

03308/2&1 BECE
June 2022
INTEGRATED
SCIENCE 2&1
Essay and Objective
2 hours

2&1

Name

Index Number

THE WEST AFRICAN EXAMINATIONS COUNCIL
GHANA

Basic Education Certificate Examination

June 2022

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.

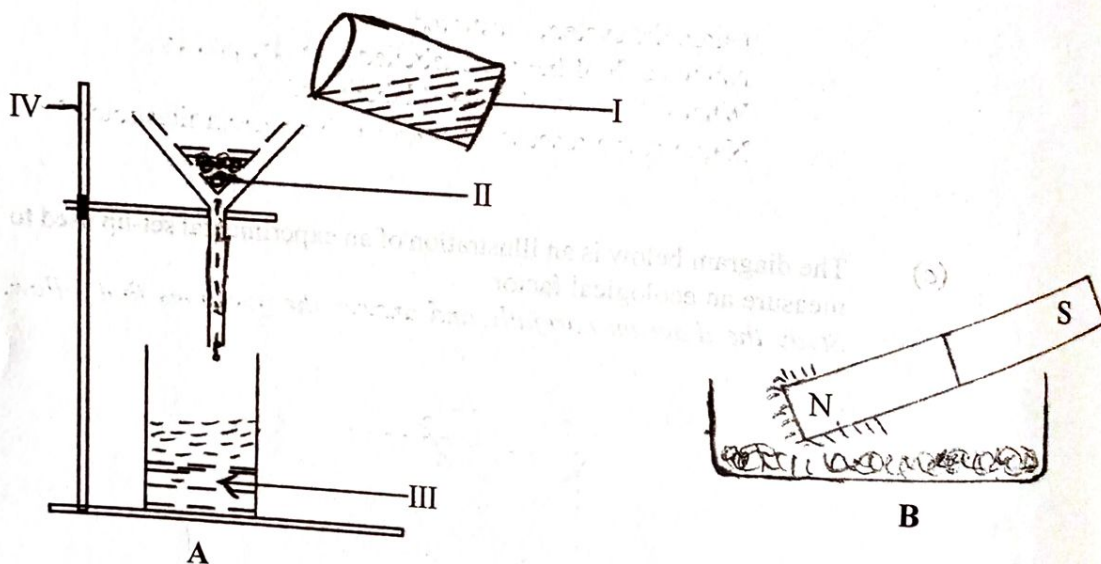
Answer **all** the questions in your answer booklet.

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

SECTION A
[40 marks]

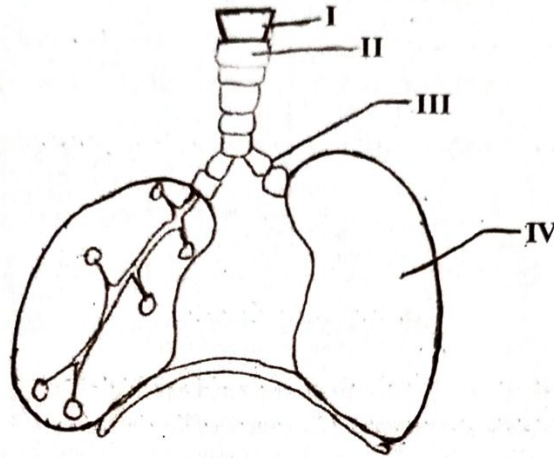
Answer **all** of Question 1.

1. (a) The diagrams below are illustrations of an experimental set-up.
Study the diagrams carefully and answer the questions that follow.



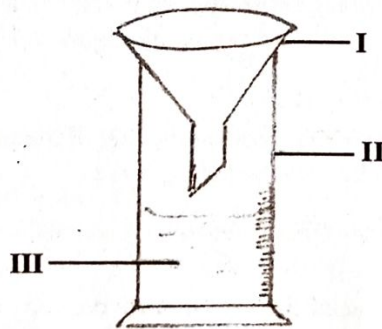
- (i) Identify **each** of the parts labelled **I**, **II** and **III**.
 (ii) Name the method of separation in **each** of the set-up:
 (α) **A**;
 (β) **B**. [3 marks]
- (iii) State the class of mixtures that the experimental set-up **A** could be used for. [2 marks]
- (iv) Give a reason for the answer stated in (iii). [1 mark]
- (v) Name **one** possible component of the mixture in set-up **B**. [2 marks]
- (vi) State the function of the part labelled **IV**. [1 mark]
- [1 mark]

- (b) The diagram below is an illustration of a part of a system in human.
Study the diagram carefully and answer the questions that follow.



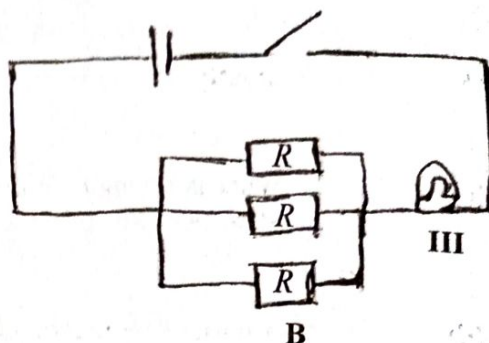
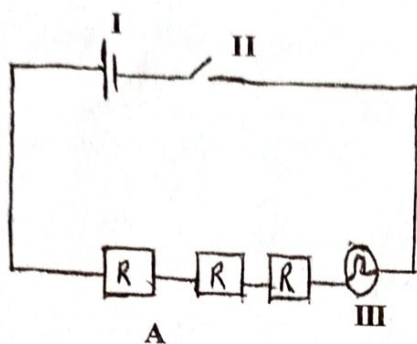
- (i) Name the system illustrated. [1 mark]
 (ii) Name **each** of the parts labelled I, II, III and IV. [4 marks]
 (iii) What is the role of the part labelled I. [1 mark]
 (iv) Name **three** diseases that affects the system illustrated. [3 marks]

- (c) The diagram below is an illustration of an experimental set-up used to measure an ecological factor.
Study the diagram carefully and answer the questions that follow.



- (i) Identify the apparatus illustrated. [1 mark]
 (ii) Name **each** of the parts labelled I, II and III. [3 marks]
 (iii) Give **one** use **each** of the parts labelled I and II. [2 marks]
 (iv) What ecological factor was measured? [1 mark]
 (v) State **three** ways in which the ecological factor measured in (iv) is important in agricultural soils. [3 marks]
 (vi) Name **one** farm tool that aids the ecological factor measured in (iv) to perform its function in agricultural soils. [1 mark]
 (vii) Describe how the farm tool named in (vi) is used to aid the factor measured in the experiment. [2 marks]

- (d) The diagrams below are illustrations of electrical circuits.
Study the diagrams carefully and answer the questions that follow.



- (i) Identify **each** of the components labelled **I**, **II** and **III**. [3 marks]
 (ii) State the type of arrangement of resistors (R) in **B**. [1 mark]
 (iii) State the effect of the arrangement of resistors in **each** of the diagrams **A** and **B** on **III**. [2 marks]
 (iv) Give a reason for **each** of the answers stated in (iii). [2 marks]

SECTION B
[60 marks]

Answer **four** questions **only** from this section.

2. (a) State **three** differences between *metals* and *non-metals* in terms of their physical properties. [3 marks]
- (b) (i) Explain the term *active region* as applied to transistors;
 (ii) state what happens in the active region of a transistor. [3 marks]
- (c) (i) State **two** effects of lack of protein in the diet of humans.
 (ii) Describe **briefly** the chemical test for glucose. [5 marks]
- (d) (i) What are *soil resources*?
 (ii) State **two** agricultural activities which make the soil lose its nutrients. [4 marks]
3. (a) List in the **correct** order, the organs through which food passes from the mouth to the anus. [2 marks]
- (b) State the **components** of a balanced ration for feeding poultry. [4 marks]
- (c) Predict the products formed when:
 (i) magnesium solution reacts with dilute hydrochloric acid;
 (ii) potassium reacts with water. [4 marks]
- (d) (i) State **two** effects of heat on a substance.
 (ii) Potassium permanganate crystals are dropped into a beaker of water and warmed:
 (α) State what would be observed;
 (β) State the phenomenon demonstrated in (α). [5 marks]

4. (a) (i) Name the stages in the life cycle of a mosquito.
 (ii) Name the stage at which feeding **does not** take place. [5 marks]
- (b) Explain **briefly** why air is regarded as a mixture. [2 marks]
- (c) (i) What is a *magnetic pole*?
 (ii) State **two** uses of temporary magnets. [4 marks]
- (d) Give **four** reasons for planting crops in rows. [4 marks]
5. (a) (i) Name **two** elements which make the teeth of mammals strong.
 (ii) Name **two** common diseases of the human teeth. [4 marks]
- (b) State **three** reasons why sandy soil **cannot** support effective plant growth. [3 marks]
- (c) An atom has 13 protons and 14 neutrons:
 (i) draw and label the structure of the atom.
 (ii) State its valency. [4 marks]
- (d) (i) State **three** ways in which fluid pressure is applied in everyday activities.
 (ii) State **one** substance that is an insulator. [4 marks]
6. (a) Explain the term *mixed cropping*. [2 marks]
- (b) (i) What is an *alloy*?
 (ii) Name the constituent elements in brass. [3 marks]
- (c) (i) State **three** effects of dumping waste materials into water bodies.
 (ii) State **one** function of **each** of the following factors in photosynthesis:
 (α) chlorophyll;
 (β) water. [5 marks]
- (d) (i) What is *work*?
 (ii) A block of wood of mass 10 kg was dragged through a distance of 3.2 m when a force of 20 N was applied. Calculate the work done. [5 marks]

END OF ESSAY TEST

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 periodic table is an arrangement of elements according to increasing
 - A. atomic number.
 - B. mass number.
 - C. nucleon number.
 - D. neutron number.

2. Which of the following statements about clayey soil is **not** true? It
 - A. swells when dry and shrinks when wet.
 - B. has high water retention.
 - C. is difficult to plough when dry.
 - D. is compact when dry.

3. A capacitor is connected in a series circuit with LED, a battery and a switch. When the circuit is closed, the LED
 - A. comes on and stays on.
 - B. flashes and goes off.
 - C. does not come on.
 - D. flashes and stays on.

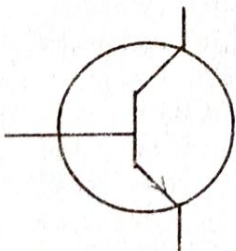
4. An example of a first class lever is
 - A. bottle opener.
 - B. crow bar.
 - C. wheel barrow.
 - D. fishing rod.

5. A mixture of alcohol and water can **best** be separated by
- filtration.
 - condensation.
 - distillation.
 - evaporation.
6. Soil depletion is **not** caused by
- erosion.
 - afforestation.
 - leaching.
 - illegal mining.
7. The solid component found on the filter paper and the liquid component that flows into a container during filtration are respectively called
- filtrate and residue.
 - condensate and residue.
 - residue and filtrate.
 - residue and condensate.
8. Which of the following statements about pressure in liquids is /are **correct**?
- Pressure in liquids at the same level acts equally in all directions.
 - Pressure in liquids depend on the area of the liquid.
 - Pressure in liquids decreases with depth.
- I only
 - II only
 - I and III only
 - I, II and III
9. Which of the following substances is a compound?
- Copper
 - Diamond
 - Sucrose
 - Sulphur
10. What force makes a ripe mango to fall from a tree?
- Force of tension
 - Magnetic force
 - Electrostatic force
 - Gravitational force
11. When gases are heated they
- melt.
 - sublime.
 - decrease in volume.
 - decrease in intermolecular forces

12. All flowering plants end their life cycle with
- seed formation.
 - seed development.
 - seed dispersal.
 - seed germination.
13. Digestion of protein begins in the stomach and ends in the
- large intestine.
 - small intestine.
 - appendix.
 - caecum.
14. A force meter measures
- mass.
 - temperature.
 - weight.
 - work.
15. Which of the following processes is an example of a physical change?
- Fermentation of food
 - Respiration
 - Magnetization of iron
 - Lighting a match
16. The ion that causes hardness in water is
- CO_3^{2-} .
 - Mg^{2+} .
 - Na^+ .
 - OH^- .
17. Urea is a good source of
- phosphorus in the soil.
 - calcium in the soil.
 - sodium in the soil.
 - nitrogen in the soil.
18. Rainfall is as a result of
- low pressure.
 - strong wind.
 - cold wind.
 - low humidity.
19. Which of the following statements are reasons for conserving energy?
- Insufficient production of energy
 - Increasing demand of energy
 - Limiting production of carbon (IV) oxide
- I and II only
 - I and III only
 - II and III only
 - I, II and III

20. People who travel in space are called
- geologists.
 - astronauts.
 - space shuttlers.
 - astronomist.
21. A lunar eclipse may occur when the
- moon is between the earth and the sun.
 - sun is between the earth and the moon.
 - earth is between the sun and the moon.
 - moon is positioned far away from the earth.
22. The **main** reason for staking tomato is to ensure
- bigger fruit development.
 - air circulation on the farm.
 - upright growth of the plant.
 - that fruits do not get rotten.
23. The energy transformation that takes place in a solar cell is
- light to chemical.
 - light to electrical.
 - electrical to heat.
 - electrical to light.
24. Which of the following instruments can be used to measure the diameter of a circle?
- A metre- rule
 - A thermometer
 - An ammeter
 - A string
25. Green plants have the ability to make their own food hence they are known as
- producers.
 - parasites.
 - consumers.
 - decomposers.
26. Which of the following substances are matter?
- Hydrogen
 - Air
 - Stone
- I and II only
 - I and III only
 - II and III only
 - I, II and III
27. It is **not** advisable to use old electrical gadgets because they
- are not efficient.
 - are dangerous.
 - produce sparks.
 - waste energy.

28. The hard outer surface of a tooth is called
- root.
 - dentine.
 - cement.
 - enamel.
29. The floor of a room has length 20 m and breadth 15 m. Determine the area of the floor.
- 35 m^2
 - 200 m^2
 - 250 m^2
 - 300 m^2
30. Which of the following characteristics is/are of the image formed in a pinhole camera? The image is
- inverted.
 - virtual.
 - diminished.
- I only
 - II and III only
 - I and III only
 - I, II and III
31. Which of the following bodies are **natural** sources of light?
- Moon
 - Sun
 - Glow Worm
- I and II only
 - I and III only
 - II and III only
 - I, II and III
32. The diagram below is an illustration of a transistor.



The arrow shows the direction of:

- electron movement.
 - hole movement.
 - electron and hole movement.
 - negative charge movement.
33. The practice of growing cowpea and maize on a piece of land at the same time is known as
- mixed farming.
 - mixed cropping.
 - land rotation.
 - crop rotation.

34. The shoot system of a flowering plant develops from the
- radicle.
 - plumule.
 - cotyledon.
 - endosperm.
35. Which of the following planets are closer to the sun than the Earth?
- Venus and Mars
 - Venus and Mercury
 - Mercury and Mars
 - Venus and Saturn
36. *Soil texture* is a term used to describe the
- amount of water soil can hold.
 - arrangement of soil particles in a given soil.
 - proportion of sand, silt and clay in a sample of soil.
 - mixture of all soil particles.
37. The number required to make the following chemical equation balanced is:
- $$\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$$
- $\frac{1}{2}$.
 - 1.
 - $\frac{1}{3}$.
 - 3.
38. An atom ${}_{11}^{23}\text{X}$ forms bond by losing one electron, the charge on the ion formed is
- 1.
 - 2.
 - +1.
 - +2.
39. The ovary, style and stigma are collectively known as the
- stamen.
 - pistil.
 - fruit.
 - stem.
40. An example of a storage pest is
- yam beetle.
 - capsid.
 - army worm.
 - weevil.

END OF PAPER