

2023 BECE INTEGRATED SCIENCE QUESTIONS

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PAPER 2
2
ESSAY
[100 marks]

1½ hours

This paper is in two sections: A and B. Answer Question 1 in section A and any other four questions in section B.

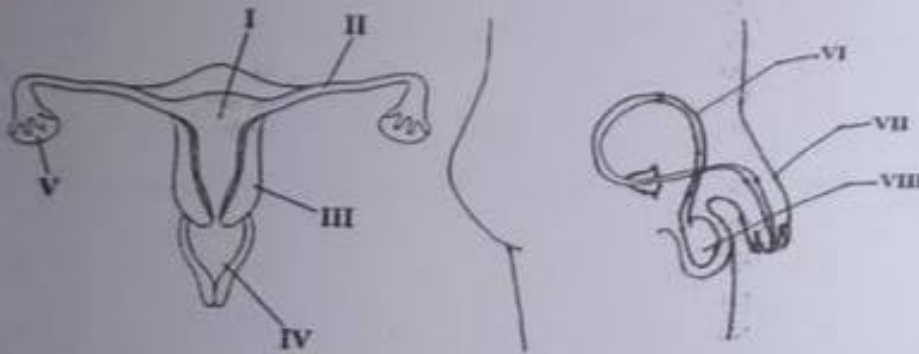
Answer all the questions in your answer booklet.

Credits will be given for clarity of expression and orderly presentation of material.

SECTION A
[40 marks]

Answer all of Question 1.

1. (a) The diagrams below are illustrations of the male and female reproductive systems for humans. Study them carefully and answer the questions that follow.



- (i) Name each of the parts labelled I, II, V, VI, VII and VIII. [6 marks]
- (ii) State the function of each of the parts labelled III, IV and VII. [3 marks]
- (iii) Name the labelled part where each of the following processes take place:
- (α) Fertilization;
 - (β) Production of sperm;
 - (γ) Ovulation.
- (iv) Name two common infectious diseases that affect both the male and female reproductive system. [3 marks]
- [2 marks]

- (b) The diagrams below are illustrations of different devices used in the farm.
Study them carefully and answer the questions that follow.



- (i) Give a **common** name for the devices illustrated. [1 mark]
- (ii) Name **each** of the devices labelled A, B and C. [3 marks]
- (iii) State **one** use of **each** of the devices named in (ii). [3 marks]
- (iv) State **two** effects of the use of the device C on the soil. [2 marks]
- (v) State **two** ways of prolonging the usefulness of the device labelled A. [2 marks]
- (c) (i) Draw the symbols for each of the following electronic components:
- (α) Resistor;
 - (β) (p-n junction) diode;
 - (γ) Cell;
 - (δ) Light Emitting Diode / LED.
- [4 marks]
- (ii) Use the symbols drawn in (i) together with a switch to draw a circuit diagram to demonstrate forward biasing of a (p-n junction) diode and the light emitting diode. [3 marks]
- (iii) State the effect of the resistor on the (p-n junction) diode and the light emitting diode when the circuit is closed. [2 marks]
- (d) The following activities were carried out in the laboratory.
Study them carefully and answer the questions that follow.
- I. 10 g of iodated salt was added to 150 ml of water in a beaker. The mixture was stirred thoroughly.
 - II. Vegetable oil was added to a quantity of water in a corked flask and shaken vigorously then allowed to stand for some time.
 - III. Few grams of grinded charcoal was added to water in a beaker and stirred vigorously and then allowed to stand.
- (i) State what will be observed in **each** of the activities I, II and III. [3 marks]
- (ii) Suggest an aim for the experiment. [1 mark]
- (iii) State **one** difference between what is observed in I and III. [1 mark]
- (iv) State a method of separation for the activity carried out in II. [1 mark]

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SECTION B
[60 marks]*Answer four questions only from this section.*

- (a) (i) What is the importance of a fuse in an electrical appliance?
(ii) State **two** household appliances that have fuse. [4 marks]
- (b) (i) What is *teenage pregnancy*?
(ii) State **two** causes of teenage pregnancy. [4 marks]
- (c) State **three** precautions against hazards. [3 marks]
- (d) (i) State **two** practices that destroy water bodies.
(ii) Give **two** methods of conserving water bodies. [4 marks]
- (a) (i) What is *aerobic respiration*?
(ii) State the **main** difference between *aerobic respiration* and *anaerobic respiration*. [3 marks]
- (b) (i) Explain the term *potential difference*.
(ii) The potential difference across the terminals of a 100 Ω resistor is 250 V. Calculate the current flowing through the resistor. [5 marks]
- (c) (i) Which crop is infected by the Swollen Shoot disease?
(ii) State the causative organism of the disease.
(iii) State the method of spread of the disease.
(iv) Give **two** ways of preventing the spread of the disease. [5 marks]
- (d) Consider the given elements: ${}^7_3\text{X}$ and ${}^{20}_9\text{Y}$
- (i) Write the electron configuration for Y;
(ii) State the possible ion that could be formed by X to make it **more** stable. [2 marks]
- (a) What is a *neutralization reaction*? [2 marks]
- (b) State **three** physical properties of a soil. [3 marks]
- (c) (i) Define the term *power*.
(ii) If a machine hauls a packing case of mass 50 kg up a building that is 10 m high in 30 s, calculate the power of the machine. [g = 10 m s⁻²] [6 marks]
- (d) State **four** areas where technology is used for the benefit of humans. [4 marks]

5. (a) State **three** ways in which mulching restores soil resources. [3 marks]
- (b) (i) Name the **two** elements that combine to form ammonia gas.
(ii) Write a balanced chemical equation for the formation of ammonia from the elements named in (i). [3 marks]
- (c) The following information is on the feeding habits of some organisms:
(i) rat feeds on grasscutter;
(ii) toad feeds on grasshopper;
(iii) snake feeds on toad;
(iv) goat feeds on grass;
(v) man feeds on hawk;
(vi) grasshopper feeds on grass;
(vii) hawk feeds on snake;
(viii) grasscutter feeds on grass.
Use all the information given above to construct a *food web*. [4 marks]
- (d) (i) What is a galaxy?
(ii) State the relationship between *stars* and *galaxies*.
(iii) Explain **briefly** the term *milky way*. [5 marks]
6. (a) (i) State **three** effects of soil erosion on the growth of crop plants.
(ii) Mention **one** method of controlling soil erosion. [4 marks]
- (b) (i) Name **two** science related businesses.
(ii) State the principles underlying the operation of **each** of the businesses named in (i). [4 marks]
- (c) (i) Explain how the female *Anopheles* mosquito transmits malaria to humans.
(ii) State **one** chemical method of controlling mosquitoes. [4 marks]
- (d) (i) Name **two** fundamental units of measurement.
(ii) State the physical quantity that **one** of the units named in (i) measures. [3 marks]

END OF ESSAY TEST

Turn over

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SECTION B
[60 marks]*Answer four questions only from this section.*

2. (a) (i) What is the importance of a fuse in an electrical appliance? [4 marks]
(ii) State two household appliances that have fuse.
- (b) (i) What is *teenage pregnancy*? [4 marks]
(ii) State two causes of teenage pregnancy. [3 marks]
- (c) State three precautions against hazards. [3 marks]
- (d) (i) State two practices that destroy water bodies. [4 marks]
(ii) Give two methods of conserving water bodies.
3. (a) (i) What is *aerobic respiration*? [3 marks]
(ii) State the main difference between *aerobic respiration* and *anaerobic respiration*.
- (b) (i) Explain the term *potential difference*. [5 marks]
(ii) The potential difference across the terminals of a 100 Ω resistor is 250 V. Calculate the current flowing through the resistor.
- (c) (i) Which crop is infected by the Swollen Shoot disease? [5 marks]
(ii) State the causative organism of the disease.
(iii) State the method of spread of the disease.
(iv) Give two ways of preventing the spread of the disease.
- (d) Consider the given elements: ${}^7_3\text{X}$ and ${}^{20}_9\text{Y}$ [2 marks]
(i) Write the electron configuration for Y.
(ii) State the possible ion that could be formed by X to make it more stable.
4. (a) What is a *neutralization reaction*? [2 marks]
- (b) State three physical properties of a soil. [3 marks]
- (c) (i) Define the term *power*. [6 marks]
(ii) If a machine hauls a packing case of mass 50 kg up a building that is 10 m high in 30 s, calculate the power of the machine. [4 marks]
[$g = 10 \text{ m s}^{-2}$]
- (d) State four areas where technology is used for the benefit of humans. [4 marks]