THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

NOVEMBER 1997

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 (1) 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 8 printed pages.

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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) Which of the following is the most important basic difference between plants and animals?

A. Growth

B. Movement

C. Nutrition

D. Irritability.

Answer (i) C.

(i) Which of the following organelles occurs in both bacterial and plant cells?

A. Chloroplast

B. Nuclear membrane

C. Cell wall

D. 70 S ribosome.

(ii) Presence of placoid scales is a distinguishing characteristic of glass

A. Chondrichthyes

B. Osteichthyes

C. Reptilia

D. Aves.

(iii) Which of the following criteria could be used to separate planarians and tapeworms into different classes?

A. Protruding eyes

B. Proglottides

C. Ability to regenerate a lost body part

D. Habitats and modes of life.

(iv) In mammals, the organ which acts as a reservoir for carbohydrates is the

A. pancrease

B. liver

C. spleen

D. stomach.

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(v) The main product of photosynthesis is transported away from the leaves by the

A. phloem

B. xylem

C. cortex

D. veins.

(vi) Which of the following statements is NOT true?

A. Plants respire all the time

B. At night plants give out carbondioxide

C. During the day the rate of photosynthesis exceeds that of respiration.

D. Plants only respire at night.

(vii) Which of the following is NOT typical of wind-pollinated flowers?

A. Large feathery stigmas

B. Hanging filaments

C. Relatively large pollen grains

D. Inconspicuous petals.

(viii) The number of chromosomes in a fetilized egg in man that will grow into a male child is

A. 22 pairs + XX

B. 22 pairs + XY

C. 22 pairs + Y

D. 22 + XY.

(ix) Assume that the trait for cataracts in the eye is recessive to the gene for normal eyes. A man with cataracts marries a normal - eyed woman. If each had a mother with cataracts, what are the chances of their first child having cataracts in the eye?

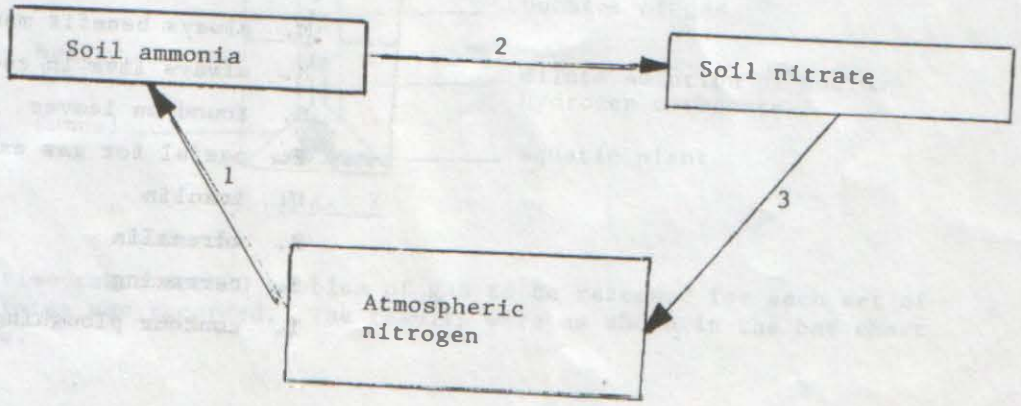
A. 0%

B. 25%

C. 50%

D. 75%.

(x) The following diagram represents part of the nitrogen cycle.



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Which of the numbered stages represent the process of denitrification?

A. 3 C. 1

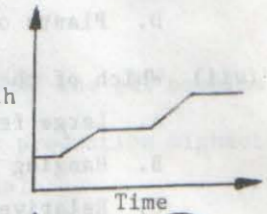
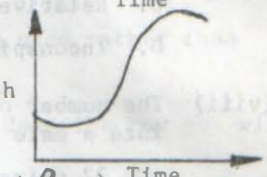
B. 2 D. All of them.

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 as shown in the worked out example.

Example:

LIST A	LIST B
(i) Complete oxidation of sugar.	C. aerobic respiration
	D. anaerobic respiration.

Answer: (i) C.

LIST A	LIST B
(i) function of apical meristems in roots	A. 
(ii) ciliary muscles relax	B. 
(iii) social insects	C. anti B (β)
(iv) lenticels	D. anti A (α)
(v) controls the blood sugar level	E. sulphur trioxide
(vi) planting crops around hill slopes	F. carbondioxide
(vii) serum of blood group A	G. has a fluid that maintains balance
(viii) sigmoid growth curve	H. has sensory cells that pick up sound vibrations
(ix) important pollutant of rain water	I. formation of new cells
(x) cochlea	J. formation of lateral roots
	K. lens becomes thinner
	L. lens thickens
	M. always benefit man
	N. always live in colonies
	O. found on leaves
	P. useful for gas exchange
	Q. insulin
	R. adrenalin
	S. terracing
	T. contour ploughing

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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) (i) Name two bacteria and for each give one disease it causes in humans.

(ii) How are the bacteria named in (a)(i) transmitted?

(b) State one important difference between the organisms in each of the following pairs

(i) Slug and starfish

(ii) Conifer and Mango tree.

(10 marks)

4. (a) For each of the following biological substances, give its name and briefly describe its function.

(i) green pigment in flowering plants

(ii) red pigment in the blood of mammals

(iii) green liquid squirted, bit by bit, into the duodenum of humans

(iv) jelly - like fluid in the inner chamber of the eye.

(b) List the parts of a nervous pathway that conducts the impulse for the knee jerk reflex.

(8 marks)

5. In an experiment to investigate the effect of colour of light on the rate of gas production by an aquatic plant, four sets of the apparatus shown below were assembled. Each was placed 20 cm from a light, but the lights were of different colours.

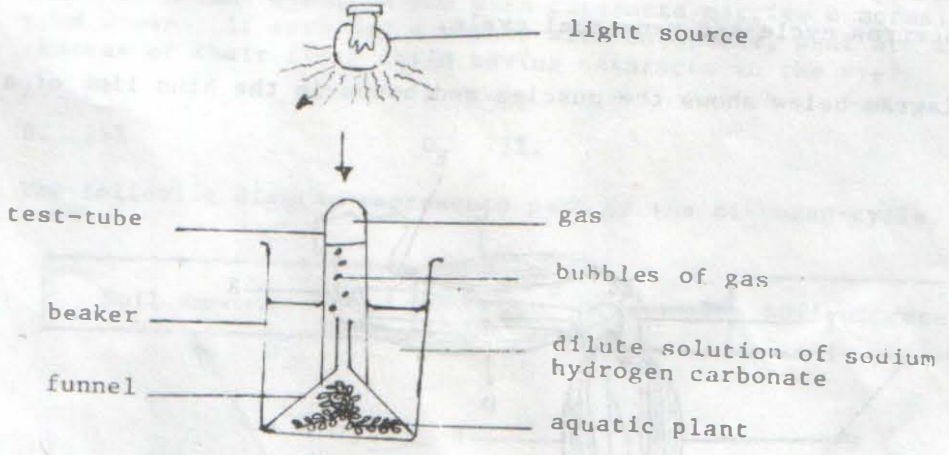

Fig. 2

The time taken for 20 bubbles of gas to be released for each set of apparatus was recorded. The results were as shown in the bar chart below.

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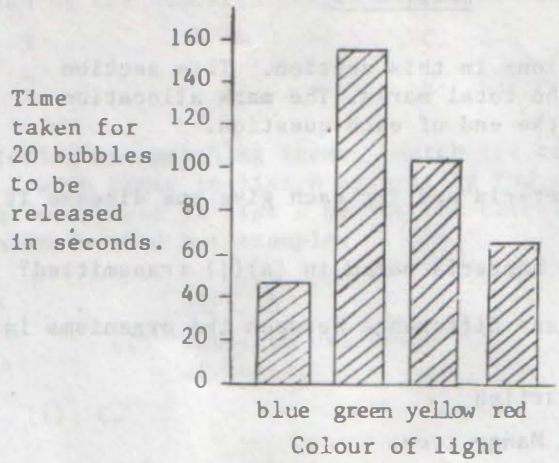


(a) Name the process by which the aquatic plant produced the gas bubbles.

(b) (i) In which colour of light was the rate of gas production highest?

(ii) Which two colours are best for photosynthesis?

(c) Why was dilute sodium hydrogen carbonate solution used rather than water?

(d) Suggest the name of the gas in the test-tube and describe how you will identify the gas.

(e) Suggest two precautions which would have to be taken to ensure that a valid comparison could be made between the four sets of apparatus.

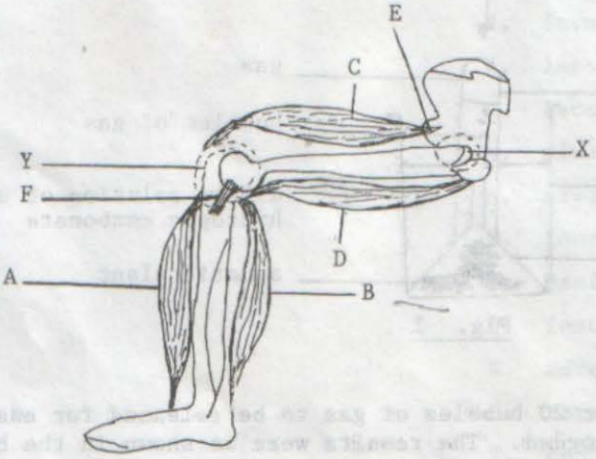
(10 marks)

6. Distinguish between the following pairs of terms

(a) artery and vein

(b) oestrus cycle and menstrual cycle.

7. The diagram below shows the muscles and bones in the hind limb of a man.



(a) Name the states (whether relaxed or contracted) of

(i) muscles A & B when raising the heel off the ground

(ii) muscles C & D when sitting down and raising the lower leg forwards off the ground.

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(b) Name joints X and Y and state the amount of movement possible at the joints.

(c) Name structures E and F. How do they differ in function? (10 marks)

8. (a) State one difference between the materials passing through the following pairs of tubes

(i) renal artery and renal vein

(ii) male urethra and female urethra.

(b) Distinguish between

(i) inhaled and exhaled air

(ii) red blood cell and white blood cell

(iii) maize grain and bean seed.

9. Carefully study the diagrams in Figures 5 & 6 below and answer the questions which follow

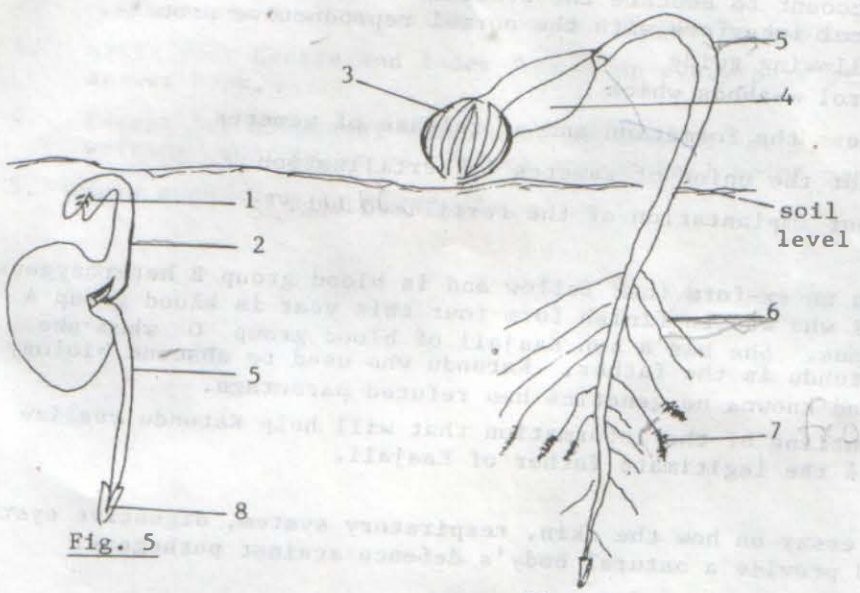

Fig. 5

Fig. 6

(a) Give the names of the parts labelled 1 - 8.

(b) How does the germination of the seed in figure 5 differ from that in figure 6?

(c) (i) What are the three conditions necessary for viable seeds to germinate?

(ii) Briefly explain why each of the 3 conditions in (c)(i) above is necessary for germination.

(10 marks)

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10. (a) What are the causes of variations in a population?

(b) Draw a diagram of a longitudinal section of a human brain. Label on the diagram the following structures.

(i) cerebral cortex

(ii) cerebellum

(iii) medulla oblongata. (8 marks)

SECTION C

Answer ONE (1) question from this section.
Each question carries 20% of the total marks.

11. Image you are a guest speaker requested to address the students of Mafinga Rural Medical Assistants College. The topic is "Nyota ya Kijani Compaign on Contraception".

Write an account to educate the students on how the different methods of birth control interfere with the normal reproductive process.
Use the following guide
Birth control methods which

(a) suppress the formation and/or release of gametes

(b) prevent the union of gametes in fertilization

(c) prevent implantation of the fertilized egg.

12. Katundu is an ex-form four fellow and is blood group B heterozygous. Haambiliki who was to finish form four this year is blood group A heterozygous. She has a son Kaajali of blood group O whom she claims Katundu is the father. Katundu who used to abscond biology classes and knowns no genetics has refuted parentage.

Give an outline of the information that will help Katundu realize that he is the legitimate father of Kaajali.

13. Write an essay on how the skin, respiratory system, digestive system and blood provide a natural body's defence against pathogens.

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