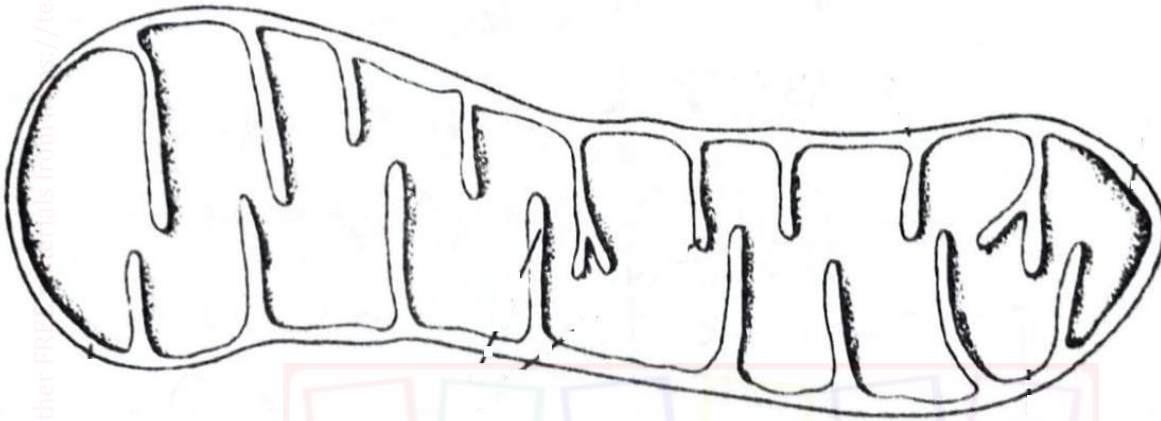


**FORM 3
BIOLOGY
PAPER 231/2 OUT OF 80
MID TERM 2 2026 EXAMINATION**

SECTION A (40 MARKS)

Answer all the questions in this section in the spaces provided.

1. The diagram below shows an organelle that is found in most cells. Study it and answer the questions that follow



- a. (i) Name the organelle (1mk)

Mitochondrion

- (ii) State the function of the organelle in (a) (i) above (1mk)

Site for respiration

- b. (i) Give the full name of the major chemical compound that is found in the organelle (1mk)

Adenosine triphosphate

- (ii) Identify the gas that is required in order to form the compound you have stated in (b) (i) above (1mk)

Oxygen

- c) Give the name of the structure labeled H and state its function (2mks)

H – Cristae

Function: to increase the surface area for attachment of respiratory enzymes

- d) (i) In which cells between spermatozoa or ova would you expect to find a high number of the organelle named in (a) (i) above? (1mk)

spermatozoa

- (ii) Give a reason for your answer in (d) (i) above (1mk)

Spermatozoa rely on their own means of propulsion (swimming) to move up the female reproductive tract hence use a lot of energy, ova uses cilia

2. (a) Name the gaseous exchange structure in the following organisms

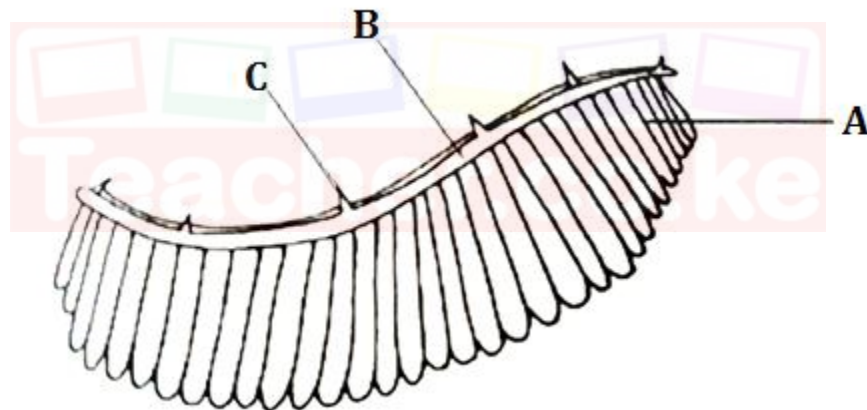
(i) Amoeba (1mk)

Cell membrane

(ii) Grasshopper (1mk)

tracheoles

- (b) The diagram below illustrates the structure of a gill from a bony fish



- (i) Name the parts labeled A, B, and C (3mks)

A Gill filament ref filaments

B Gill bar

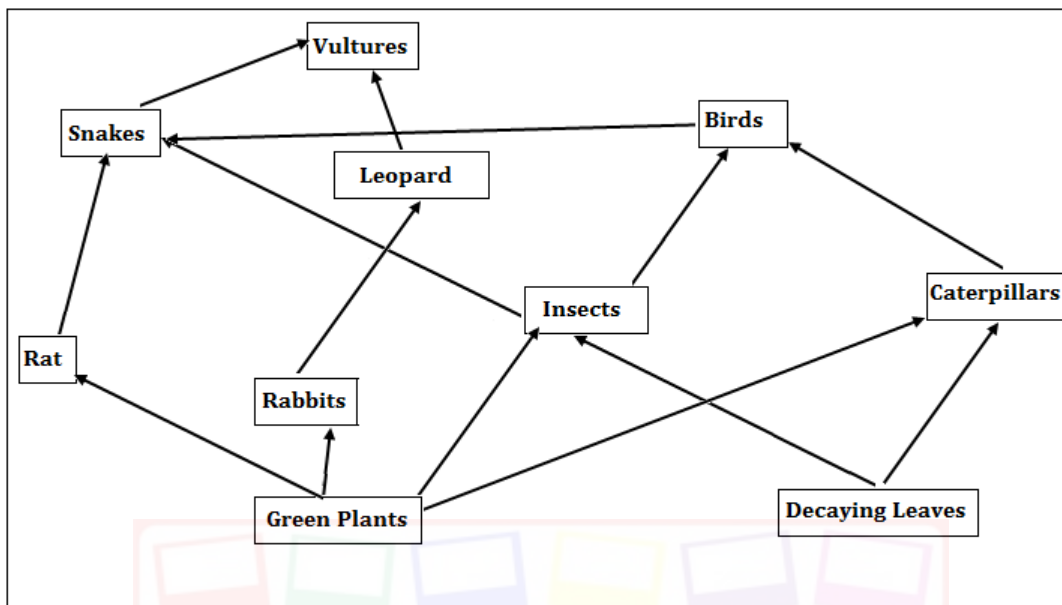
C Gill rakers

- (ii) State the function of the part labeled C (1mk)

Prevent solid particles from harming / injuring gill fillaments

- (iii) How is part A adapted to carry out its functions (2mk)
- i) **Thin membrane for fast diffusion of gases**
 - ii) **supplied with blood capillaries to transport gases**
 - iii) **Numerous to increase surface area for gaseous exchange (any 2)**

3. Study the illustration below



- a. Identify the ecosystem (1mk)

Terrestrial ecosystem

- b. (i) Which organism has the least biomass in the food web? (1mk)

Vultures

- (ii) Explain your answer in (b) (i) above (1mk)

- **At each trophic level energy is lost as heat**
- **Some food used for respiration**
- **Some energy lost as undigested or indigested food materials**

- c) Name the trophic level occupied by the following organisms (1mk)

(i) Insects (1mk)

Primary consumers

(ii) Leopards (1mk)

Secondary consumers

- d) Construct a food chain in which the vulture is a quaternary consumer (1mk)

i) Green plants – caterpillars – Birds – snakes – vultures

ii) Gp – insects – Birds – snakes – vultures

iii) Decaying leaves – caterpillars – birds – snakes – vultures

e) (i) Name one group of organism not shown in the food web but play an important role in the ecosystem (1mk)

saprophytic bacteria or fungi

(ii) What is the role of the organism you named in (d) (i) above (1mk)

Decomposers on remains of plants and animals causing decay hence release inorganic materials (nutrients) which are later re-used by producers to form new organic compounds.

4. During a biology practical lessons, the teacher provided students with the following apparatus.

- A pooter
- A scalpel
- Specimen bottle
- A pair of forceps
- Sweep net
- Chloroform

(a) Give the precautions the biology teacher gave the student before the practical when collection of specimen begun (3mks)

- i) Collect only the number of specimen needed**
- ii) Not to destroy the natural habitat of the specimen**
- iii) Dangerous / injurious specimens to be handled with care**
- iv) Not to harm the specimen during collection**
- v) Line specimen should be returned to their habitat**
- vi) Highly mobile animals to be immobilized using a suitable chemical substance**

(b) What was the function of the following apparatus?

(i) Pooter (1mk)

For sucking small animals eg ants and termites from rock surfaces or barks of trees

(ii) Sweep net (1mk)

For catching flying insects

(iii) Chloroform (1mk)

For immobilizing highly mobile animals

(b) Other than observation, name other two scientific skills developed by studying biology (2mks)

Identifying, recording, classifying, measuring, annalysing and evaluating

5. Complete the table below by placing the organism, tick, shrimp, millipede, praying mantis, tsetsefly, crab and spider in the right class and giving a reason in each case (8mks)

Class	Organisms	Reasons
Diplopoda	Millipede	<ul style="list-style-type: none"> -Body is cylindrical - Body consists of head, short thorax and body trunk. - Head has a short antenna - 2 pairs of working legs
Insecta	<ul style="list-style-type: none"> -Praying mantis - Tsetsefly 	<ul style="list-style-type: none"> - 3 body parts - One pair of antennae - 3 pairs of legs - Compound eyes
Crustacea	<ul style="list-style-type: none"> Shrimp Crab 	<ul style="list-style-type: none"> -Have carapace - 2 pairs of antennae - have claws - hardened exoskeleton
Arachnida	<ul style="list-style-type: none"> Tick spider 	<ul style="list-style-type: none"> -Simple eyes - two body parts - 4 pairs of legs - have chelicerae

SECTION B

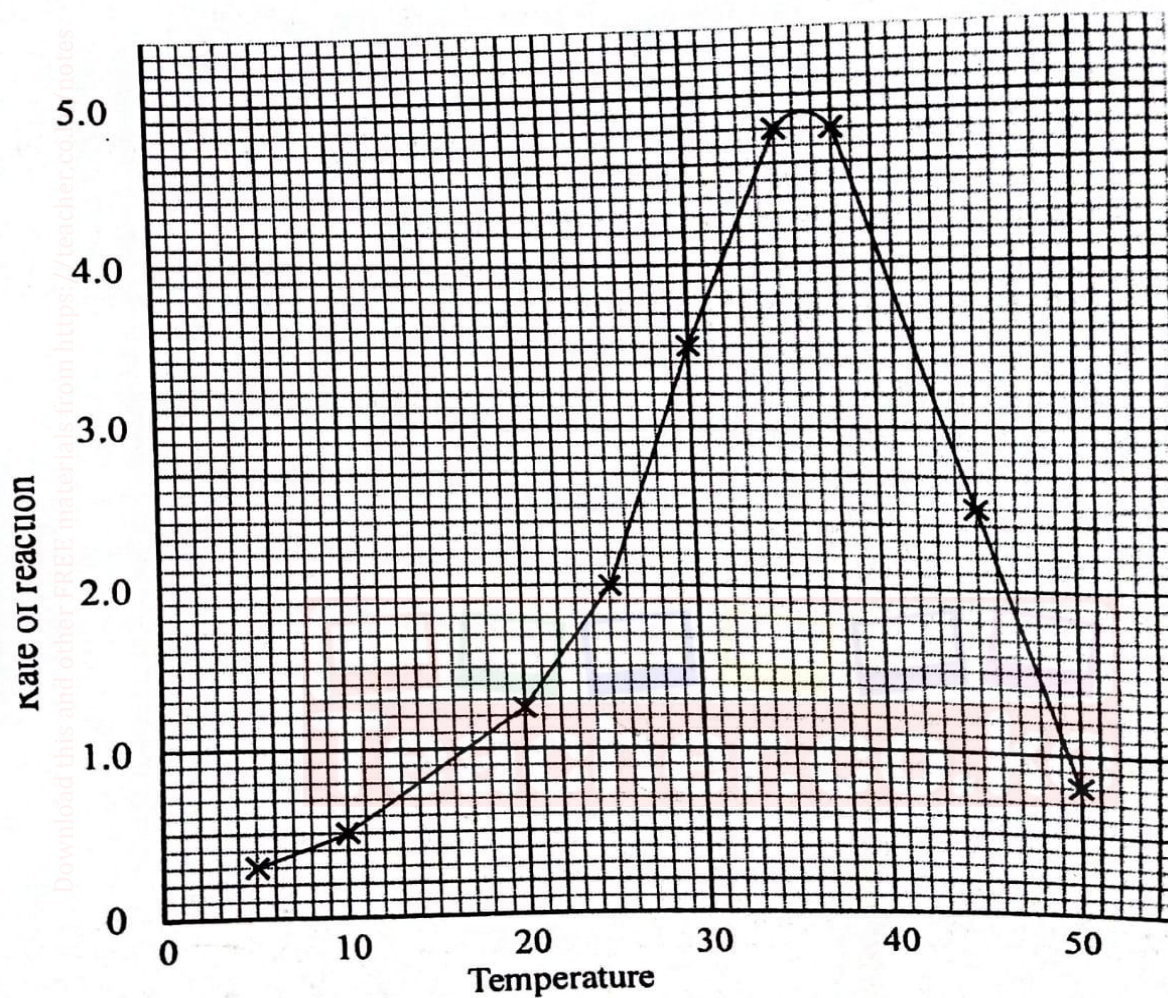
Answer question 6 (compulsory) and either question 7 or 8

6. An experiment was carried out to investigate the effect of temperature on the rate of a reaction catalysed by salivary amylase. The Ph was slightly alkaline. The results are shown in the table below

Temperature	5	10	20	25	30	35	38	45	50
Rate of reaction	0.3	0.5	1.25	2.0	3.5	4.8	4.8	2.5	0.8

a) On a grid draw a graph of rate reaction against temperature

(6mks)



b) What is the optimum temperature of the enzyme (1mk)

36.5°C ± 0.5°C

c) At what temperature was the rate of the reaction 1.4 (2mks)
21°C ± 0.5 and 48°C ± 0.5°C

d) Account for the shape of the graph between (i) 5°C and 35° C (2mks)

As the temperature increased, rate of reaction increased because enzyme becomes more active with increasing temperature within that range

(ii) 38° C and 50° C (3mks)

As temperature increased rate of reaction decreased because the enzyme was denatured by the high temperature.

e) How is the hydrochloric acid from the stomach neutralized and where does this occur (2mks)
-Through the action of sodium hydrogen carbonate present in the pancreatic juice .
-Occurs in the duodenum

f) Name one digestive enzyme in humans that works best in acidic conditions (1mk)
- Pepsin
-Rennin

g) Apart from temperature and pH name other 3 factors that affect enzyme controlled reactions (3mks)
- Specificity
- substrate concentration
- Enzyme concentration
- Enzyme co-factors
- Enzyme co-enzymes
- Enzymes inhibitors

7. (a) Describe the adaptation of hydrophytes to their photosynthetic function (10mks)

(b) Explain how mammalian ileum is adapted to perform its function. (10mks)



8. Explain how seeds and fruits are adapted to the various methods of dispersal (20mks)