

THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION, MAY 1994

133/2

BIOLOGY PAPER 2  
(For both School and Private Candidates)

TIME:  $2\frac{1}{2}$  Hours

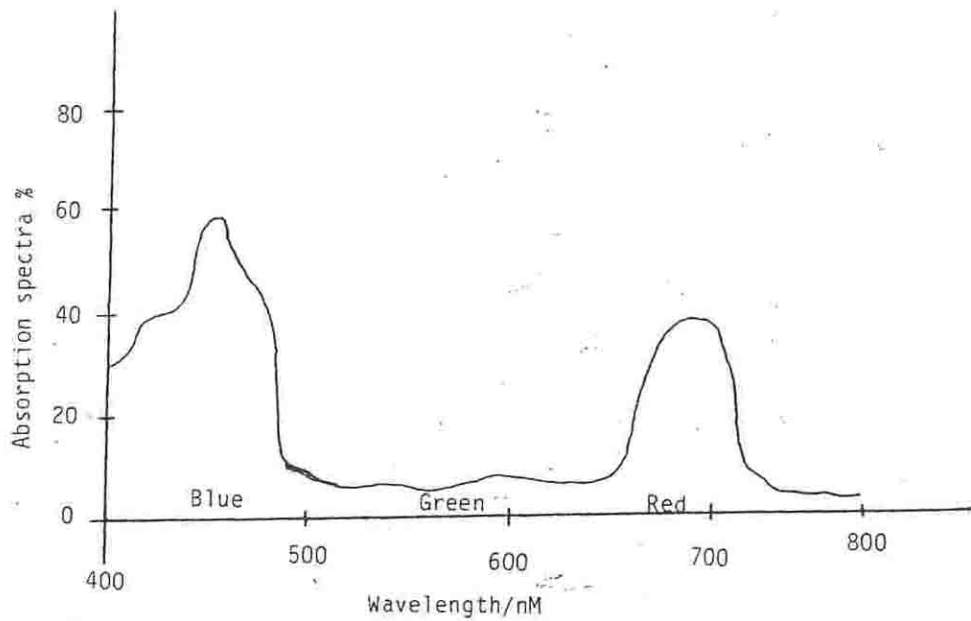
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1. Answer ALL questions
2. Write your Centre and Index Number on every page of your answer book.
3. Except for diagrams, all writing must be in blue or black ink/ball point pens.
4. Read each question carefully.

This paper consists of 5 printed pages.

1. (a) (i) State the components of the Cell Theory.  
(ii) What are the structural differences between prokaryotic and eukaryotic cells?
  - (b) Giving reasons state where in the body of a mammal you would find a large number of lysosomes and mitochondria.
  - (c) How is the epidermis of a dicot leaf adapted for the functions it performs?
  - (d) (i) By means of labelled T.S. diagrams only, show the differences between structures of myelinated and non-myelinated nerve fibres.  
(ii) State the role of the myelin sheath.
2. (a) (i) Explain why viruses must inevitably lead a parasitic mode of life.  
(ii) What is the importance of the wet and dry conditions in the life-cycle of a moss plant?
  - (b) Differentiate between a seed and a fruit.
3. (a) (i) What is a parasite?  
(ii) List, giving common and scientific names, one parasite of man from each of the following phyla: Protozoa, Platyhelminthes, Annelida and Aschelminthes.
  - (b) At what lowest classification rank are man, elephant, whale and bat grouped together? What characteristics do they share at this rank?
4. (a) (i) Distinguish between the following terms as used in connection with enzymes: co-factor and co-enzyme, inhibitor and activator.  
(ii) How do ions of the following elements affect some enzyme controlled reactions? Hydrogen, calcium and mercury.
  - (b) Briefly describe the role of each of the following in protein synthesis: Ribosomes, DNA, mRNA and tRNA.
5. (a) (i) Explain how living organisms are involved in nitrogen fixation.  
(ii) How is the nitrogen made available to other plants?
  - (b) Transpiration is said to be a "necessary evil". Comment.

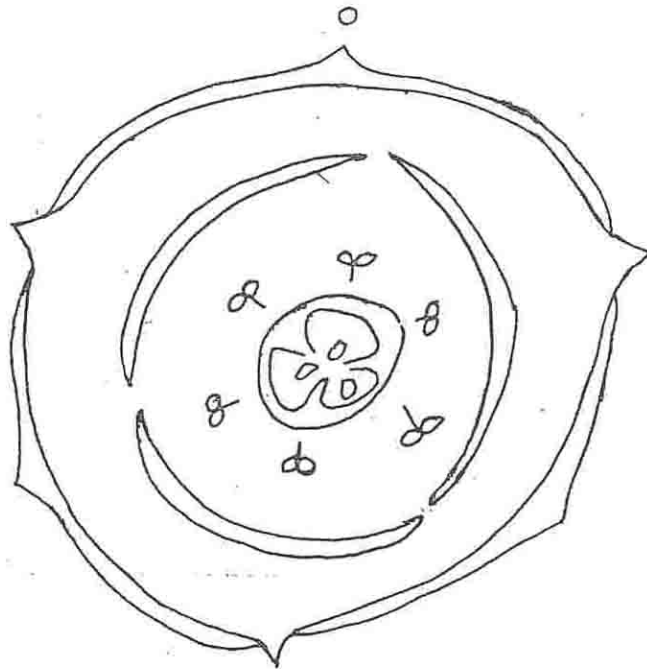
6. (a) Study the graph below. Give a summary of your interpretation of the graph.



Action spectra of chlorophyll

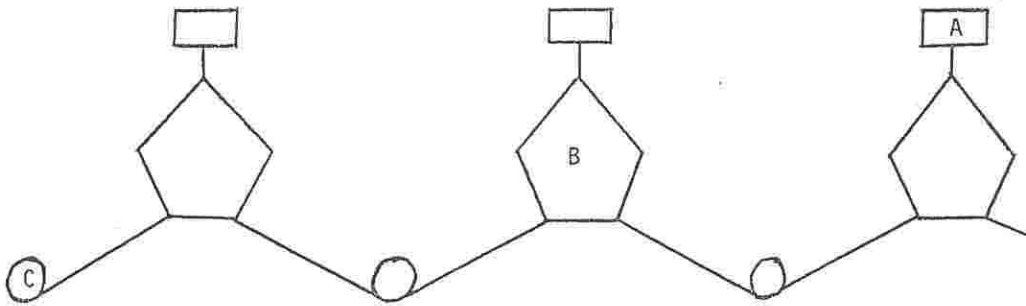
- (b) Give a brief account of the role of a mammalian liver in protein metabolism.
7. (a) Respiration is an energy releasing process. Explain why the first stage of glycolysis use up ATP instead of releasing ATP.
- (b) Explain why endotherms can live in cold polar climates but are not so numerous in hot desert climates where ectotherms thrive.
8. (a) How does the failure to secrete insulin and anti-diuretic hormone (ADH) affect the amount and composition of urine secreted in man?
- (b) (i) True growth is not simply an increase in size. State three different ways in which growth can be expressed.
- (ii) How does light availability influence growth in plants?

9. (a) Below is a floral diagram of a hypothetical flower.



- (i) To what sub-class of angiosperms would the flower belong? Give reasons for your answer.
- (ii) Write the possible floral formula for the flower.
- (b) (i) Draw a well labelled diagram of a human spermatozoan.
- (ii) State why testes in man are located external to the body cavity.
10. (a) (i) Briefly explain how a nerve impulse is transmitted along a nerve fibre.
- (ii) What is meant by "adaptations of receptors"?
- (b) (i) What are gibberellins?
- (ii) Differentiate between tactic and nastic responses in plants.

11. (a) (i) The diagram below shows part of a polynucleotide chain. Name the chemical groups labelled A, B and C.



- (ii) If the sequence of bases found in a strand of DNA which serves as a template for the synthesis of a mRNA is adenine - guanine - cytosine - thymine, what will be the sequence of bases found in the newly synthesized mRNA?
- (b) (i) Explain how variation may arise in asexually reproducing organisms.  
(ii) Why are most mutations recessive?
12. (a) Distinguish between
- (i) primary and secondary ecological succession
  - (ii) ecosystem and community
- (b) Give explanations for the following statements.
- (i) Organisms in two totally unrelated taxa may resemble each other in certain features.
  - (ii) Homology is evidence for divergent evolution.
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