

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION
MAY 1997

133/2

BIOLOGY PAPER 2

(For both School and Private Candidates)

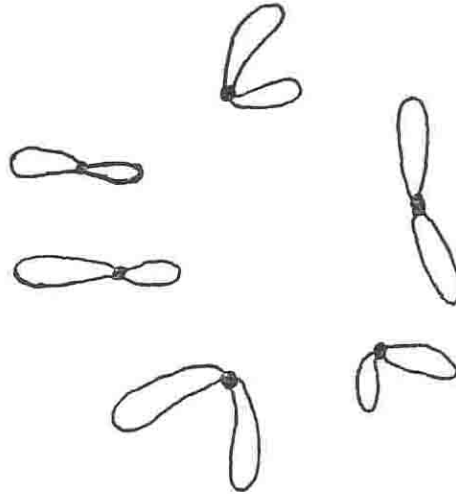
TIME: 2½ Hours

INSTRUCTIONS TO CANDIDATES

1. Answer ALL questions.
2. Write your Centre and Index Number on every page of your answer book.
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.

This paper consists of 5 printed pages.

1. (a) The diagram below represents a mitotic metaphase plate of a hypothetical cell as seen from polar view. Study the diagram carefully then answer the questions which follow.

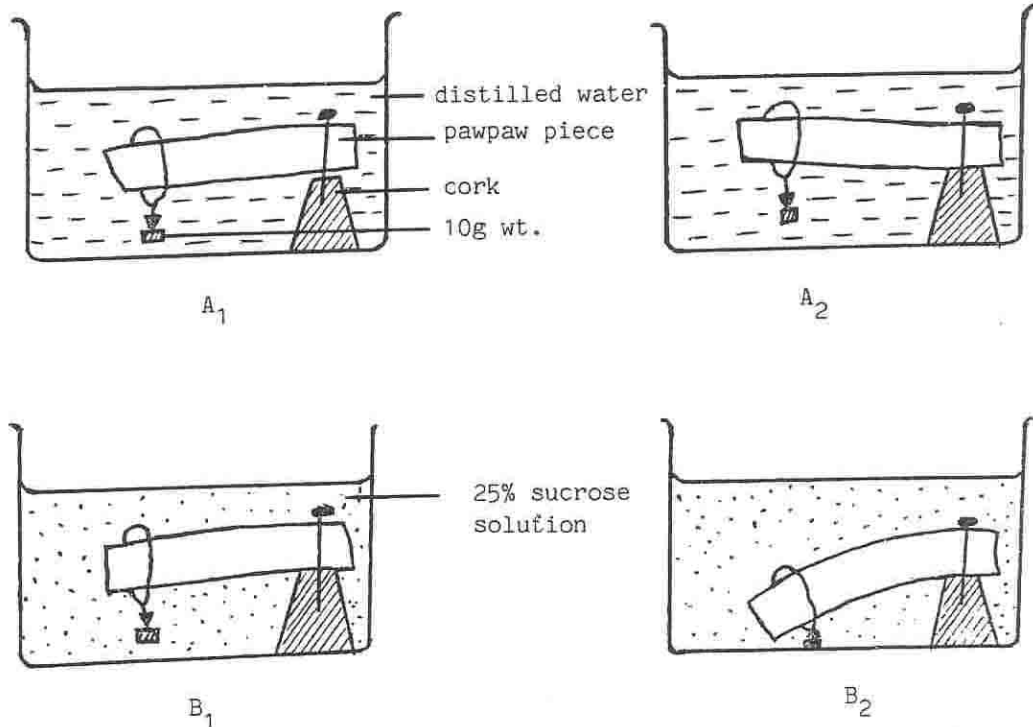


- (i) State the number of pairs of homologous chromosomes and the value of $2n$
- (ii) Show diagrammatically the appearance of metaphase plate of meiosis I as viewed from the side.
- (b) Name the organelles in animal cells in which the processes mentioned below occur
- (i) transcription
 - (ii) synthesis of adenosine triphosphate
 - (iii) synthesis of polypeptides
 - (iv) formation of primary lysosomes.
2. (a) (i) In what ways are fungi similar to and different from plants?
- (ii) Giving specific examples, mention two ways in which fungi are of medical importance.
- (b) Briefly explain why the exoskeleton in insects is both an advantage and a disadvantage.
3. (a) (i) What do you understand by the phrase "biological control"?
- (ii) State the advantages and disadvantages of biological control.

- (b) The free-living planarians and the parasitic tapeworms belong to the same phylum. Identify the features which are well developed in the former but show partial or total degeneracy in the latter.
4. (a) (i) What are lipids
(ii) Describe the roles of lipids in organisms.
- (b) State the properties of water which account for its ability to play various life promoting functions in organisms.
5. (a) Describe the fate of pyruvic acid under unaerobic conditions.
(b) How is the small intestine in humans adapted for its role of absorption?
6. (a) The table below shows the main types of nitrogenous excretory products and the habitats of three classes of animals.

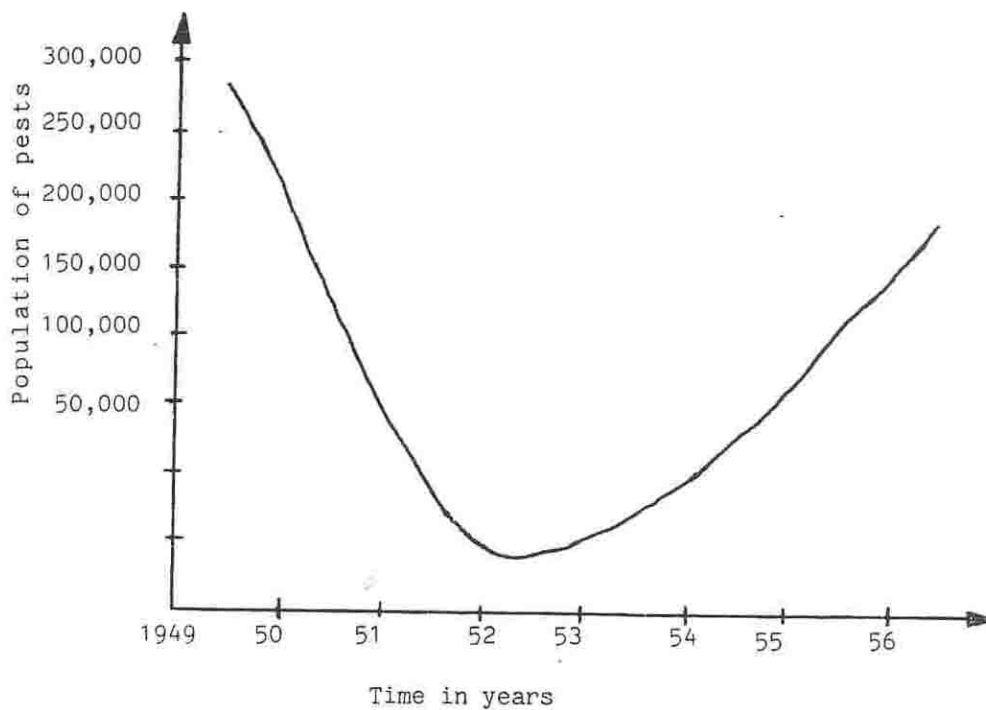
CLASS	NITROGENOUS EXCRETORY WASTE	HABITAT
Osteichthyes	Ammonia	Fresh water or marine
Mammalia	Urea	Land
Insecta	Uric acid	Land

- (i) Explain the relationship between the type of excretory waste and habitat.
- (ii) Which of the above nitrogenous excretory wastes is associated with the evolution of the cleidoic eggs?
- (b) Why is it not advisable for a victim of diabetes mellitus to drink alcohol?
7. (a) Draw a sketch graph to show a growth curve of an annual plant starting with seed germination, and ending with production.
(b) Account for the shape of the growth curve.
8. (a) Two identical pieces of raw pawpaw, to each of which a 10g weight was suspended, were separately immersed in distilled water and a 25% sucrose solution. The diagrams below show how the pieces appeared at the start of the experiment and after 24 hours.



- (i) Explain what has happened to pawpaw pieces in A and B set-ups.
- (ii) What biological concepts are demonstrated by the experiment?
- (iii) How are the concepts you have mentioned in (ii) above useful to plant life?
- (b) State the factors which influence the rate of transpiration.
9. (a) Name any two types of plant growth regulating substances and state one function of each.
- (b) Outline the events which take place during transmission of a nerve impulse across the synapse.
10. (a) In a certain population of mice, yellow coat is dominant to gray coat. Whenever yellow mice were interbred, the resulting offspring were yellow and gray in the ratio of 2:1. Give an illustrated explanation of this observation.
- (b) Give two examples of human traits which are inherited in a criss-cross fashion.

11. (a) Define the term population from
(i) a geneticist's point of view
(ii) an ecologist's point of view.
- (b) Explain two factors which affect population growth.
12. A FAO researcher sprayed DDT regularly for several years to a population of pests. She sampled the population every year of spraying. When the results were graphically represented the graph obtained was as shown below:



- (a) Explain these experimental results in terms of natural selection.
- (b) What are the limitations of Darwin's theory of natural selection?
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