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

133/2 **BIOLOGY PAPER 2**
(For Both School and Private Candidates)

TIME: 2½ Hours 03 June 1999 P.M.

INSTRUCTIONS

1. Answer ALL questions.
2. Write your centre and index number on every page of your answer booklet provided.
3. Except for diagrams, which must be drawn in pencil, all writing must be in blue or black ink/ball point pen.
4. Read each question carefully.

   Note: The mark allocation is indicated at the end of each question.

This paper consists of 4 printed pages.

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1. Figure 1.0 below shows some cells of the stem of a flowering plant in longitudinal section.

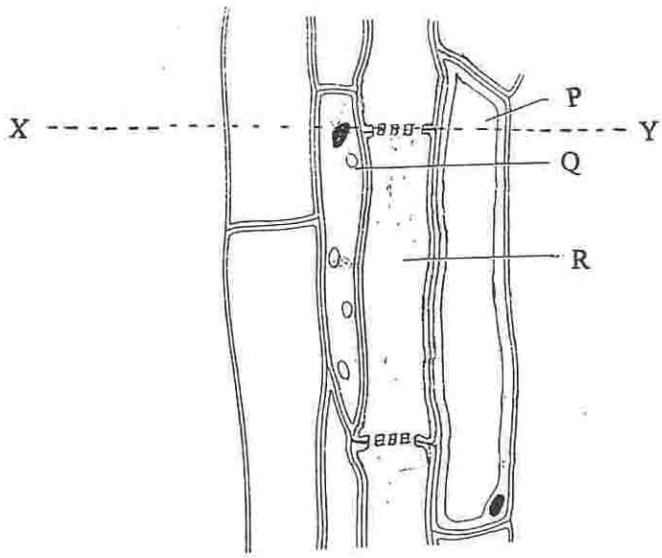

Figure 1.0

(a) (i) Name the cells labelled P, Q and R
(ii) Draw the cells as they would appear in the transverse section along the dotted line X — Y.

(b) (i) Give the name of the tissue which comprise the cells shown in the diagram.
(ii) Explain how cells P, Q and R adapt this tissue to its function(s).

2. (a) Mention any <u>five</u> types of membranes and state one function of each.

(b) Why are chloroplasts and mitochondria said to be "cells within cells?"

3. (a) Study the following characteristics of monocots and dicots. Which ones are characteristic of monocots only, dicots only, or both?
- single cotyledon
- food storage in cotyledon
- petals in multiples of three
- food arbsorption by cotyledon
- cambium
- scattered vascular bundles
- both tracheids and vessel elements
- persistent endosperm
- covered seeds
- heterosporous.

(b) (i) Using common names, give one example of an organism belonging to each of the following groups
- Protozoa
- Chilopoda
- Arachnida
- Compositae/Asteraceae
- Rubiacea
- Malvacea

(ii) State <u>four</u> features of birds that have contributed to the success of this group.

4. (a) Explain why it is important that active transport is employed in the arbsorption of food stuffs: monosaccharides, dipeptides and amino acids.

(b) State the features of the respiratory surfaces which are common to all vertebrates and briefly explain the importance of each feature.

5. (a) What is meant by
   (i) peptide linkage
   (ii) conjugated protein?

   (b) Give the role in protein synthesis of each of the following.
   (i) DNA
   (ii) Ribosome

6. Three plants, X, Y and Z were placed in varying conditions of light and temperature. In the first experiment the plants X, Y and Z were illuminated with white light, blue light and green light respectively.
In the second experiment all three plants were placed in bright daylight but at different temperatures. Plant X was kept at 11°C, Y at 22°C and Z at 31°C.
Assuming all other conditions were kept the same and the plants were of the same species,

   (a) state with reasons which of the plants would be likely to show
   (i) the slowest
   (ii) the fastest rate of photosynthesis?

   (b) comment on the effect of the differences in temperature that would have on the rate of photosynthesis in the three plants.

7. (a) By means of labelled diagrams only show the differences between a motor neurone and a sensory neurone.

   (b) In an experiment, thin pieces of mica were inserted into three tips of coleoptiles as shown in fig. 7.0 below.

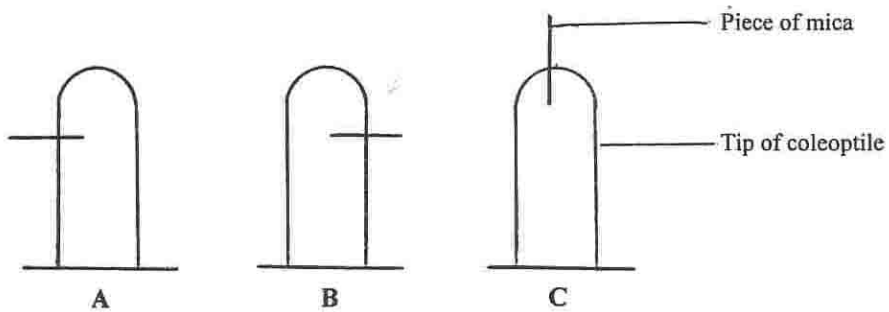

Fig. 7.0

In the light of the auxin theory, predict with a full explanation the results of experiments A, B and C in figure 7.0 above.

8. (a) Draw a diagram to show the cellular structure of the retina of a mammalian eye.

   (b) How does the eye control the amount of light entering it?

9. (a) Figure 9.0 below illustrates gametogenesis in a flowering plant.

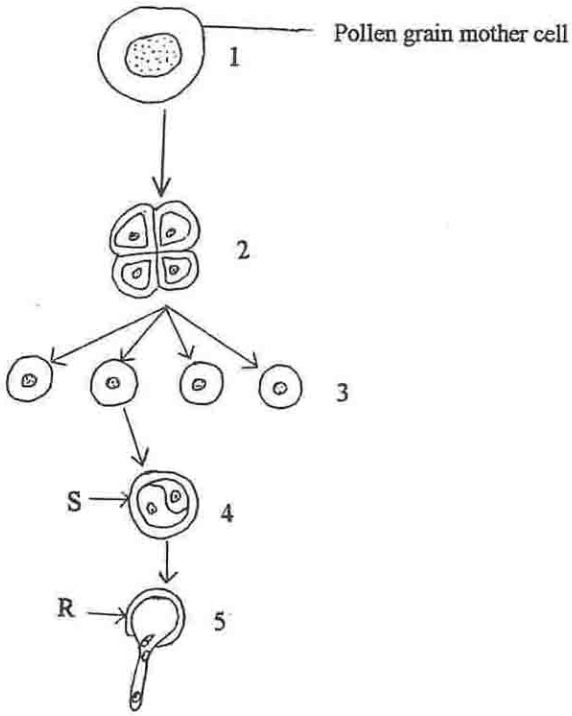

Figure 9.0

(i) What structure in the diagram corresponds to a mammalian spermatozoan?
(ii) Name a structure in a mammalian testis that corresponds to the pollen grain mother cell.
(iii) Explain how structure S is formed from structure R.

10. (a) One of the hormones secreted by the anterior lobe of the pituitary gland is called growth hormone.
(i) What are the effects of this hormone in the body?
(ii) What are the effects of oversecretion of this hormone?

(b) Name two other hormones secreted by the anterior lobe of the pituitary and give one function of each.

11. (a) State the laws of heredity as postulated by Gregor Mendel.
(b) In Drosophila melanogaster, the gene for greyness (E) is dominant to the gene for ebony colour (e).
(i) What would be the F1 phenotypes if the parental flies were both heterozygous for the body colour?
(ii) If the male fly were homozygous grey and the female fly heterozygous, what would be the F1 offspring phenotypes?

12. (a) What is meant by biological control?
(b) What are the advantages and disadvantages of using biological control, over the other methods of pest control?