

Biology II

012

22/07/2021 08.30 AM - 11.30 AM



NESA NATIONAL EXAMINATION AND
SCHOOL INSPECTION
AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2020-2021

SUBJECT: BIOLOGY II

COMBINATIONS:

- BIOLOGY-CHEMISTRY-GEOGRAPHY (BCG)
- MATHEMATICS-CHEMISTRY-BIOLOGY (MCB)
- PHYSICS-CHEMISTRY-BIOLOGY (PCB)

DURATION: 3 HOURS

INSTRUCTIONS:

- 1) Write your names and index number on the answer booklet as written on your registration form and **DO NOT** write your names and index number on additional answer sheets if provided.
- 2) Do not open this question paper until you are told to do so.
- 3) This paper consists of two sections: **A** and **B**.
SECTION A: Attempt all questions. (70marks)
SECTION B: Attempt any **THREE** questions. (30marks)
- 4) Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS (70 marks)

- 1) a) Define the following terms. (2 marks)
 - (i) Classification (2 marks)
 - (ii) Phylogeny (2 marks)
- b) What is the relationship between natural classification and phylogeny? (2 marks)
- 2) Arrange the following cell organelles in their order of size starting with the largest: (5 marks)

Chloroplast, Endoplasmic reticulum, Centriole nucleus, Mitochondria, Lysosome, Ribosome.
- 3) Use Simpson's index to calculate the diversity of a habitat that contains the following Organisms: (4 marks)

20 woodlice, 5 Mice, 1 shrew, 32 Earthworms, 15 grasshoppers, 1 Owl.
- 4) The table below contains statements about four molecules. Complete the table by indicating with a tick (✓) or a cross (x) whether the statements apply to Haemoglobin, DNA, phospholipid or antibodies.

Statement	Haemoglobin	DNA	Phospholipids	Antibodies
Contain Iron				
Contains phosphate				
Able to replicate				
Hydrogen bonds stabilize the molecule				
Contain Nitrogen				

(5 marks)

- 5) Although Prokaryotes are more numerous and widespread than Eukaryotes, their level of complexity and efficiency is restricted. What has enabled Eukaryotes to become more complex. (2 marks)
- 6) Suggest reasons why Microvilli are only possible in animal cells but not in plant cells. (2 marks)
- 7) Assuming all other factors are kept constant, explain why increasing the concentration of substrate does not always increase the rate of reaction. (2 marks)

- 8) Fill in the missing appropriate terms in the following passage.
 The primary structure of Protein is determined by sequence ofwhich make up thechain.
 The secondary structure results from coiling of folding of the chain due to.....formed between -NH and the.....group of thebond. **(5 marks)**
- 9) Compare and contrast active transport and facilitated diffusion. **(4 marks)**
- 10) a) Why do plants need to move water to their leaves? **(2 marks)**
 b) Suggest why it is important that the products of Photosynthesis can be moved in both directions through the sieve tubes. **(3 marks)**
- 11) Suggest the advantages and disadvantages to farmers of crops that are genetically identical. **(4 marks)**
- 12) Explain how the environment can cause variation. **(3 marks)**
- 13) a) Explain how enzymes reduce the activation energy of a reaction. **(2 marks)**
 b) Why do enzymes usually work only within very narrow PH range? **(2 marks)**
 c) Suggest why enzymes are usually maintained at low concentrations in cells. **(2 marks)**
- 14) a) Describe the differences between a parasite and a pathogen. **(2 marks)**
 b) Explain why people in the less economically developed countries are more likely to suffer from infectious diseases. **(5 marks)**
- 15) Explain why loss of genetic diversity means the species can no longer evolve. **(3 marks)**
- 16) a) What is the difference between T helper and T killer cells. **(2 marks)**
 b) People who receive drug treatment for HIV/AIDS take a mixture of drugs that act in different ways. Suggest the advantages of taking a mix of drugs. **(3 marks)**
 c) Antibiotics are prescribed to people who have HIV/AIDS for treatment of secondary infections, but not for treatment of HIV infection. Explain why this is so. **(2 marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS (30 marks)

- 17) a) What is the role of Mitosis? **(2 marks)**
b) Give the differences between Mitosis and Meiosis. **(8 marks)**
- 18) Comment on the flow of energy through ecosystems and discuss the various ways in which human activity can influence its flow at all levels in terrestrial ecosystem. **(10 marks)**
- 19) A number of current agricultural practices are of immediate benefit to farmers but may have long term adverse effects on humans and the environment. For each of the following agricultural practices, state the benefits and adverse environmental or human consequences.
- a) Deforestation **(5 marks)**
b) Nitrogenous Fertilisers **(5 marks)**
- 20) a) What is Natural selection? **(4 marks)**
b) What is the role of Mutation in Natural selection? **(6 marks)**
- 21) Explain how organisms have overcome the challenges of being Multicellular. **(10 marks)**