Biology II

012

28/07/2022 08:30 AM – 11:30 AM

NESA NATIONAL EXAMINATION AND SCHOOL INSPECTION AUTHORITY

ADVANCED LEVEL NATIONAL EXAMINATIONS, 2021-2022

SUBJECT: BIOLOGY II

PAPER II: THEORY

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. **(70 marks)**

   SECTION B : Attempt only **THREE** questions. **(30 marks)**
4) Use only a **blue** or **black** pen.

SECTION A: ATTEMPT ALL QUESTIONS (70 marks)

1) a) Which eucaryotic kingdoms contain:

i) Autotrophic organisms? **(1 mark)**

ii) Heterotrophic organisms? **(1 mark)**

b) Classify each of the following organisms: cockroach, honeybee and maize under the following taxa, kingdom, phylum and class. **(3 marks)**

2) a) What is the importance of plasma membrane in active transport? **(1 mark)**

b) Apart from controlling the movement of materials out of cells, state another function of cell membrane. **(1 mark)**

c) During mitosis in a certain animal, chromatids failed to separate and move to opposite poles.

i) Name the organelle that the cell was lacking. **(1 mark)**

ii) State the function of the named organelle in (i) above. **(1 mark**

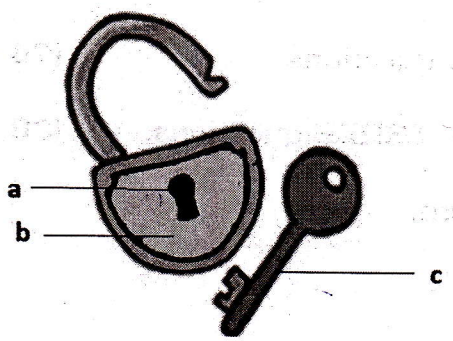
3) Design a table to show how you can test for food substance suspected to contain a protein, indicating procedure, observations, and conclusion. **(3 marks)**

4) a) Distinguish between **amylopectin** and **amylose** **(2 marks)**

b) What is the universal solvent in living organisms? **(1 mark)**

5) a) What is meant by "turn over number of an enzyme"? **(1 mark)**

b) The diagram below represents Rock and Key hypothesis



Match letters in column **1** with appropriate terms in column **2**.

Column 1	**Column 2**
a	Substrate
b	Active site
c. ~9	Enzyme

(3 marks)

c) Enzyme $\rightleftharpoons$ Enzyme + Product.

From this equation, name two properties of enzyme shown. **(2 marks)**

6) Contrast the following:

i) Cyclic and non-cyclic photophosphorylation. **(2 marks)**

ii) Photophosphorylation and oxidative phosphorylation. **(2 marks)**

7) a) i) Define the term translocation. **(1 mark)**

ii) What is the importance of translocation in the life of a plant?

(2 marks)

b) Transpiration has sometimes been described as a "necessary evil". Justify this statement. **(4 marks)**

8) a) A dog weighing 18kg requires 226 KJ while a mouse weighing 50 g requires 2010 KJ per day. Explain. **(3 marks)**

b) Name the end products of anaerobic respiration in :

i) Plants **(1 mark)**

ii) Animals **(1 mark)**

c) Give two reasons why obligate anaerobes die in the presence of oxygen. **(1 mark)**

9) Assess any five applications of anaerobic respiration. **(5 marks)**

10) a) Sinoatrial node is called pacemaker. Justify this statement. **(2 marks)**

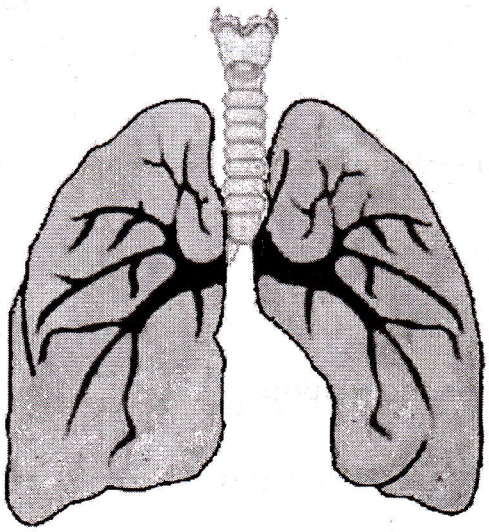
b) Explain why the atrial fibrillation decreases the efficiency of the heart. **(3 marks)**

11) a) Why do animals need to move from one place to another? **(2 marks)**

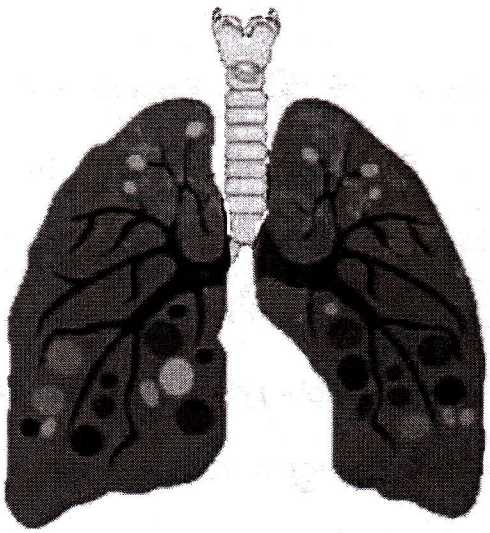
b) What are the three types of skeletons in animals? **(3 marks)**

12) Explain the role of behavioural rhythms? **(4 marks)**

13) Study the pictures below (**A**) and (**B**) that represent lungs and then answer the questions that follow.



(A)



(B)

(a) Which of these lungs (**A**) or (**B**) is healthier? **(1 mark)**

(b) How is it different from the other one? **(1 mark)**

14) Would fertilization take place if copulation takes place two days before ovulation? Give a reason for your answer. **(2 marks)**

15) Low blood sugar level is harmful to the body. Explain this statement. **(2 marks)**

16) The sun is the main source of energy in many ecosystems. Name an alternative source of energy in other ecosystems. **(2 marks)**

17) Is it possible for colour-blind girl to be born? Explain. **(2 marks)**

18) Rearrange the order of the following statements to give a flow diagram showing the evolution of resistance to the antibiotic streptomycin by the bacterium Escherchia Coli (E.Coli).

a) Most of the population of E.Coli are resistant to streptomycin

b) A mutation in a DNA triplet of a plasmid, changing TTT to TTG, gives an E.Coli bacterium resistance to streptomycin

c) The resistant bacterium divides and passes copies of R plasmid (plasmid with gene for resistance to antibiotic) to its offsprings.

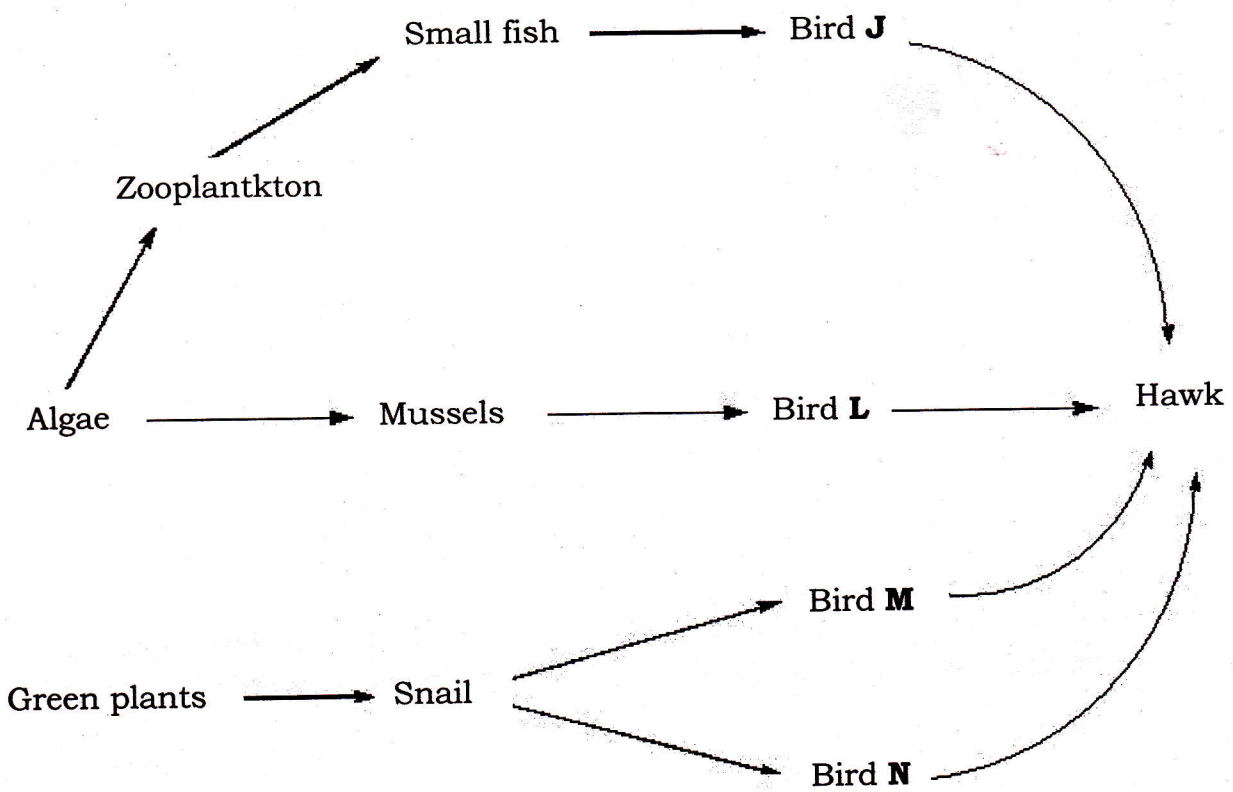
d) Sensitive bacteria die in the presence of streptomycin as a selective agent.

e) The frequency of the mutated gene in the population increases.

f) The resistant bacterium has a selective advantage and survives. **(3 marks)**

SECTION B: ATTEMPT ANY THREE QUESTIONS (30 marks)

19) Some students went for an ecological study and constructed the food web below.



a) Name the process through which energy from the sun is included into the food web. **(1 mark)**

- producers

b) Name the mode of feeding of bird **M** in the food web. **(1 mark)**

c) Name Two ecosystems in which the organisms in the food web live. **(2 marks)**

d) From the food web, construct a food chain in which the Hawk is the quaternary consumer. **(2 marks)**

e) If bird **N** migrated, what would happen to the organisms in the food web? **(4 marks)**

20) a) What is homeostasis? **(2 marks)**

b) Discuss the homeostatic functions of the liver. **(8 marks)**

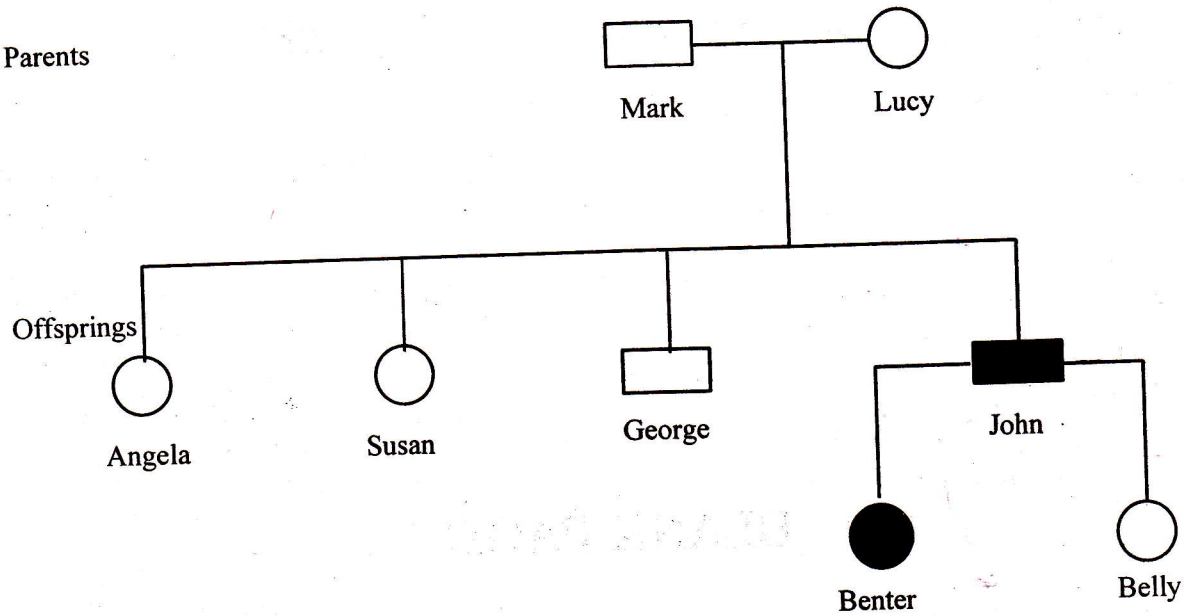
21) Give your personal views on the economic importance of Kingdom Fungi. **(10 marks)**

22) Explain how the various activities of human beings have affected their environment negatively. **(10 marks)**

23) a) What is meant by sex-linkage? **(2 marks)**

b) Colour-blind is a sex-linked disorder in human. The gene responsible for the disorder is recessive and is located on the X-Chromosome.

Below is a pedigree chart showing the inheritance of colour blindness.



Key

Normal male

Colour blind male

Normal female

Colour blind female

Using letter **B** to represent the gene for normal colour vision and letter **b** to represent the gene for colour blindness. Work out the genotypes of:

i) Angela,

ii) Susan,

iii) George

iv) John. **(8 marks)**

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