

03301/2&1 BECE
June 2023
INTEGRATED
SCIENCE 2&1
Essay and Objective
2 hours

2&1

- ❖ PAST QUESTIONS
- ❖ QUIZZES
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THE WEST AFRICAN EXAMINATIONS COUNCIL

GHANA

Basic Education Certificate Examination

June 2023

INTEGRATED SCIENCE 2&1
Essay and Objective

2 hours

Do not open this booklet until you are told to do so. While you are waiting, read and observe the following instructions carefully. Write your name and index number in ink in the spaces provided above.

This booklet consists of two papers. Answer Paper 2 which comes first, in your answer booklet and Paper 1 on your Objective Test answer sheet. Paper 2 will last 1 hour 15 minutes after which the answer booklet will be collected. Do not start Paper 1 until you are told to do so. Paper 1 will last 45 minutes.

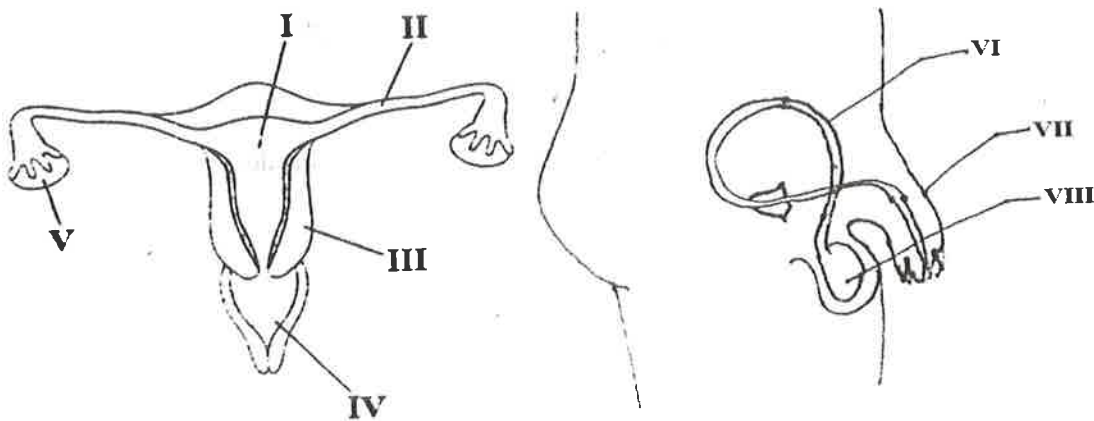
This paper is in two sections: A and B. Answer Question 1 in section A and any other four questions in section B.

Answer all the questions in your answer booklet.
Credit will be given for clarity of expression and orderly presentation of material.

SECTION A
[40 marks]

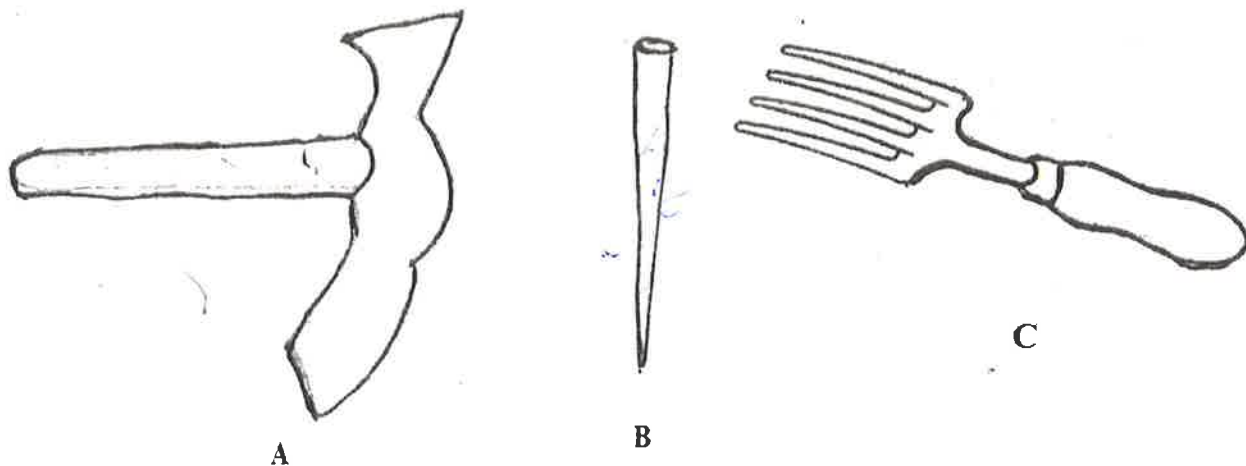
Answer all of Question 1.

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. [3 marks]
- (iv) Name **two** common infectious diseases that affect both the male and female reproductive system. [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: [4 marks]
- (α) Resistor;
- (β) (p-n junction) diode;
- (γ) Cell;
- (δ) Light Emitting Diode / LED.
- (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]

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?
(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]
3. (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]
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*.
(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) man 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

BLANK SHEET

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

**YOU WILL BE PENALIZED SEVERELY IF YOU ARE
FOUND LOOKING AT THE NEXT PAGE BEFORE
YOU ARE TOLD TO DO SO.**

June 2023

INTEGRATED SCIENCE 1
[40 marks]

45 minutes

*While you are waiting, read and observe the following instructions.
Answer Paper 1 on your Objective Test answer sheet. Do not start Paper 1 until you are told to do so. Paper 1 will last 45 minutes.*

1. Use 2B pencil throughout.
2. On the pre-printed answer sheet, check that the following details are **correctly** printed: Your **surname** followed by your **other names**, the *Subject Name*, your *Index Number*, *Centre Number* and the *Paper Code*.
3. In the boxes marked *Candidate Number*, *Centre Number* and *Paper Code*, **reshade** each of the shaded spaces.
4. An example is given below. This is for a candidate whose name is Clare Naa ALI. Her *index number* is 772384188 and she is writing the examination at *Centre Number* 77234. She is offering *Integrated Science 1* and the *Paper Code* is 0331.

THE WEST AFRICAN EXAMINATIONS COUNCIL, GHANA BASIC EDUCATION CERTIFICATE EXAMINATION OBJECTIVE ANSWER SHEET

CANDIDATE NAME: ALI CLARE NAA	SUBJECT: INTEGRATED SCIENCE 1
----------------------------------	----------------------------------

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Use 2B pencil, Press firmly. 2. Answer each question by choosing one letter and then, shade through the letter chosen like this <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> 3. If you want to change an answer, erase | <ol style="list-style-type: none"> your first mark completely. 4. If only four alternative answers are given for each question, ignore the letter E. 5. Your question paper may have fewer than 60 questions. |
|---|--|

CANDIDATE NUMBER	CENTRE NUMBER	PAPER CODE	For Supervisors only. If candidate is absent shade this space.
7 7 2 3 8 4 1 8 8	7 7 2 3 4	0 3 3 1	
0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	
1 1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	1 1 1 1 1 1 1 1	
2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2	
3 3 3 3 3 3 3 3 3	3 3 3 3 3 3 3 3	3 3 3 3 3 3 3 3	
4 4 4 4 4 4 4 4 4	4 4 4 4 4 4 4 4	4 4 4 4 4 4 4 4	
5 5 5 5 5 5 5 5 5	5 5 5 5 5 5 5 5	5 5 5 5 5 5 5 5	
6 6 6 6 6 6 6 6 6	6 6 6 6 6 6 6 6	6 6 6 6 6 6 6 6	
7 7 7 7 7 7 7 7 7	7 7 7 7 7 7 7 7	7 7 7 7 7 7 7 7	
8 8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8	8 8 8 8 8 8 8 8	
9 9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9	9 9 9 9 9 9 9 9	

Answer **all** the questions.

Each question is followed by four options lettered **A** to **D**. Find the **correct** option for **each** question and shade in **pencil** on your answer sheet the space which bears the same letter as the option you have chosen. Give only **one** answer to **each** question. An example is given below.

Which of the following substances is **not** an element?

- A. Aluminium
- B. Ammonia
- C. Oxygen
- D. Sodium

The correct answer is Ammonia, which is lettered **B** and therefore answer space **B** would be shaded.

A

B

C

D

E

Think carefully before you shade the answer spaces. Erase completely any answer you wish to change.

Do all rough work on this question paper.

Now answer the following questions.

1. The very hard greenish-black deposit around the corners of the teeth is known as
 - A. gum disease.
 - B. plaque.
 - C. caries.
 - D. cavity.

2. When equal amount of water is poured on dry soil samples, the increase in weight per unit amount of soil would be **highest** in
 - A. gravel.
 - B. clayey soil.
 - C. sandy soil.
 - D. loamy soil.

3. The following practices are cultural practices in crop production **except**
 - A. nursing.
 - B. pest control.
 - C. mulching.
 - D. weeding.

4. An example of a mixture is
 - A. sodium sulphate.
 - B. hydrogen chloride.
 - C. ammonia.
 - D. salt solution.

5. Which of the following statements about acids are correct?
- I. They turn red litmus paper blue.
 - II. They can be neutralized by bases.
 - III. Citrus fruits contain acids.
- A. I and II only
 - B. II and III only
 - C. I and III only
 - D. I, II and III
6. The practice of reducing the number of seedlings per stand for better growth is known as
- A. earthing up.
 - B. filling in.
 - C. pricking-out.
 - D. thinning out.
7. A herbal mixture has a volume of 200 m^3 and a mass of 10,000 kg. Determine the density of the mixture.
- A. 50 kg m^{-3}
 - B. 200 kg m^{-3}
 - C. 800 kg m^{-3}
 - D. $10,200 \text{ kg m}^{-3}$
8. How many atoms are present in H_2O_2 ?
- A. 5
 - B. 4
 - C. 3
 - D. 2
9. Which of the following electronic components is **not** made of semi-conductors?
- A. Capacitor
 - B. Diode
 - C. LED
 - D. Transistor
10. Steam changes to liquid by a process called
- A. evaporation.
 - B. condensation.
 - C. melting.
 - D. boiling.
11. Which of the following body shapes facilitates movement in a fluid?
- A. Rectangular
 - B. Spherical
 - C. Streamline
 - D. Triangular

12. Stirring of soil on vegetable beds is to
- improve aeration of soil.
 - increase activities of soil organisms.
 - increase water penetration in the soil.
 - reduce weed growth.
- A. I and II only
B. I, III and IV only
C. II, III and IV only
D. I, II and IV only
13. The base of the N-P-N transistor normally
- is a p-type semi conductor.
 - is an n-type semi conductor.
 - is undoped semi conductor.
 - have electrons as majority charge carriers.
14. One benefit of technology to industrialization is
- increase in cost of production.
 - reduction in skillful labour.
 - provision of machinery.
 - environmental pollution.
15. Contour ploughing is normally practiced on
- hard-rocky lands.
 - muddy lands.
 - non-fertile lands.
 - sloppy lands.
16. A pupil of mass 70 kg climbed a building of height 15 m. Determine the pupil's potential energy at the top of the building.
- [$g = 10 \text{ m s}^{-2}$]
- 10,500 J
 - 5,250 J
 - 1,050 J
 - 700 J
17. Which of the following pairs of structures are present in animal cells?
- Mitochondrion and chloroplast
 - Nucleus and chloroplast
 - Vacuole and nucleus
 - Cell wall and mitochondrion
18. Artificial satellites can be used for
- communication.
 - oil and gas exploration.
 - meteorological studies.
- A. I only
B. II only
C. I and III only
D. I, II and III

19. The image formed by a plane mirror is always
- A. real.
 - B. magnified.
 - C. inverted.
 - D. virtual.
20. The following practices are principles in crop production **except**
- A. land selection.
 - B. pests and diseases control.
 - C. seed planting.
 - D. harvesting and processing.
21. Which of the following pairs of elements is in the same period in the periodic table?
- A. ${}_5\text{B}$ and ${}_{13}\text{Al}$
 - B. ${}_1\text{H}$ and ${}_3\text{Li}$
 - C. ${}_4\text{Be}$ and ${}_5\text{B}$
 - D. ${}_{11}\text{Na}$ and ${}_{19}\text{K}$
22. The daily variation of atmospheric conditions is called
- A. climate.
 - B. weather.
 - C. season.
 - D. humidity.
23. To test for starch in a green leaf, it is usually boiled to
- A. isolate the starch.
 - B. kill the leaf.
 - C. make the leaf soft.
 - D. extract the chlorophyll.
24. The following effects are as a result of soil erosion **except**
- A. increase in bushfires.
 - B. weakening support of plants.
 - C. loss of important minerals to plants.
 - D. weakening of support of buildings.

The following products, X, Y, Z and W have masses 0.05 kg, 50 mg, 500 g and 0.05 g respectively.
Use this information to answer questions 25 and 26.

25. If all the products have equal volumes, which of the product (s) would have the **highest** density?
- A. X
 - B. Y
 - C. Z
 - D. W and X
26. Which of the products have the same mass?
- A. Y and W
 - B. X and Y
 - C. Y and Z
 - D. X and W

27. Which of the following ions is formed by the loss of 2 electrons?
- A. Ca^{2+}
 - B. S^{2-}
 - C. K^+
 - D. F^-
28. The farming system that makes the **most** effective use of land is
- A. crop rotation.
 - B. land rotation.
 - C. mixed cropping.
 - D. mixed farming.
29. An example of a natural source of light is
- A. lantern.
 - B. moon.
 - C. glow worm.
 - D. torchlight.
30. The SI unit that is derived is
- A. kg.
 - B. K.
 - C. Pa.
 - D. s.
31. The grouping together of many stars is known as
- A. comet.
 - B. astronomy.
 - C. solar-system.
 - D. galaxy.
32. The current in a resistor is 3 A. If the resistance of the resistor is 4 ohms, determine the potential difference across the resistor.
- A. 0.75 V
 - B. 1.33 V
 - C. 7.00 V
 - D. 12.00 V
33. Anemometer is an instrument for measuring
- A. relative humidity.
 - B. rainfall amount.
 - C. wind direction.
 - D. wind speed.
34. Which of the following statements distinguishes arteries from veins?
- A. Arteries have relatively narrow lumen while veins have relatively wide lumen.
 - B. Arteries transport blood to the heart while veins carry blood away from the heart.
 - C. Arteries carry deoxygenated blood while veins carry oxygenated blood.
 - D. Arteries have valves while veins do not have valves.

35. The element used in the manufacturing of electronic components is
- A. sodium.
 - B. fluorine.
 - C. silicon.
 - D. neon.
36. Which of the following factors has the **greatest** influence on vegetable crop production?
- A. Availability of labour
 - B. Nearness to market
 - C. Source of water
 - D. Presence of pest
37. The **brightest** of all the planets is
- A. Mars.
 - B. Saturn.
 - C. Uranus.
 - D. Venus.
38. The use of separating funnel is **most** appropriate for separating which of the following mixtures?
- A. Sulphur and water
 - B. Water and sodium chloride
 - C. Vegetable oil and kerosene
 - D. Water and vegetable oil
39. When a ray of light travels from a dense medium into a denser medium, it
- A. bends towards the normal.
 - B. bends away from the normal.
 - C. is parallel to the incident ray.
 - D. is perpendicular to the incident ray.
40. The two **main** particles in the nucleus of an atom are
- A. neutrons and protons.
 - B. neutrons and electrons.
 - C. shells and neutrons.
 - D. electrons and protons.

END OF PAPER