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

033/1 BIOLOGY 1

(For Both School and Private Candidates)

Time: 3 Hours **05 November 2002 a.m.**

Instructions

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions in sections A and B, and **ONE (1)** question from section C.
3. Read each question carefully before you start answering it.
4. Cellular phones are **not** allowed in the examination room.
5. Electronic calculators are **not** allowed in the examination room.
6. Write your Examination Number on every page of your answer booklet(s).

This paper consists of 8 printed pages

SECTION A (20 marks)

Answer ALL questions in this section

1. For each of the items (i) – (x) choose the correct answer from among the given alternatives and write its letter beside the item number.

(i) The purpose of control in an experiment is to

A identify the problem B test the hypothesis C display results
D confirm conclusion E predict results.

(ii) The diagrams below (Fig. 1) show five different cells. Study them and then answer the question below.

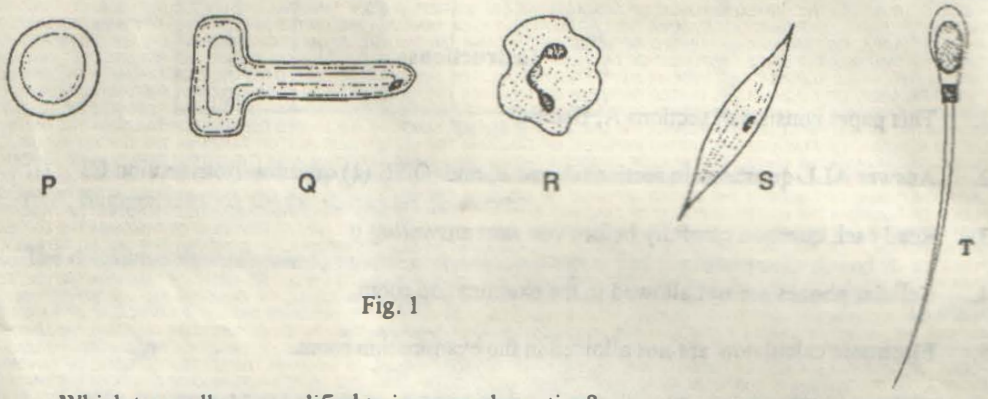


Fig. 1

Which two cells are modified to increase absorption?

A P and Q B Q and R C R and S D S and Q
E T and P

(iii) Vaccine against polio is likely to contain weakened

A polio bacteria B taxin C antibody D antigen
E virus.

(iv) Which of the following diseases is caused by bacteria?

A Sleeping sickness B Malaria C Aids D Tuberculosis
E Askariasis.

(v) Plant production and photosynthetic rate in the field are greatly influenced by

A temperature B water supply C carbon dioxide supply
D light intensity E soil fertility.

(vi) By which process does carbon dioxide pass from the blood into the alveoli of the lungs?

A Diffusion B Osmosis C Respiration D Transpiration
E Oxidation.

(vii) The diagram in Fig. 2 shows the plan of part of the human circulatory system. In which blood vessel are the breakdown products of alcohol first found?

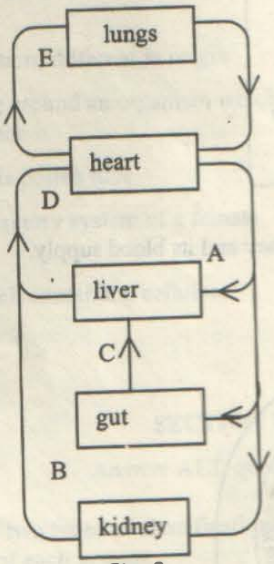


Fig. 2

(viii) Joints can be likened to levers. Which of the following is an example of first class lever?

A An ankle when one is standing on a tip-toe

B A knee when one is kicking a football

C An elbow when one is picking up an object

D The shoulder when one is raising the arm

E The hip when one is dancing "zouk" or "sindimba".

(ix) Figure 3 below shows a section through a human eye. What are X, Y and Z?

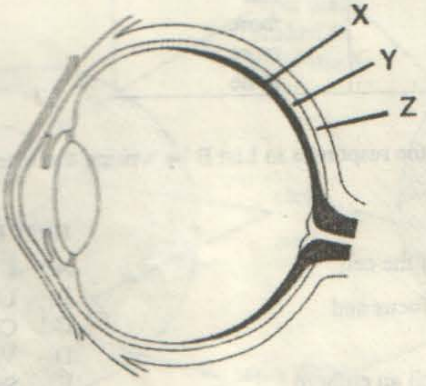


Fig. 3

	X	Y	Z
A	choroid	sclerotic	retina
B	sclerotic	choroid	fovea
C	retina	sclerotic	choroid
D	retina	choroid	sclerotic
E	sclerotic	choroid	retina

(x) The diagram below (Figure 4) shows a kidney and its blood supply.

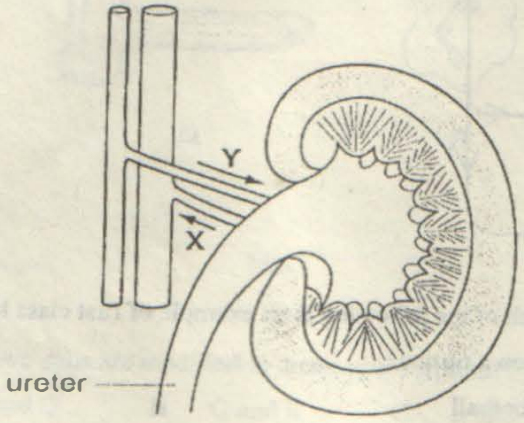


Fig. 4

Which of the following correctly compares the carbon dioxide and urea content of the blood in ves
X and Y?

	Carbondioxide in X	Urea in Y
A	less	less
B	more	less
C	less	more
D	more	more
E	same	same

2. Match the items in list A with the responses in List B by writing the letter of the correct response beside the item number.

LIST A

(i) Respiratory centre of the cell

(ii) It brings image into focus and magnifies it

(iii) The structure in which an embryo develops in female mammals

LIST B

A Ureter
B Urethra
C Cell wall
D Vacuole
E Stigma
F Style

(iv) Transformation of seeds into seedlings

(v) Sex-linked genetic disorder of the blood

(vi) Same function, different in origin

(vii) Everything around an organism which can influence it

(viii) It surrounds pollen tube

(ix) Part of excretory system of a female mammal

(x) Part of a cell containing cellulose.

G Uterus
H Placenta
I Mitochondria
J Nucleus
K Revolving eye piece
L Objective lense
M Haemophilia
N Sickle cell anaemia
O Environment
P Population
Q Homologous
R Analogous
S Germination
T Gametogenesis

SECTION B (60 marks)

Answer ALL questions in this section

3. (a) (i) Name the two types of classification systems of organisms and write down the merits and demerits of each system.

(ii) Why is it necessary to classify organisms?

(b) State the importance of each of the following biological substances:

(i) Chlorophyll

(ii) Haemoglobin

(iii) Bile. (8 marks)

4. Two petri dishes, A and B, were sterilized and then filled with agar (culture medium). Petri dish A was infected with bacteria A and Petri dish B with bacteria B. Round filter papers/filter paper discs soaked in antibiotics X and Y were placed in each petri dish and the set up incubated at 37 °C for two days. The results were as shown in Figure 5 below.

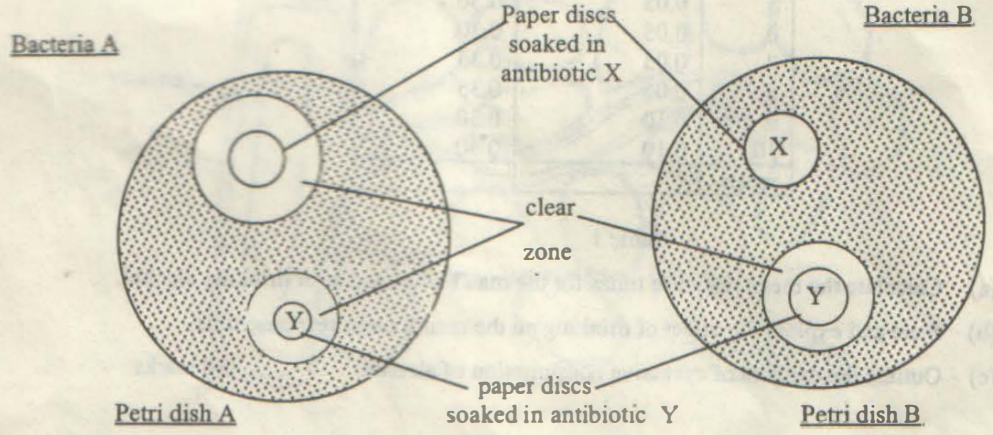


Fig. 5

(a) Why were the petri dishes sterilized before use?

(b) State the function of the antibiotics.

(c) Give an example of an antibiotic including its source.

(d) With reference to the results of the above experiment

(i) which of the two antibiotics has a universal action?

(ii) which antibiotic is more effective against bacteria A? Give an explanation.

(iii) which antibiotic is more effective against bacteria B? Give an explanation.

(e) What conclusion can you draw from this experiment? (7 marks)

5. (a) It is possible to breathe by using both the mouth and the nose simultaneously or one of them at a time but one passage is the best.

(i) Which passage is best for breathing?

(ii) Give reasons for your answer in 5.(a) (i) above.

(b) Differentiate between breathing and gaseous exchange. (6 marks)

6. (a) Explain four problems associated with early pregnancy.

(b) Give three reasons why parents are advised to practise birth control and child spacing.

(7 marks)

7. The table below (table 1) shows the effects of drinking alcohol on man's responses. The response time was the time taken for him to press a button after a light was switched on.

Table of response, time before and after drinking alcohol

Test	Response time (second)	
	Before drinking	After drinking
1	0.25	0.40
2	0.20	0.40
3	0.15	0.35
4	0.10	0.35
5	0.05	0.30
6	0.05	0.30
7	0.05	0.35
8	0.05	0.35
9	0.10	0.30
10	0.10	0.30
mean		

Table 1

(a) Calculate the mean response times for the man before and after drinking alcohol.

(b) State and explain the effect of drinking on the man's mean response time.

(c) Outline the dangers of excessive consumption of alcohol. (8 marks

8. (a) Distinguish between hypogeal and epigeal germination.

(b) Study carefully the diagrams below (Figure 6) and answer the questions which follow.

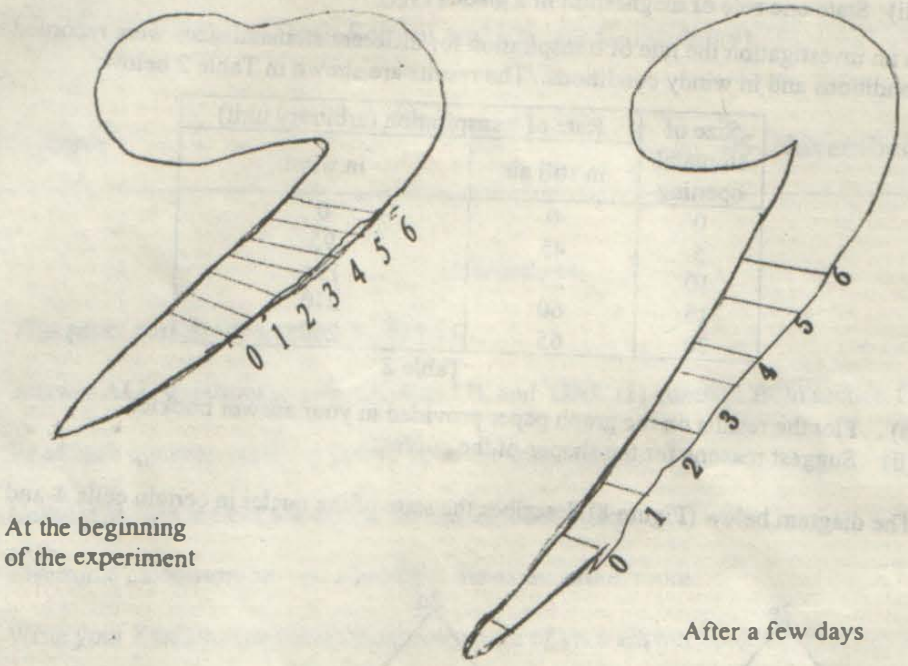


Fig. 6

(i) Name the phenomenon illustrated in Fig. 6 above.

(ii) Explain briefly why seed dormancy is important to plants. (8 marks)

9. Figure 7 below shows a root hair cell which is surrounded by soil particles.

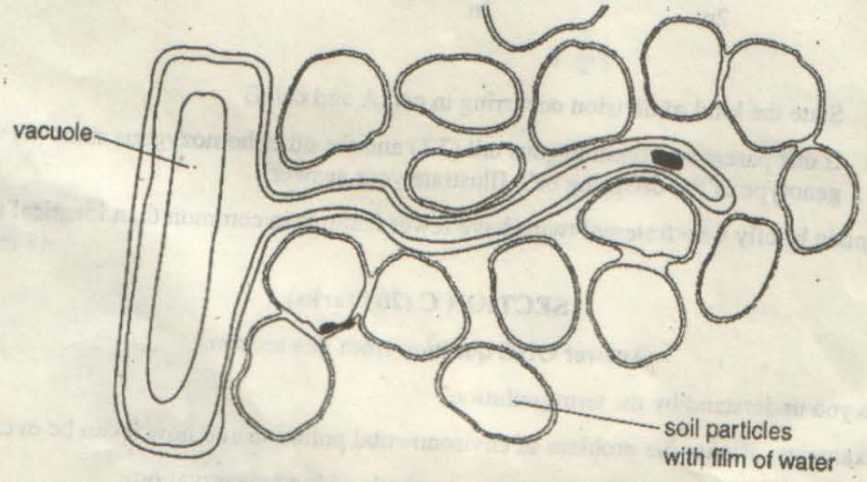


Fig. 7

The water film around the soil particles is a dilute solution of mineral salts.

(a) (i) Explain how water passes from the soil into the vacuole of the root hair cell.

(ii) Mineral salts are also absorbed by root hair cells. In which tissue are these minerals carried to the rest of the plant?

(iii) State one role of magnesium in a plant.

(b) In an investigation the rate of transpiration for different stomatal sizes were recorded in still air conditions and in windy conditions. The results are shown in Table 2 below:

Size of stomatal opening	Rate of transpiration (arbitrary unit)	
	in still air	in wind
0	0	0
5	45	95
10	55	155
15	60	210
20	65	260

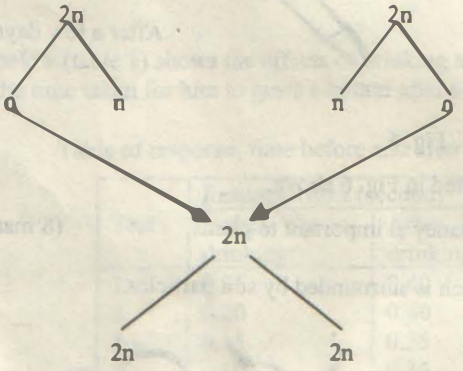
Table 2

(i) Plot the results on the graph paper provided in your answer booklet.
(ii) Suggest reasons for the shapes of the curves.

10. (a) The diagram below (Figure 8) describes the state of the nuclei in certain cells A and B

(8 marks)

A



B

Fig. 8

(i) State the kind of division occurring in cell A and cell B

(ii) If one parent was homozygous tall (TT) and the other homozygous short (tt) what will the genotype of the offspring be? Illustrate your answer.

(b) Explain briefly why fraternal twins have fewer features in common than identical twins.

(8 marks)

SECTION C (20 marks)

Answer **ONE** question from this section.

11. What do you understand by the term pollution?

Using examples, discuss the problem of environmental pollution and how it can be overcome.

12. Using relevant examples, discuss the various methods of food preservation.

13. Explain the ways in which bacteria improve soil fertility emphasizing on the importance of insoluble organic compounds in the soil to bacteria.