

**STRAND 1: Structure and Life Processes**

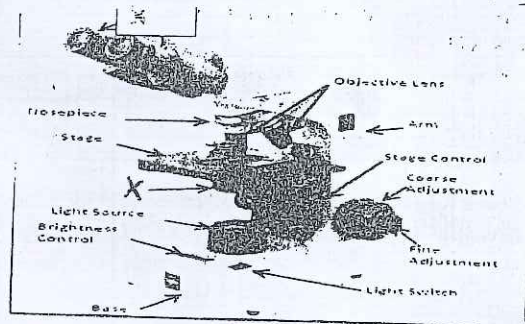
[75 marks]

**Sub strand 1.1 Cell Organisation**

(15 marks)

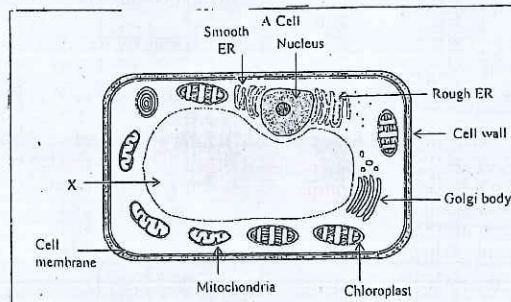
The five questions in this sub strand are all compulsory.

1. Study the diagram below which shows a compound microscope.



- (i) Identify the part labelled X and give its function. (2 marks)  
 (ii) State one way of caring for a microscope. (1 mark)

2. Study the diagram of the plant cell given below to answer the questions that follow:



- Identify the cell organelle labelled X and describe its role in keeping the cell firm. (2 marks)

**RATU NAVULA COLLEGE****YEAR 12 TRIAL EXAMINATION 2020****BIOLOGY**

Time allowed: Three Hours

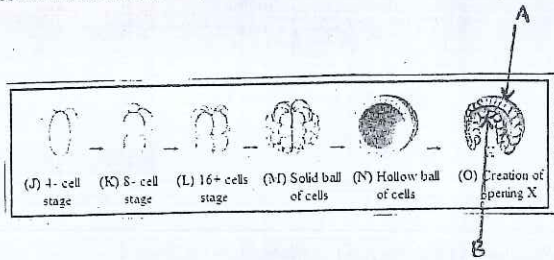
**INSTRUCTIONS**

1. Write your **Index Number** and **Year Level** on the front page of the **Answer Booklet**.
2. Write **all** your answers in the **Answer Booklet** provided.
3. Answer **all** the questions with a blue or black ball pen or ink pen. Do not use red ink you may use a pencil only for drawing.
4. If you use extra sheets of paper, be sure to show clearly the question number(s) being answered and to tie each sheet in your answer booklet at the appropriate places. Ensure that your index number is written on the extra sheets.
5. There are two strands in this paper. Each strand will contain short answer questions and an essay question each. **Both strands are compulsory.**
6. You may use a calculator, provided it is silent, battery operated and non-programmable.

**SUMMARY OF QUESTIONS**

STRANDS		TOTAL MARKS	SUGGESTED TIME
1	Structure and life processes	75	120 minutes
2	Living together	25	60 minutes
<b>TOTAL</b>		<b>100</b>	<b>180 minutes</b>

6. Study the diagram given below of a developing embryo in animals and answer the questions that follow.

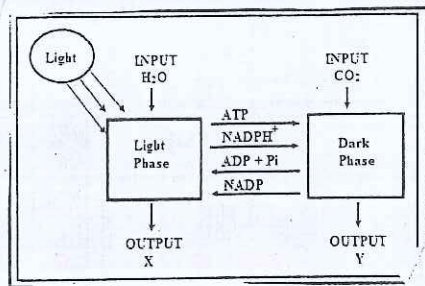


- (i) Identify the morphological feature that defines stage labelled M. (1 mark)
- (ii) Describe the stage labelled N. (1 mark)
- (iii) State the name of the layer A and identify an organ or system that germ layer B will develop into. (2 marks)

**Sub strand 1.2 Cell Organization (18 marks)**

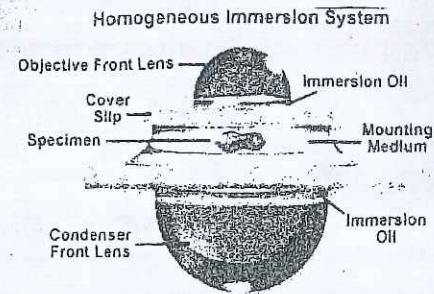
The five questions in this sub strand are compulsory.

1. Study the diagram of photosynthesis given below to answer the questions that follow:



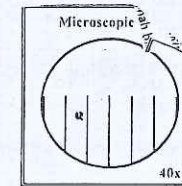
- (i) Name the exact location in the chloroplast where light reactions and dark reactions occur. (1 mark)
- (ii) Use the diagram to state one difference between light reactions and dark reactions. (1 mark)
- (iii) What are ATP and NADPH? (1 mark)

3. The basic immersion oil system shown is used to observe bacteria.



Why is oil immersion used in 100x lens? (1 mark)

4. A transparent millimeter ruler was placed under the microscope at 40 X magnification as shown in the diagram given below:

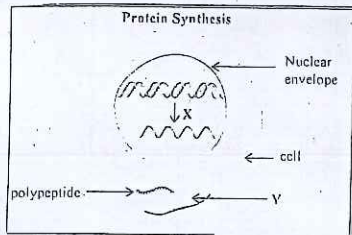


- (i) What is the diameter of the field of view at 40X magnification in micrometers ( $\mu m$ )? (1 mark)
- (ii) If two plant cells of equal size were observed across the diameter at 40X magnification, calculate the size of one cell in micrometers ( $\mu m$ ). (1 mark)
- (iii) Calculate the field of view in micrometers at 80X (medium power) magnification. (2 marks)

5. State a difference between eukaryotes and prokaryotes. (1 mark)

(ii) State the role of the enzyme lactase in the human digestive system. (1 mark)

5. Study the diagram of protein synthesis in a cell given below to answer the questions that follows:



- (i) Name and describe the process labelled X. (2 marks)
- (ii) Name the organelle labelled Y and state its function in protein synthesis. (2 marks)
- (iii) Explain why replication is said to be semi conservative. (1 mark)

**Sub strand 1.3 Genetic Continuity (10 marks)**

The four questions in this sub strand are compulsory.

1. (i) Two babies, Ilai and Vasiti are born to different sets of parents, represented by couples 1 and 2 in the table below. Baby Ilai has blood group O and baby Vasiti has blood group A.

	Blood Group	
	Mother	Father
Couple 1	AB	O
Couple 2	B	B

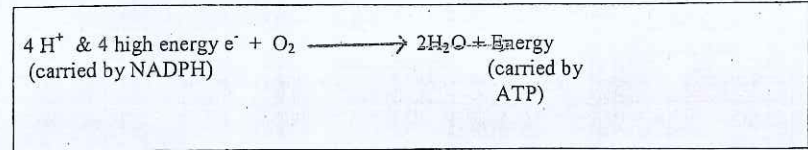
Use the information above to match each baby with its correct set of parents. Show all working in the space provided in the Answer Booklet. (2 marks)

(ii) Define the term co – dominance. (1 mark)

(iv) State the final products of light and dark reactions. (1mark)

(v) What happens in photophosphorylation? (1 mark)

2. Study the diagram of a stage of cellular respiration given below to answer the questions that follow:



- (i) Name the stage of cellular respiration shown in the above diagram. (1mark)  
*Electron transport chain*
- (ii) Describe what happens in the above stage. (2 marks)
- (iii) Explain the overall effect on the animal body when the above process takes place in the absence of oxygen. (1 mark)
- (iv) State one economical advantage of anaerobic respiration. (1 mark)

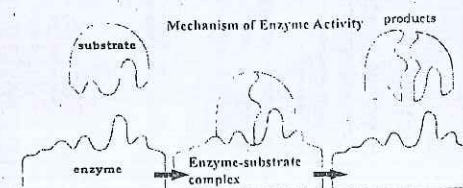
3.

Denaturation is the process whereby the shape of the protein is changed.

State one way in which proteins can be denatured. (1 mark)

4.

The diagram of the enzyme activity is given below, answer the questions that follow.

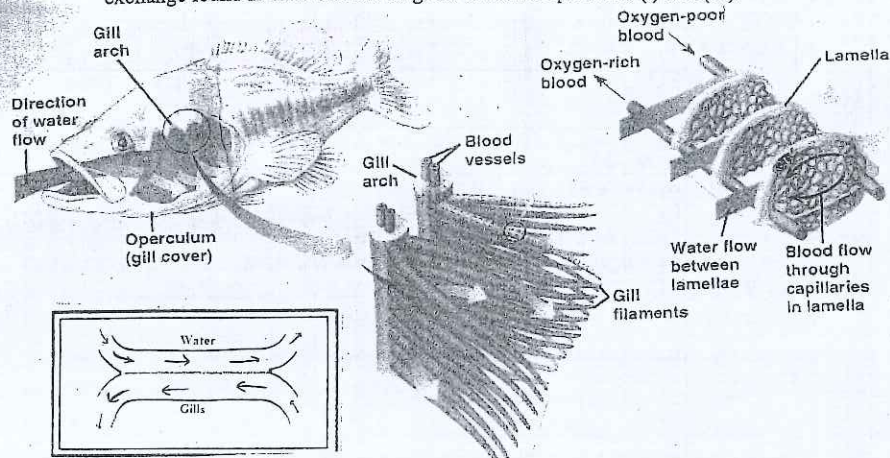


(i) Name the site on the enzyme where the substrate binds. (1 mark)

2. The vertebrate digestive systems are the most complex in the Animal Kingdom, with herbivores having the longest alimentary canal.

Describe one other adaptation of the herbivorous mammals for digesting plant materials, example cattle. (1 mark)

3. The diagram given below shows the concept of the counter current system of gas exchange found in fish. Use the diagram to answer questions (i) and (iii).



- (i) Describe how the gas exchange system is most appropriate for fish. (1 mark)
- (ii) State an adaptive value of lamellae present on the gill filaments. (1 mark)
- (iii) Explain what is counter current flow and its importance in fish gas exchange system. (2 marks)
4. Explain how transpirational pull and water cohesion helps to move water up through the xylem. (2 marks)

2.

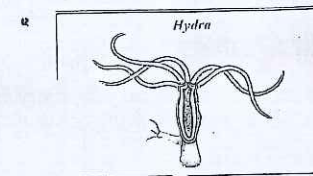
Genetic variations drive natural selection and eventually evolution. One of the important sources of genetic variation is mutation.

- (i) Define mutation. (1 mark)
- (ii) Describe the importance of variation in resisting diseases. (2 marks)
3. State a difference between allopatric speciation and sympatric speciation. (2marks)
4. What is the difference between homologous structures and analogous structures? Give an example of each. (2 marks)

#### Substrand 1.4 Comparative Form And Function In Plants And Animals [22 marks]

The ten questions in this sub strand are compulsory.

1. Study the diagram of a cnidarian given below and answer the questions that follow.



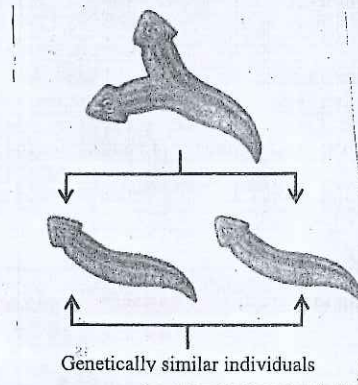
- (i) Identify the type of gut system present in Cnidarians. (1 mark)
- (ii) Describe the process of ingestion and digestion in Cnidarians. (2 marks)

8. Annelids example earthworm has hydrostatic skeleton and contracted muscles.
- (i) State an adaptive value of the hydrostatic skeleton. (1mark)
  - (ii) Describe how the contracted muscles and bristles help annelids in movement. (2 marks)
9. Identify whether the following action is complete by the nervous system or the endocrine system by placing a tick in the appropriate column:

Actions	Nervous system	Endocrine system
Quickly moving away the fingers after touching a hot iron.		✓
Growing in height from birth till the end of poverty.		
Release of adrenalin in a dangerous, yet exciting situation		
Blinking eyes		

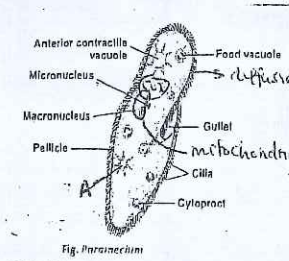
(2 marks)

10. Use the diagram to answer the following questions:



- (i) Identify the type of reproduction that is occurring in the flatworm. (1 mark)
- (ii) Explain how this type of reproduction is an advantage to flatworms. (1 mark)

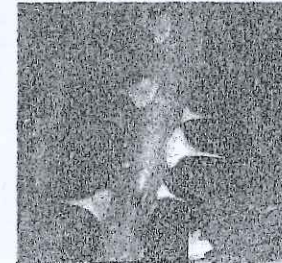
5. Unicellular organisms such as Paramecium face osmotic problems. Refer to the diagram of Paramecium and answer the questions.



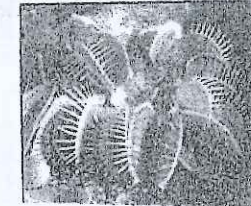
- (i) Name the structure labelled A. (1 mark)
- (ii) Describe how structure A helps the Paramecium maintain solute balance. (1 mark)

6. What is the advantage of excreting uric acid rather than urea in the egg-laying terrestrial reptiles and birds? (1 mark)
7. Study the diagram of two plant types given below and answer the questions that follow.

Rose Plant



Venus Fly Trap

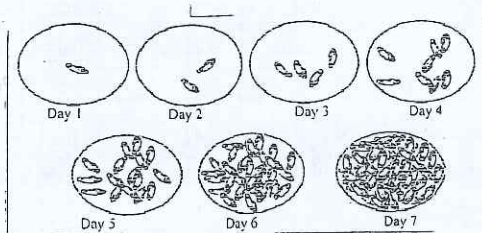


- (i) Describe how each of the plants shown above protects itself from herbivores. (1 mark)
- (ii) Name and describe one type of nastic movement. (1 mark)

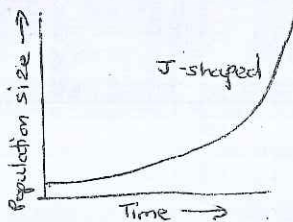
Strand 2 Living Together [25 Marks]  
 Sub strand 2.1 Organism and The Environment (10marks)

The three questions in this sub strand are compulsory.

1. The diagram below shows the changes in a population of Paramecium over a seven (7) day period. Each individual in the population divides once per day i.e. the population doubles daily.



- (i) If the population range is 10cm, calculate the population density for Day 4. (2 marks)
- (ii) Identify a biotic factor that would affect the population if it continues to increase at this rate. (1 mark)
- (iii) Draw a line graph to show the change in the population size of Paramecium from Day 1 to Day 7. (1 mark)
2. Given below is an exponential growth curve for population growth, increasing rapidly and then stops growing.



- (i) State a reason for the rapid increase in the J- shaped curve. (1 mark)

ESSAY (10 MARKS)

There are two questions in this section. Answer only one question.

In this section you are given an opportunity to show that you can:

- (i) select ideas relevant to the question  
 (ii) use appropriate examples  
 (iii) communicate information clearly and logically

Write an essay using 180 – 200 words on any one of the questions given below.

Please note that the allocation of marks for content has been included for each question and 2 marks for the structure of the essay.

Either

#### QUESTION 1

Mammals and birds are vertebrates with a four – chambered heart; two auricles and two ventricles, forming a closed, double – loop circulation as their transport system.

With reference to the above statement, discuss the following:

- (i) definitions of the terms vertebrates and double loop circulation. (2 marks)
- (ii) four reasons why birds and mammals need an efficient transport system. (4 marks)
- (iii) two ways in which the transport system interacts with other systems of the body. (2 marks)

OR

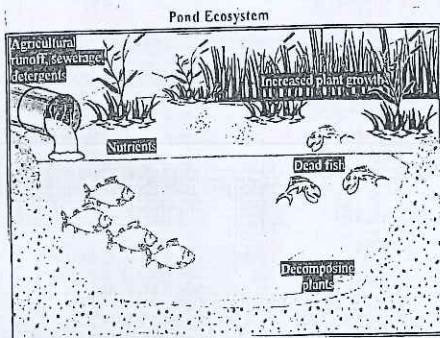
#### QUESTION 2

Charles Darwin proposed that the process of evolution was driven by basic mechanisms such as natural selection, mutation and genetic drift.

With reference to the above statement,

- (i) define evolution and natural selection. (2 marks)
- (ii) discuss two evidences of evolution, using appropriate examples of natural selection that illustrates evolution. (4 marks)
- (iii) discuss one example of natural selection that illustrates evolution. (2 marks)

2. Study the picture of a pond ecosystem given below and answer the questions that follow:



- (i) Name the ecological phenomenon demonstrated in the picture above. (1 mark)
- (ii) State what is causing the fish to die in the pond. (1 mark)
3. Why can't two species that occupy the same ecological niche co-exist? (1 mark)

- (ii) Give a reason why the population stops growing. (1 mark)
3. (i) Explain why intraspecific competition is more intense than interspecific competition? (2 marks)
- (ii) Clearly explain why algal bloom is caused in water ways? How this eventually leads to the deaths of fish and other aquatic life? (2 marks)

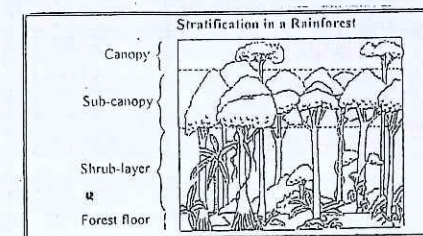
## Substrand 2.2

## Community

(5 marks)

The three questions in this sub strand are compulsory.

1. Study the diagram of stratification given below and answer the questions that follow:



- (i) Identify the environmental factor that causes stratification in forests. (1 mark)
- (ii) State why the leaves in the shrub layer are usually large, very thin and transparent. (1 mark)

**SECTION C****ESSAY****[10 MARKS]**

There are **two** questions in this section. Answer only **one** question.

In this section you are given an opportunity to show that you can:

- (i) select ideas relevant to the question
- (ii) use appropriate examples
- (iii) communicate information clearly and logically

Write an essay using 180 – 200 words on any one of the questions given below.

Please note that the allocation of marks for content has been included for each question and 2 marks for the structure of the essay.

**EITHER****QUESTION 1**

Many plants are capable of both sexual and asexual reproduction.

With reference to the above statement

- (i) define sexual and asexual reproduction. (2 marks)
- (ii) discuss four methods of asexual reproduction with examples of local crops that use each method. (4 marks)
- (iii) discuss two factors that have contributed to the reproductive success of plants. (2 marks)

OR

**QUESTION 2**

Individuals make up a population in a community or ecosystem.

With reference to the above statement:

- (i) define community and ecosystem. (2 marks)
- (ii) discuss two methods of sampling to determine population size. (4 marks)
- (iii) discuss two precautions taken during the sampling processes. (2 marks)

**THE END**

23/10/2021