

Biology and Health Sciences I

002

01/08/2023

08:30 AM – 11:30 AM



ORDINARY LEVEL NATIONAL EXAMINATIONS, 2022-2023

SUBJECT: Biology and Health Sciences I

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 **THREE** sections: **A**, **B** and **C**.

Section A: Attempt **all** questions. **(55 marks)**

Section B: Attempt any **three** questions. **(30 marks)**

Section C: Attempt only **one** question. **(15 marks)**

- 4) Use only a **blue** or **black** pen.

Section A: Attempt all questions. (55 marks)

- 1) List any four characteristics of animals in Class of Mammalia **(4 marks)**
- 2) Fill in the missing terms:
DCPIP is a _____ reagent in colour. When _____ is present in a food sample, the _____ disappears. **(3 marks)**
- 3) a) What is meant by the term photosynthesis? **(1 mark)**
b) Name the gas in the air that is needed for photosynthesis. **(1 mark)**
c) Name the cell organelle in which photosynthesis occurs. **(1 mark)**
- 4) a) Name the activity of man that has caused a lot of destruction of the environment. **(1 mark)**
b) Apart from the activity you have named in (a) above, suggest other three economic activities which are harmful to our environment. **(3 marks)**
- 5) Indicate whether the relationships below are commensalism, grazing, mutualism or parasitism.
a) Barnacles attached to the sides of a whale. _____
b) Cattle egrets: birds that follow grazing cattle. _____
c) A flatworm attached to a horseshoe crab _____
d) A donkey feeding on grass in a field _____ **(4 marks)**
- 6) Name three plant hormones. **(3 marks)**
- 7) a) What is sexual orientation? **(1 mark)**
b) What is the advantage of abstinence? **(2 marks)**
- 8) Describe briefly how energy is lost along a food chain. **(3 marks)**
- 9) Why is it risky to practice pre-marital sexual intercourse? **(2 marks)**
- 10) Explain how the pollen grains of insect-pollinated plants are adapted for transfer. **(3 marks)**
- 11) Distinguish between single circulation and double circulation. **(3 marks)**
- 12) Differentiate between spermatogenesis and oogenesis. **(4 marks)**
- 13) What good healthy practices can you do daily in order to maintain your respiratory system healthy? **(4 marks)**
- 14) Anaerobic respiration by micro-organisms is called fermentation.
a) Name the micro-organism involved. **(1 mark)**
b) Which industrial process involves fermentation? **(2 marks)**
- 15) It is advisable to irrigate our crops in the evening but not in the afternoon. Explain why? **(3 marks)**

- 16) Study the table below which shows the changes in uptake or output of sugar by the liver (Normal blood sugar level is in the range of 90 mg - 100 mg/100 cm³). Use the data given to answer the questions that follow:

Time (Min)	Glucose concentration	
	Hepatic portal vein	Hepatic vein
0	102	100
15	110	102
30	125	97
45	107	94
60	94	80
75	75	80
90	80	80

- a) Why is the glucose level in the hepatic portal vein:
 i) increasing in the first 30 minutes? **(1 mark)**
 ii) decreasing after the 30th minute? **(1 mark)**
 b) Why is the glucose level in the blood leaving the liver lower than that in the blood entering it? **(2 marks)**

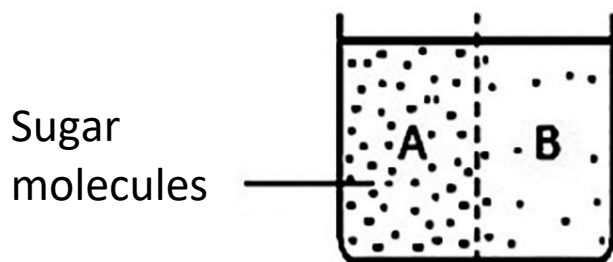
- 17) Mutation always causes a mutant phenotype. Do you agree? **(2 marks)**

Section B: Attempt any three questions (30 marks)

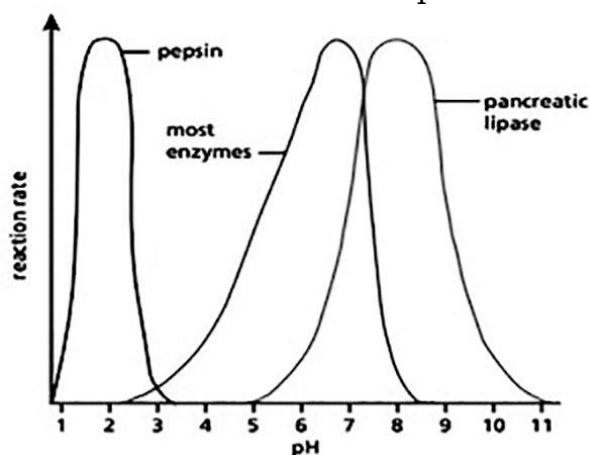
- 18) Insects are both useful and harmful. Justify. **(10 marks)**
- 19) a) What term is used to describe organisms that cause diseases? **(1 mark)**
 b) The general defense system tries to prevent disease-causing organisms from entering the body. List two parts of the general defense system in the body. **(2 marks)**
 c) Distinguish between active immunity and passive immunity by defining each. **(2 marks)**
 d) Which of the two produces the longest-lasting immunity? **(1 mark)**
 e) Viruses cause diseases in plants, humans, and other animals. Name any two diseases which are caused by viruses. **(2 marks)**
 f) Some people receive vaccinations to protect them from disease. What is meant by term vaccination? **(2 marks)**
- 20) Make a table to distinguish between mitosis and miosis. **(10 marks)**
- 21) What do you do daily in order to maintain the health of your digestive system? **(10 marks)**
- 22) Red green colour blindness is a sex-linked trait. A colour-blind woman marries a man who has normal colour vision. If they have eight children; six boys and two girls, how many are normal, how many are colourblind? (Use appropriate symbols to show your working). **(10 marks)**

Section C: Attempt any one question (15 marks)

- 23) An experiment was carried out by a group of students to investigate a physiological process which occurs in plants and animals. The setup of the experiment involves a beaker containing two solutions separated by a membrane.



- a) Which solution is hypertonic? **(2 marks)**
b) Which solution has more water potential? **(2 marks)**
c) In which direction will the water molecules move by osmosis? Why? **(6 marks)**
d) What name is given to the membrane separating the two solutions **A** and **B**? **(3 marks)**
e) Which alternative setup can you design to replace this but in the same experiment? **(2 marks)**
- 24) The graphs below show the effect of pH on human digestive enzymes.



- a) From the graphs above, what is the optimum pH of the following enzymes: **(4 marks)**
i) Pepsin
ii) Pancreatic lipase
- b) Which enzyme works best in: **(4 marks)**
i) Strongly acidic medium
ii) Slightly alkaline medium
- c) According to the graph of most enzymes, the optimum pH is 6 to 7. Suggest any two digestive enzymes that work best within this pH range. **(4 marks)**
- d) What would happen in the human body if the pH in the stomach is increased to 7? **(3 marks)**

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