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

133/1

BIOLOGY 1
(For Both School and Private Candidates)

Time: 2 Hours 30 Minutes . 2006 February, 14 Tuesday p.m.

INSTRUCTIONS

1. This paper consists of fifteen (15) questions in sections A and B.
2. Answer all questions in section A and two (2) questions from section B.
3. Read each question carefully.
4. Cellular phones are not allowed in the examination room.
5. Write your Examination Number on every page of your answer booklet(s).

ACS

This paper consists of 6 printed pages.

Scanned with CamScanner

SECTION A (70 marks)

Answer all questions in this section.

1. (a) What do you understand by a dichotomous identification key?

(b) From your knowledge of classification, construct a simple numbered dichotomous key which could be used to identify the classes of the phylum chordata: Mammalia, Aves, Reptilia, Amphibia, Chondrichthyes and Osteichthyes. Use the following features: hair, skeleton type, scales, fins and feathers.

2. Refer to the following list of organisms labelled A, B, C, D and E to answer questions 2(a) and (b)

A – Protozoan

B – Bacterium

C – Mould

D – Bryophyte

E – Flowering plant

(a) (i) In which organism(s) would reproduction be entirely asexual?

(ii) Which organisms produce spores at some stage in their life history?

(iii) Which organisms possess mitochondria?

(iv) Which organism may fix nitrogen?

(v) What are the two (2) main structural differences between D and E?

(b) What kingdoms are represented by the organisms labelled A to E?

3 (a) Explain the roles of the following in photosynthesis:

(i) ribulose diphosphate.

(ii) NADP.

(b) (i) Why are C_4 plants more efficient in photosynthesizing than C_3 plants?

(ii) What would be the effect of raising oxygen concentration on C_3 photosynthesis?

4. (a) Mention one (1) role played by each of the following in the release of energy during aerobic respiration.

(i) Mitochondria.

(ii) Oxygen.

(iii) Cytochrome.

(iv) Glucose.

(b) Explain the possible effects of a decrease in environmental temperature on the rate of gas exchange in a:

(i) well illuminated foliage leaf.

(ii) small mammal.

Scanned with CamScanner

(a) What are the main differences between negative and positive feedbacks?

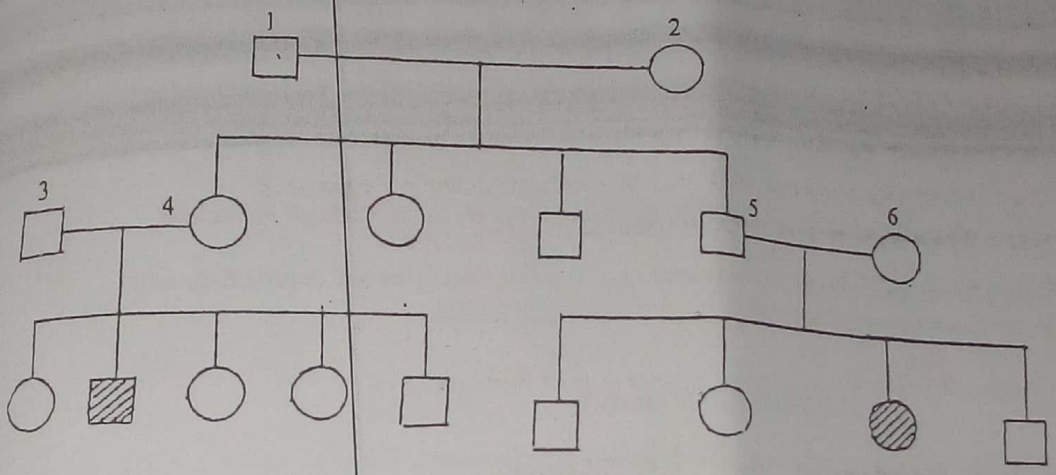
(b) How do organisms:

(i) gain heat?

(ii) lose heat?

(a) State Mendels's first law of inheritance.

(b) Carefully study the pedigree given below (Fig. 1) showing the inheritance of a certain trait.



Key

Normal female

Normal male

Affected male

Affected female

Fig. 1

(i) Determine the genotypes and phenotypes of individuals numbered 1, 2, 3, 4, 5 and 6.

(ii) What type of inheritance is displayed in the pedigree above?

(iii) Suggest two (2) human traits transmitted in a manner similar to the pedigree above.

(iv) What is the nature of the gene controlling the trait being investigated in the pedigree?

Scanned with CamScanner

7 (a) Explain briefly the meaning of selective breeding.

(b) The occurrence of homologous and vestigial structures is often used to explain the theory of organic evolution. Explain this statement.

8 (a) Define ecological succession.

(b) State the merits and demerits of using pyramid of numbers and pyramid of biomass in ecological studies?

9 (a) Describe the structure of a typical amino acid.

(b) With the help of a relevant illustration, show how two amino acids can be condensed to form a known product.

10 (a) What are the useful contributions of Jean Baptiste Larmarck in the study of evolution?

(b) What did Weisman conclude after his experiment of breeding mice and cutting their tails over many successive generations?

SECTION B (30 marks)

Answer two (2) questions from this section.

11. (a) Copy the table below and fill in the missing information

Phytohormone	Site of synthesis	Three functions	
Auxins			
Gibberellins			
Ethene			

(b) Compare, in respect to each other, tropisms, taxes and nastic movements in plants.

12. The release of energy from a glucose molecule occurs in three (3) stages namely: glycolysis, Kreb's cycle and electron transfer. Give the summary of the essential features of two (2) of these stages.

Scanned with CamScanner

13. (a) The oxygen dissociation curves of oxyhaemoglobin are shown in the sketch graph below (Fig.2), plotted from a data obtained at different levels of carbon dioxide concentration.

Curves A, B and C represent dissociation of oxygen when the partial pressure of carbondioxide is 15 mm Hg, 42 mm Hg and 72 mm Hg respectively.

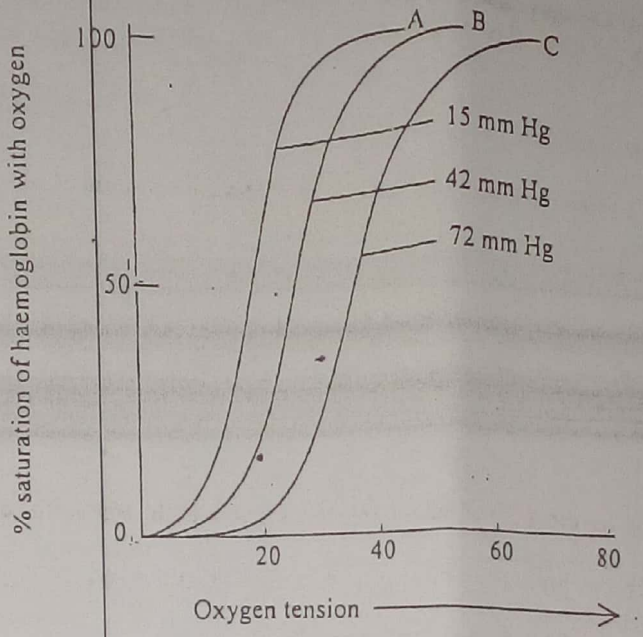


Fig. 2

(i) Give a general statement with respect to oxygen loading or unloading to/from haemoglobin in the presence of carbondioxide.

(ii) How is the change observed in the sketch graph achieved?

(iii) What is the general term given to the observed phenomenon?

(iv) What is the advantage of such behaviour of oxygen loading with respect to increased partial pressure of carbondioxide?

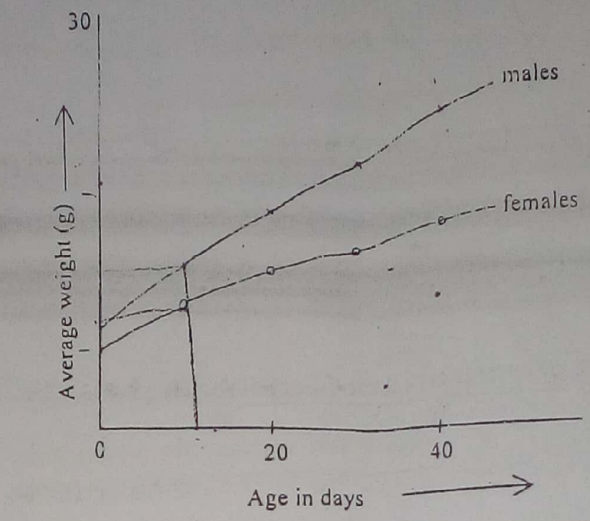
(b) Explain the fate of glucose in the glomerulus filtrate as it is not normally found in urine passed out in man.

(c) Write down four (4) functions of the mammalian blood in relation to transport and defence.

Scanned with CamScanner

14 (a) What do you understand by the term growth?

(b) Carefully examine the growth curves of mice in Fig. 3 below and answer the questions that follow.



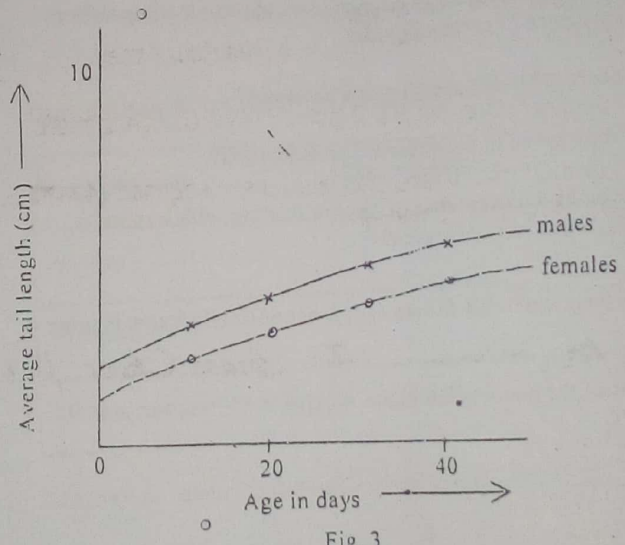


Fig. 3

(i) Did the mice (both females and males), increase in weight faster at any time during the four week period?

(ii) What is the weight of the female and male mice after 14 days of growth?

(iii) What is the relationship between the growth rate of mice tails and bodies?

(iv) What conclusion can you draw from the growth rates of both sexes of mice?

15 (a) Distinguish complete metamorphosis from incomplete metamorphosis.

(b) Explain hormonal control of metamorphosis (moulting) in insects.

ACS

Scanned with CamScanner