THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATIION EXAMINATION

NOVEMBER 1996

033/1

BIOLOGY PAPER 1

(For both School and Private Candidates)

TIME: 3 Hours

INSTRUCTIONS

1. This paper consists of sections A, B and C. Answer ALL questions in sections A and B and ONE question in section C.
2. All answers must be written in the answer book provided.
3. Write your centre and index number on every page of your answer book.
4. Except for diagrams, which must be drawn in pencil, all writing must be in blue/black ink or ball point pen.
5. Read each question carefully.

This paper consists of 9 printed pages.

SECTION A

Answer ALL questions in this section. This section carries 10% of the total marks.

1. Items (i) - (x) consist of questions or incomplete statements followed by four suggested answers. Select the best answer in each case and write down its letter beside the item number as shown in the worked out example.

Example: (i) Adventitious roots never develop from
A. leaves
B. stolons
C. stems
D. other roots

Answer: (i) D

(i) Which of the following cells has a strong contractile ability?
A. Muscle cell
B. Amoeba
C. Xylem vessel cell
D. Glandular cell.

(ii) The operculum in fish serves as
A. an entrance for water
B. an exit for waste products
C. a protective device for the gills
D. a protective device for the eyes.

(iii) Which of the following characteristics could not be used to distinguish monocotyledons from dicotyledons?
A. Pattern of veins on the leaves
B. The structure of the seeds
C. Size and arrangement of roots
D. The number of flowers

(iv) The experimental set up shown in Fig.1 can be used to investigate the process of photosynthesis.

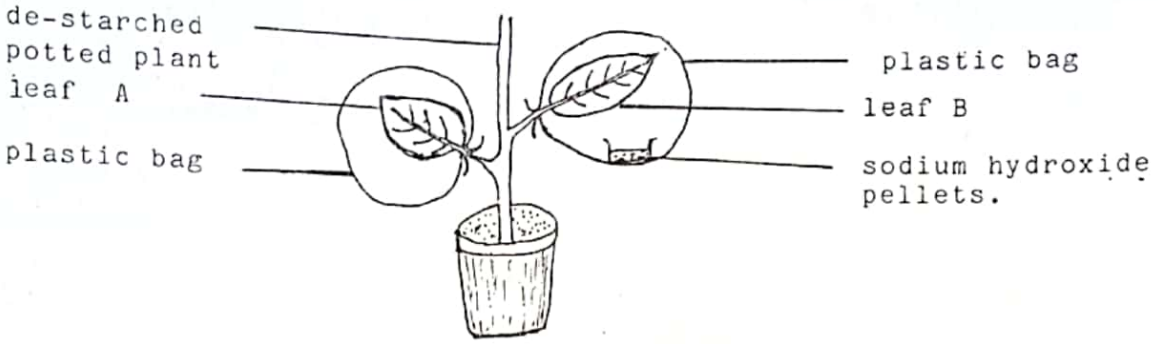

Fig.1

If the experiment was left in the light for four (4) hours

A. leaf B would form starch
B. leaf A would form starch.
C. both leaves A & B would form starch
D. none of the leaves would form starch.

(v) During a vigorous exercise, the body temperature rises to above normal. This is because of the increased

A. rate of heart beat
B. rate of breathing
C. increased digestion
D. production of energy.

(vi) Which of the following mammalian blood vessels contains blood full of oxygen at low pressure?

A. Pulmonary artery
B. Pulmonary vein
C. Aorta
D. Vena cava.

(vii) If clay is added to a sandy soil, which of the following will increase?

A. Permeability to water
B. Aeration
C. Water holding capacity
D. Bacterial activity.

(viii) Myopia (nearsightedness) is a condition

A. which can be corrected by using a concave lens infront of the eyes

B. which can be corrected by using a convex lens infront of the eyes

C. caused by irregularly shaped cornea

D. caused by light rays converging behind the retina.

(ix) In a certain variety of beans, yellow colour is dominant to green. If a homozygous yellow plant is crossed with a green plant, the expected phenotypic ratios of the offspring would be.

A. 75% yellow : 25% green

B. 75% green : 25% yellow

C. all green

D. all yellow

(x) The term used to describe the process whereby communities of living organisms in a location replace each other is known as

A. ecological pyramid

B. ecological succession

C. competition

D. food chain.

2. The following are matching items. Match the terms, statements or phrases in list A with those in list B by writing the correct letter of the term, statement or phrase in list B beside the corresponding item number in list A as shown in the worked out example.

Example:

List A	List B
(i) a sex linked genetic disorder of the blood	J haemophilia K sickle cell anaemia

Answer: (i) J

List A	List B
(i) detoxifies poisons	A. serum
(ii) deficiency of vitamin C	B. fibrinogen
(iii) complete oxidation of sugar	C. uterus
(iv) necessary for the clotting of blood	D. urethra
(v) shows an L.S. of a dicotyledonous stem	E. ligament F. tendon

List A

(vi) part of the excretory system of a female mammal

(vii) holds together joints

(viii) high concentrations of auxins

(ix) example of a false fruit

(x) correct order of development in a cockroach

List B

G. slows down root growth

H. encourages root growth

I. maize grain

J. pineapple

K. egg → nymph → pupa → adult

L. egg → nymph → adult

M. aerobic respiration

N. anaerobic respiration

O. bleeding gums

P. anaemia

Q. liver

R. spleen

S.

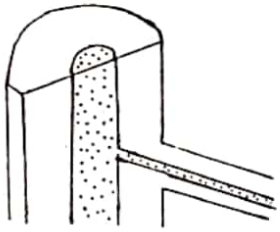

Fig.2

T.

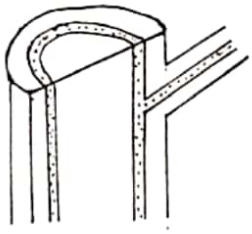

Fig.3

SECTION B

Answer ALL questions in this section. This section carries 70% of the total marks. The mark allocation is indicated at the end of each question.

3. (a) Explain the functions of the following parts of a compound microscope

(i) Stage

(ii) Eyepiece.

(b) Name four types of cells found in
(i) a plant body
(ii) an animal body (8 marks)

4. (a) Give two distinctive features of each of the following groups of organisms
(i) Protozoa
(ii) Fungi

(b) (i) Draw and label a Protozoan which has both plant and animal characteristics.
(ii) Give two distinguishing features of the class to which the organism you have drawn in (b)(i) belongs.
(10 marks)

5. The graph below, Fig.4 shows the rate of photosynthesis in a certain pondweed under different carbondioxide concentrations and light intensities.

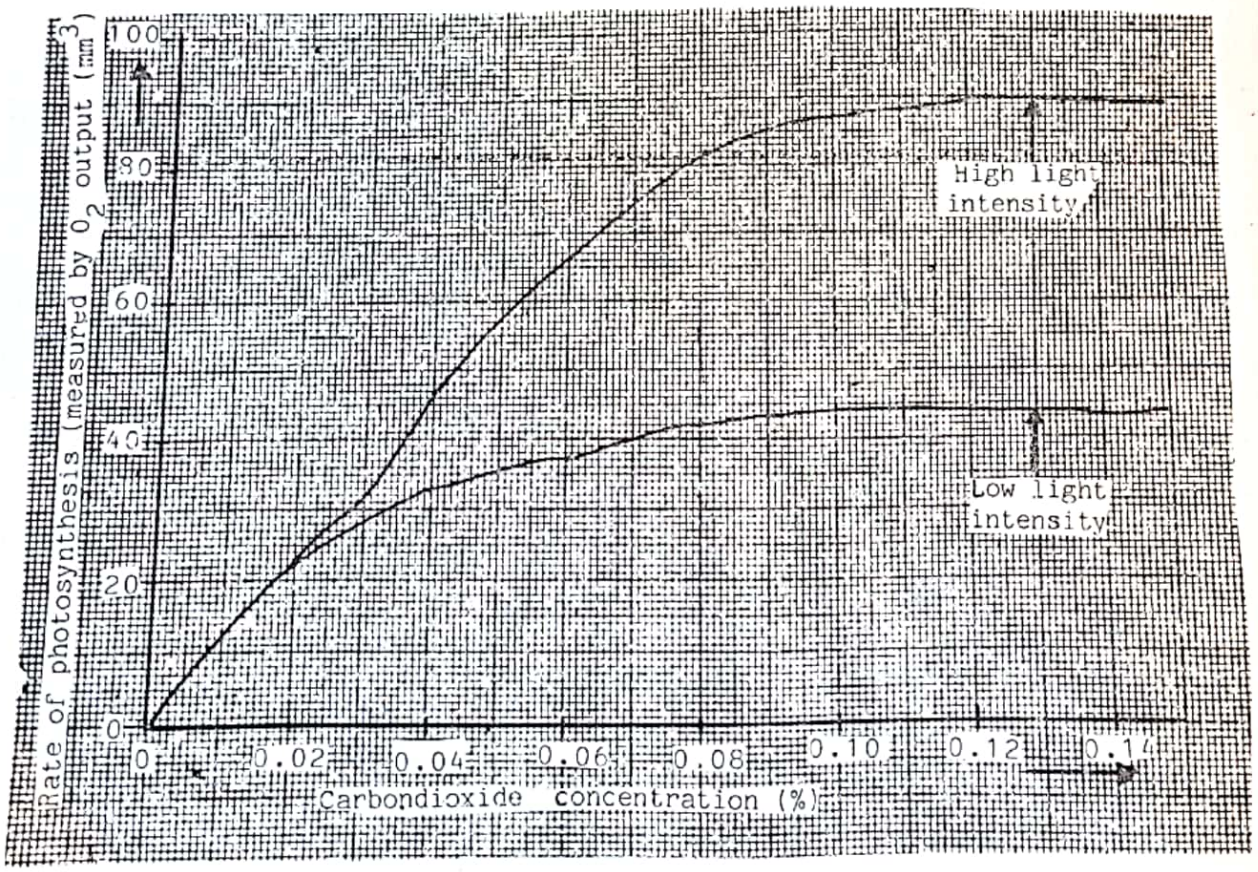

Fig.4

Refer to the graph and answer the following questions.

(a) (i) Describe the effects of low and high light intensities on the rate of photosynthesis.

(ii) What would be the effect of increasing the carbon-dioxide concentration above 0.12% at high light intensity?

(b) At low lightintensity

(i) What is the effect of increase of carbondioxide?

(ii) What is the concentration of carbondioxide at which the rate of photosynthesis is at its maximum? What can be said about light intensity at this point?

(8 marks)

6. (a) (i) Animal fat is a rich source of certain vitamins in the diet of human beings. Name two vitamins found in animal fat.

(ii) Give one function and one deficiency disease in humans of each of the two vitamins you have mentioned in (a)(i).

(b) (i) State one rich source of iron in the diet of humans, one function performed by iron and one disease caused by iron deficiency in the body.

(ii) Why do women normally require more iron than men?

(10 marks)

7. The diagram below, Fig.5, shows a developing foetus inside the uterus of a mammal.

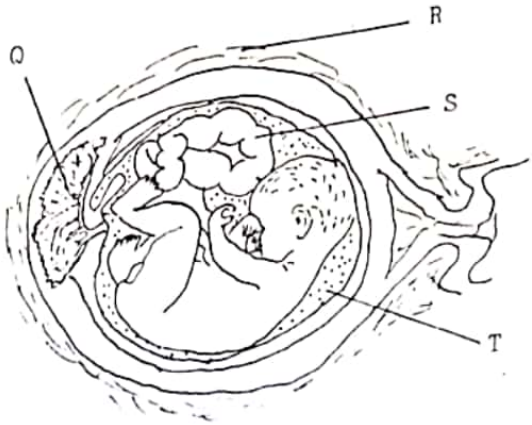

Fig.5

(a) (i) Name Q, R, S and T

(ii) Give two functions of T

(b) What two materials pass along S

(i) from the mother to the foetus?

(ii) from the foetus to the mother?

(8 marks)

8. (a) A black rabbit homozygous for coat colour was crossed with a white rabbit of unknown genotype. The offspring were all black. By means of a diagram and symbols find the genotype of the parents and offspring.

(b) (i) What is a sex-linked characteristic?

(ii) If coat colour in rabbits (Q.8(a)) is a sex linked characteristic, what would be the phenotypes and genotypes of offspring produced from a cross between a black male and a white female? (10 marks)

9. Briefly explain two roles of the skin of a human in
(a) conserving heat
(b) loosing heat. (8 marks)

10. Fig.6 below illustrates a feeding relationship in an ecosystem. The arrow ⟶ means "eaten by"

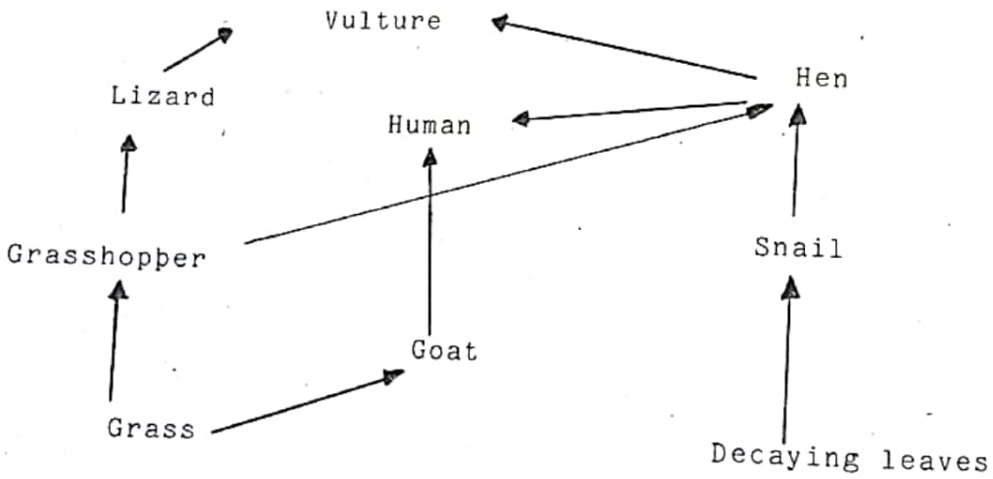

Fig.6

(a) (i) What name is given to the feeding relationship in Fig.6?

(ii) Which important group of organisms should be included in the diagram to make the ecosystem balanced?

(iii) Of what importance is the missing group named in (a)(ii) above, to the feeding relationship?

(b) Giving reasons, identify one organism in Fig.6 which is

(i) a primary consumer

(ii) a secondary consumer

(iii) both a prey and predator

(iv) in the first trophic level. (8 marks)

SECTION C

Answer ONE question from this section. Each question carries 20% of the total marks.

10. Write an essay on EITHER Dysentry OR Typhoid using the following outline

(i) cause

(ii) transmission

(iii) symptoms

(iv) prevention

(v) treatment

12. Discuss the various ways by which sandy soils can be made suitable for crop production.

13. (a) Draw a large and neat vertical section (V.S.) of a human heart. Label it fully and include all the major blood vessels associated with it.

(b) Using arrows indicate on your diagram the path taken by the blood as it enters, passes through and leaves the heart.

(c) Explain how blood entering the heart differs from that leaving it.

(d) Explain why animals cannot survive without blood.