

**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.

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)**

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
- 2) Fill in the missing terms:  
DCPIP is a \_\_\_\_\_ reagent in colour. When \_\_\_\_\_ is present in a food sample, the \_\_\_\_\_ disappears.
- 3) a) What is meant by the term photosynthesis?  
b) Name the gas in the air that is needed for photosynthesis.  
c) Name the cell organelle in which photosynthesis occurs.
- 4) a) Name the activity of man that has caused a lot of destruction of the environment.  
(b) Apart from the activity you have named in (a) above, suggest other three economic activities which are harmful to our environment.
- 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. \_\_\_\_\_
- 6) Name three plant hormones.
- 7) a) What is sexual orientation?  
b) What is the advantage of abstinence?
- 8) Describe briefly how energy is lost along a food chain.
- 9) Why is it risky to practice pre-marital sexual intercourse?
- 10) Explain how the pollen grains of insect-pollinated plants are adapted for transfer.
- 11) Distinguish between single circulation and double circulation.
- 12) Differentiate between spermatogenesis and oogenesis.
- 13) What good healthy practices can you do daily in order to maintain your respiratory system healthy?
- 14) Anaerobic respiration by micro-organisms is called fermentation.
  - a) Name the micro-organism involved.
  - b) Which industrial process involves fermentation?
- 15) It is advisable to irrigate our crops in the evening but not in the afternoon. Explain why?

- 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 cm<sup>3</sup>). 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 30<sup>th</sup> 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)

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

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

- 8) Insects are both useful and harmful. Justify. (10 marks)
- 9) 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)

Make a table to distinguish between mitosis and miosis. (10 marks)

What do you do daily in order to maintain the health of your digestive system? (10 marks)

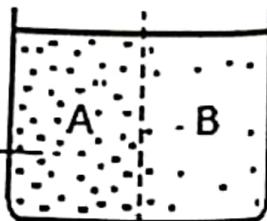
Red green colour blindness is a sex-linked trait. A colour-blind woman marries a man who has normal colour vision. If they have eight children; six boys and two girls, how many are normal, how many are colourblind? (Use appropriate symbols to show your working). (10 marks)

60

**Section C: Attempt any one question (15 marks)**

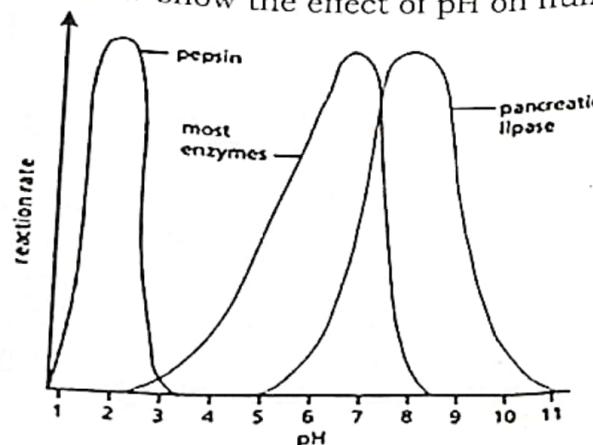
23) An experiment was carried out by a group of students to investigate a physiological process which occurs in plants and animals. The setup of the experiment involves a beaker containing two solutions separated by a membrane.

Sugar molecules



- 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)

) 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: i) Pepsin ii) Pancreatic lipase (4 marks)
- ) Which enzyme works best in: i) Strongly acidic medium ii) Slightly alkaline medium (4 marks)

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)

What would happen in the human body if the pH in the stomach is increased to 7? (3 marks)

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