of **three (3)** questions**.**
2. Answer **all** questions.
3. Question **one (1)** carries **20** marks, and the other **two (2),** carry **15** marks each.
4. Mathematical tables and non-programmable calculators may be used.
5. All writing must be in **blue** or **black** ink **except** drawing which must be in pencil
6. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
7. Write your **Examination Number** on every page of your answer booklet (s).

1. You are provided with specimen $\mathbf{N_1}$. Dissect it and display the reproductive and digestive systems and pin the digestive system to the right hand side.

Questions

(a) Draw a neat diagram of the dissected specimen $\mathbf{N_1}$ and label twelve (12) parts.

(b) Explain the roles played by the labelled parts of the system in the digestion process by giving six points.

2. You are provided with solution $\mathbf{S_2}$.

Questions

(a) Identify the food substances present in the solution $\mathbf{S_2}$ and tabulate the work as shown in the table below:

Food tested	Procedures	Observation	Inference

(b) State two properties of the food substance(s) identified in solutions $\mathbf{S_2}$.

(c) State the food substances missing in solution $\mathbf{S_2}$ to make it a balanced diet.

3. You are provided with specimens $\mathbf{N_2}$ and **W**:

Questions

(a) State the type of metamorphosis undergone by each of the specimens $\mathbf{N_2}$ and **W**.

(b) Describe the developmental stages in the life cycles of the specimens $\mathbf{N_2}$ and **W** with the aid of diagram.

(c) State the advantage and disadvantage of specimen $\mathbf{N_2}$ in the ecosystem.

CONFIDENTIAL

Candidate's Examination Number.....

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION 2022

ASSESMENT FORM OF DISSECTION AND DRAWING

133/3A BIOLOGY 3A
(ACTUAL PRACTICAL A)

Make an on-the spot assessment of each candidate's dissection at least 45 minutes after the beginning of the examination. The candidate is required to display the ***viscera in situ*** **of specimen S_1 and draw the relevant diagram**. Use a red pen to circle the marks scored by the candidate in this sheet.

Assessment of Dissection (3 Marks)

Quality of Dissection	Marks
Body wall neatly pinned aside, dissection generally neat and tidy with all or almost all of the required structures clearly visible and free from all overlying tissues. No debris scattered in dish or board.	3
Body wall neatly pinned aside, dissection generally neat and tidy but with some of the required structures incompletely displayed i.e. not clearly visible or free from all overlying tissues.	2
Body wall pinned aside but not very neatly. Dissection generally untidy with only a few of the required structures displayed and others damaged e.g. organs roughly cut or torn, ducts or major blood vessels broken.	1
Any dissection whose quality is worse than the above descriptions.	0

Assessment of the Drawing (2 Marks)

Quality of the Drawing	Marks
Drawing generally neat with continuous lines or curves and accurate representation of the dissection.	2
Drawing generally neat and fairly accurate.	1
Drawing fairly neat but inaccurate.	½
Drawing dirty and inaccurate.	0

Name of Assessor ----------Signature ----------

Date---------- Mobile Phone Number----------