

033/2&1 BECE

June 2020

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 2020

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.*

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

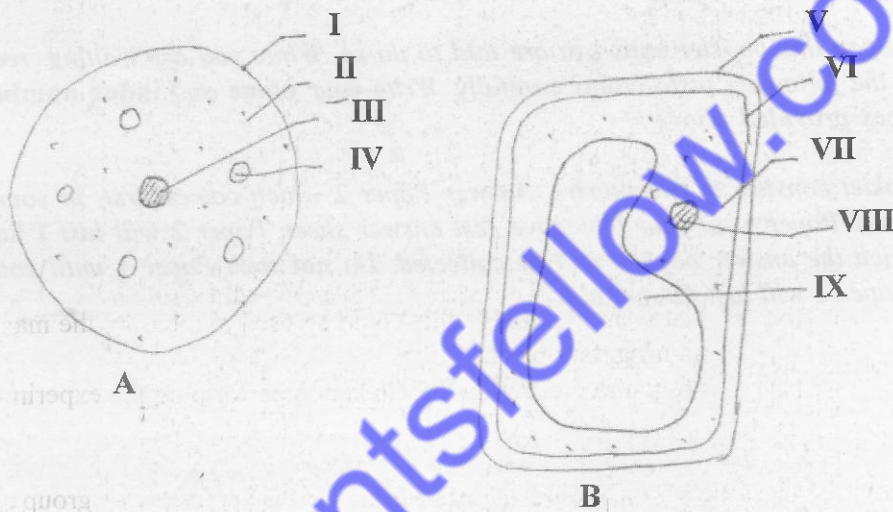
Answer **all** the questions in your answer booklet.

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

SECTION A  
[40 marks]

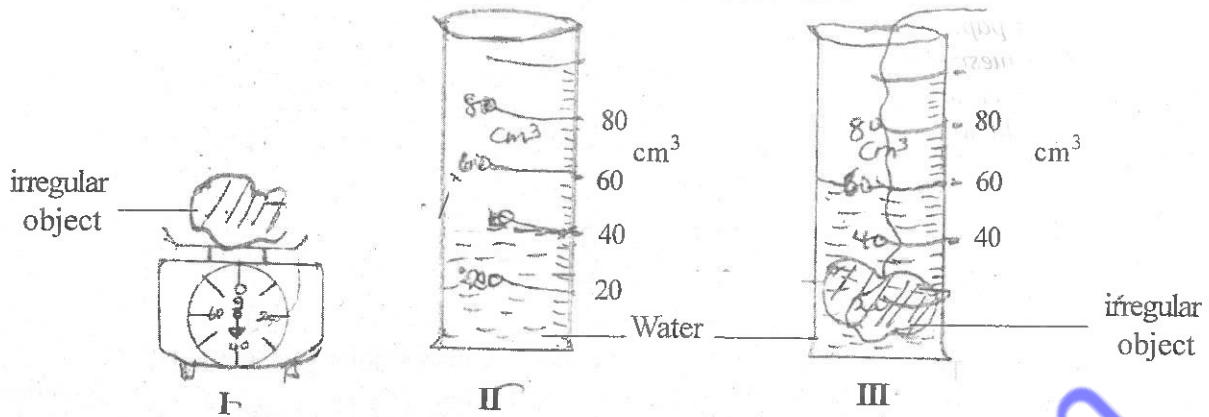
Answer **all** of Question 1.

1. (a) The diagrams below are illustrations of two cells labelled A and B.  
Study the diagrams carefully and answer the questions that follow.



- (i) Name each of the parts labelled I, II, III and IV. [4 marks]
- (ii) Which of the parts named in (a)(i) is the same as the parts labelled VI and IX in cell B. [2 marks]
- (iii) Which of the cells is a plant cell? [1 mark]
- (iv) Give **two** reasons for the answer given in (a)(iii). [2 marks]
- (v) Tabulate two differences between the parts labelled I and V. [2 marks]

- (b) The diagram below is an illustration of an experiment carried out in the laboratory. Study the diagram carefully and answer the questions that follow.



- (i) Read and record the:
  - (α) mass of irregular object (M) in I; [3 marks]
  - (β) Volume of water ( $V_1$ ) in II; [2 marks]
  - (γ) Volume of water ( $V_2$ ) in III. [3 marks]
- (ii) Determine the volume of the irregular object. [2 marks]
- (iii) Calculate the density of the irregular object. [3 marks]
- (iv) Name an instrument that could be used to measure the mass of an irregular object. [1 mark]
- (v) State **one** precaution to be taken in performing the experiment. [1 mark]

- (c) The following activities were performed in the laboratory by group of pupils. Study the activities and answer the questions that follow.

- I. Camphor was heated.
- II. Wood was burnt.
- III. Iron nails were heated strongly.
- IV. Sodium chloride was dissolved in water.

- (i) Which of the activities are:
  - (α) chemical processes; [4 marks]
  - (β) physical processes. [4 marks]
- (ii) Give **two** reasons why the activities listed in:
  - (α) (i)(α) are chemical processes. [4 marks]
  - (β) (i)(β) are physical processes. [2 marks]
- (iii) Give **two** examples of physical change that take place in your environment. [2 marks]

- (d) A farmer cultivated soyabean, yam and maize on a farm in a rotational programme as illustrated below. Study the illustration carefully and answer the questions that follow.

plot year	1	2	3
1	maize	I	II
2	III	maize	IV
3	V	VI	maize

- (i) Copy and complete the table. [3 marks]  
 (ii) List **three** principles to consider when planning this rotational programme. [3 marks]  
 (iii) Give **two** reasons for selecting the crop named for V in plot 1 year 3. [2 marks]  
 (iv) State **one** advantage of practising this farming system. [1 mark]

SECTION B  
[60 marks]

Answer four questions only from this section.

2. (a) State **three** external features of the weaver bird that adapt it to live successfully in its environment. [3 marks]  
 (b) List **four** harmful effects of air pollution. [4 marks]  
 (c) (i) Draw the magnetic lines of force around a bar magnet.  
 (ii) If the work input of a machine is 30 joules, what would be its efficiency when the work output is 25 joules? [5 marks]  
 (d) Outline **three** principles involved in vegetable crop production. [3 marks]
3. (a) (i) State **two** differences between an *ecosystem* and a *habitat*.  
 (ii) What is meant by the term *blood*? [4 marks]  
 (b) Explain why it is difficult to separate iron and sulphur mixture after strong heating. [2 marks]  
 (c) Draw and label a diagram of a ray of light which makes an angle of  $35^\circ$  with the surface of a plane mirror. [5 marks]  
 (d) State **two**:  
 (i) advantages of land rotation;  
 (ii) disadvantages of land rotation. [4 marks]

4. (a) State **one** symptom **each** of the following infectious diseases:  
 (i) cerebrospinal meningitis;  
 (ii) chicken pox;  
 (iii) typhoid. [3 marks]
- (b) (i) What is *energy*?  
 (ii) Give **two** reasons why it is necessary to conserve energy. [4 marks]
- (c) (i) State **two** methods of restoring soil resources.  
 (ii) Explain **briefly one** of the methods stated in (c)(i). [4 marks]
- (d) (i) What is a *binary compound*? [4 marks]
- (ii) Write the chemical formula of the compound formed between:  
 (α) Oxygen and lithium;  
 (β) Magnesium and Chlorine.  
 (iii) Name the compound formed in (ii)(α). [4 marks]
5. (a) (i) State **two** uses of water in agriculture.  
 (ii) Name **two** crops that are deep rooted. [4 marks]
- (b) (i) Explain the term *circulatory system* in humans.  
 (ii) Classify **each** of the following processes as diffusion or osmosis:  
 (α) absorption of water by the roots of a plant;  
 (β) movement of digested food from the small intestine into the bloodstream. [4 marks]
- (c) (i) What is *mass*?  
 (ii) A box of equal size 3 cm has a density of  $2.0 \text{ g cm}^{-3}$ .  
 What is its mass? [5 marks]
- (d) Give the state of **each** of the following substances:  
 (i) ash;  
 (ii) carbon dioxide. [2 marks]
6. (a) State **three** functions of the female reproductive system in humans. [3 marks]
- (b) (i) What is the role of a capacitor in a circuit?  
 (ii) Give **two** examples of a compound machine. [4 marks]
- (c) (i) What is *Integrated Pest Management*?  
 (ii) State **two** advantages of practising integrated pest management. [4 marks]
- (d) (i) State **two** classes of mixtures.  
 (ii) Classify **each** of the following substances under the classes stated in (i):  
 (α) bronze;  
 (β) when perfume is sprayed into the air. [4 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. Which of the following parts of the tooth is embedded in the jaw bone?
  - A. Gum
  - B. Neck
  - C. Root
  - D. Crown
2. Which part of the human body stores sperms temporarily?
  - A. Epididymis
  - B. Scrotum
  - C. Prostrate gland
  - D. Sperm duct
3. An advantage of soft water over hard water is that soft water
  - A. is good for the formation of strong bones in humans.
  - B. prevents heart diseases.
  - C. has a pleasant smell.
  - D. saves a lot of soap when used in washing.
4. The workdone by a force of 20 N, on a body is 60 J. Calculate the distance through which the force moved.
  - A. 8.0 m
  - B. 4.0 m
  - C. 3.0 m
  - D. 2.0 m

5. Which of the following processes removes carbon from the atmosphere?
- Respiration
  - Burning
  - Decomposition
  - Photosynthesis
6. A substance which is made up of the same kind of atoms is called
- a compound.
  - an element.
  - a mixture.
  - an ion.
7. Which of the following statement(s) is/are true of a shadow? A shadow is formed
- by a transparent object,
  - by an opaque object,
  - on a screen.
- I only
  - II only
  - I and III only
  - II and III only
8. Which of the following diseases results from malnutrition?
- Scurvy
  - Measles
  - Malaria
  - Gonorrhoea
9. The chemical formula of an aluminium sulphide is  $Al_yS_3$ . Determine the value of  $y$ .
- 1
  - 2
  - 3
  - 4
10. Which of the following sources of energy is/are renewable?
- Wind
  - Coal
  - Crude oil
- I only
  - I and II only
  - II and III only
  - I, II and III
11. Clayey soils are described as heavy because they
- have high water-holding capacity.
  - contain a lot of stones.
  - have large air spaces.
  - are difficult to till.

12. An example of a legume is
- groundnut.
  - millet.
  - sorghum.
  - sweet potato.
13. The process used to separate a mixture of iron filings and sulphur is
- magnetic attraction.
  - sublimation.
  - distillation.
  - evaporation.
14. The colour of a soil profile determines the
- depth at which implements are set.
  - drainage ability of the soil.
  - fertility of the soil.
  - type of tool to use.
15. The end-product of digestion of fats and oils is
- amino acid.
  - glucose.
  - maltose.
  - fatty acid and glycerol.
16. The unit of potential difference is
- ampere.
  - watt.
  - ohm.
  - volt.
17. A stone displaced  $20 \text{ cm}^3$  of water when immersed in the water. If the mass of the stone is 40 g, find the density of the stone.
- $60 \text{ g cm}^{-3}$
  - $40 \text{ g cm}^{-3}$
  - $2 \text{ g cm}^{-3}$
  - $0.5 \text{ g cm}^{-3}$
18. One similarity of physical and chemical changes is that both
- are easily reversible.
  - result in change of state of matter.
  - produce no change in mass.
  - are accompanied by great heat change.
19. Which of the following elements is a macro-nutrient?
- Copper
  - Manganese
  - Zinc
  - Sulphur



20. The process by which metabolic wastes are removed from the body is called
- respiration.
  - excretion.
  - ingestion.
  - egestion.
21. The part of the flower that produces pollen grains is the
- stamen.
  - filament.
  - petal.
  - anther.
22. Which of the following statement(s) about pressure in fluids is/are correct? Pressure
- decreases with depth.
  - increases with depth.
  - does not depend on area.
- I only
  - II only
  - I and III only
  - II and III only
23. A boy who is seventeen years old is an
- adult.
  - adolescent.
  - old person.
  - infant.
24. The mode of heat transfer in which no material is involved is known as
- conduction.
  - convection.
  - expansion.
  - radiation.
25. Which of the following factors are used to describe a fertile soil?
- Amount of organic matter
  - Colour
  - Texture
- I and II only
  - I and III only
  - II and III only
  - I, II and III
26. The major charge carriers in p-type semiconductors are
- anions.
  - electrons.
  - holes.
  - neutrons.
27. The dry season in Ghana is mainly from
- January to March.
  - April to June.
  - July to September.
  - October to December.

28. The practice that excess branches of growing plants are removed is termed
- mulching.
  - pruning.
  - thinning.
  - staking.
29. Which of the following soil types has the **highest** capillarity?
- Clay
  - Loam
  - Sand
  - Silt
30. Which of the following farming practices promote soil erosion?
- Alley cropping
  - Bush burning
  - Over grazing
- I and II only
  - I and III only
  - II and III only
  - I, II and III
31. The **nearest** planet to the sun in the solar system is
- Earth.
  - Mars.
  - Mercury.
  - Venus.
32. In which of the following devices is electrical energy transformed into light energy?
- Electric bell
  - Fluorescent tube
  - Lantern
  - Radio
33. An example of a semi-metal is
- silicon.
  - carbon.
  - beryllium.
  - argon.
34. The elements in the periodic table are arranged according to their
- atomic number.
  - atomic mass.
  - mass number.
  - neutron number.
35. Which of the following states of matter are fluids?
- Solid
  - Liquid
  - Gas
- I and II only
  - I and III only
  - II and III only
  - I, II and III

36. A liquid-liquid mixture can be separated by
- filtration.
  - evaporation.
  - sublimation.
  - distillation.
37. When an unknown solution reacted with magnesium, a gas was produced. Which of the following solutions could be the unknown solution?
- Sodium chloride solution
  - Sodium hydroxide solution
  - Hydrochloric acid
  - Calcium nitrate solution
38. Which of the following statements about acids are **correct**?
- They react with calcium carbonate to give a gas.
  - They turn red litmus paper blue.
  - They react with reactive metals to give a gas.
  - They turn blue litmus paper red.
- I, II and IV only
  - I, II and III only
  - II, III and IV only
  - I, III and IV only
39. The structure which enables a fish to breathe in water is
- buccal cavity.
  - gills.
  - swim bladder.
  - lungs.
40. A fruit in which the pappus has been modified into a parachute structure is dispersed by
- explosion.
  - mammals.
  - water.
  - wind.

**END OF PAPER**