

SC5172&1  
WASSCE 2018  
INTEGRATED  
SCIENCE 2&1  
Essay and Objective  
2½ hours

2&1

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination  
for School Candidates

SC 2018

INTEGRATED SCIENCE 2&1

2½ 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 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 1½ hours after which the answer booklet will be collected. Do not start Paper 1 until you are told to do so. Paper 1 will last 1 hour.*

thestudentstfellow.com

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

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

All questions carry equal marks.

1. (a) (i) What is meant by the term *modern technology*?  
(ii) Give **three** reasons for the lack of improvement of technology in Ghana. [5 marks]
- (b) (i) Explain the term *convection* as used in heat energy.  
(ii) Explain why convection **cannot** take place in solids. [5 marks]
- (c) (i) Differentiate between *soil erosion* and *soil depletion*.  
(ii) Give **three** effects of soil erosion on agricultural productivity. [5 marks]
- (d) (i) List **three** causes of indigestion in humans.  
(ii) State **two** ways of preventing tooth decay. [5 marks]
2. (a) A man with normal red blood cells is married to a woman who is a sickle cell carrier. With the aid of a genetic diagram, explain the genetic constitution of their children. [4 marks]
- (b) (i) Explain the term *sublimation*.  
(ii) Name **three** substances that can sublime. [5marks]
- (c) Two lamps, **each** of resistance  $3\ \Omega$ , are connected in parallel. The arrangement is then connected across a  $4.5\ \text{V}$  battery.  
(i) Draw a circuit diagram for the arrangement.  
(ii) Calculate the effective resistance of the lamps.  
(iii) Calculate the total current in the circuit. [6 marks]
- (d) (i) Distinguish between *green manure* and *farmyard manure*.  
(ii) State **three** ways in which organic fertilizers are important to the soil. [5 marks]
3. (a) (i) Explain the term *identification* as used in animal production.  
(ii) Describe **two** methods of identifying farm animals. [6 marks]
- (b) (i) What is a *reflex action*?  
(ii) Distinguish between *excretion* and *egestion*. [4 marks]
- (c) (i) List **two** groups of hydrocarbons.  
(ii) A group of hydrocarbons has the general formula  $\text{C}_n\text{H}_{2n}$ .  
(a) Name the **first two** members of the group.  
(b) State the **main** reaction that members of this group undergo. [5 marks]

(d) State the class of lever to which **each** of the following simple machines belongs:

- (i) broom;
- (ii) claw hammer;
- (iii) fishing rod;
- (iv) secateurs;
- (v) bottle top opener.

[5 marks]

4. (a) (i) Define the term *pressure*.  
 (ii) A regular concrete block weighing 5 kg, has dimensions 8 cm x 20 cm x 50 cm. Calculate the **greatest** possible pressure the block will exert on the ground.

$$[g = 10 \text{ m s}^{-2}]$$

[6 marks]

(b) (i) Give **three** reasons why poultry farms should be distanced from residential areas.  
 (ii) Mention **two** methods of preserving poultry eggs.

[5 marks]

(c) State **two** causes **each** of the following problems associated with reproduction in humans:

- (i) ectopic pregnancy;
- (ii) infertility in men.

[4 marks]

(d) Indicate whether **each** of the following substances is an element, a compound or a mixture:

- (i) water;
- (ii) iron filings;
- (iii) glass;
- (iv) milk of magnesia;
- (v) iodine crystals.

[5 marks]

5. (a) A 0.04 g of copper metal reacts completely with 25 cm<sup>3</sup> of 0.5 mol dm<sup>-3</sup> H<sub>2</sub>SO<sub>4</sub>.

- (i) Write a balanced chemical equation for the reaction.
- (ii) Calculate the molar mass of the copper metal.

[6 marks]

(b) (i) Give **two** functions of the human ear.  
 (ii) Arrange the following media in order of **increasing** speed of sound in **each** of them: solids, liquids, and gases.

[5 marks]

(c) (i) Give **two** advantages of clayey soil over sandy soil.  
 (ii) State **three** symptoms of nitrogen deficiency in maize.

[5 marks]

(d) State **four** ways in which biotic factors are useful in an ecosystem.

[4 marks]

Turn over

6. (a) (i) State **three** ways through which AIDS is transmitted.  
(ii) List **three** effects of drug abuse on the user. [6 marks]
- (b) Name **four** endocrine glands found in humans. [4 marks]
- (c) (i) What is a *shadow*?  
(ii) Draw a ray diagram to illustrate a ray of light travelling from glass to air. [5 marks]
- (d) (i) Explain the term *artificial insemination* as used in animal production.  
(ii) State **three** advantages of artificial insemination in animal production. [5 marks]

***END OF ESSAY TEST***

thestudentstfellow.com

# 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.**

**WHILE YOU ARE WAITING, READ THE FOLLOWING  
INSTRUCTIONS CAREFULLY.**

PAPER 1  
OBJECTIVE TEST  
[50 marks]

1 hour

1. Use 2B pencil throughout.
2. On the pre-printed answer sheet, check that the following details are correctly printed:
  - (a) In the space marked *Name*, check your **surname** followed by your **other names**.
  - (b) In the spaces marked *Examination, Year, Subject and Paper*, check 'WASSCE', 'SC 2018', 'INTEGRATED SCIENCE', and '1' respectively.
  - (c) In the box marked *Index Number*, your **index number** has been printed vertically in the spaces on the left-hand side, and each numbered space has been shaded in line with each digit. **Reshade** each of the shaded spaces.
  - (d) In the box marked *Subject Code*, the digits 517113 are printed vertically in the spaces on the left-hand side. **Reshade** the corresponding numbered spaces as you did for your index number.
3. An example is given below. This is for a female candidate whose *name* is *Aba Kokui USMAN*. Her *index number* is 7102143958 and she is offering *Integrated Science*1.

### THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINT IN BLOCK LETTERS		GHA
Name: <b>USMAN ABA KOKUI</b>		
Examination: <b>WASSCE</b>	Year: <b>SC2018</b>	
Subject: <b>INTEGRATED SCIENCE</b>	Paper: <b>1</b>	

INSTRUCTIONS TO CANDIDATES	
1. Use grade 2B pencil throughout.	
2. Answer each question by choosing one letter and shading it like this: <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E	
3. Erase completely any answer you wish to change.	
4. Leave extra spaces blank if the answer spaces provided are more than you need.	

INDEX NUMBER										SUBJECT CODE									
7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	For Supervisors only									
9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	If candidate is absent shade this space <input type="checkbox"/>									
5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										

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 answer 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 elements is a metal?

- A. Carbon
- B. Copper
- C. Helium
- D. Krypton

The correct answer is Copper, 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 answers you wish to change.

Do all rough work on this question paper.

Now answer the following questions

1. The component of white light which is **most** deviated when light is dispersed is
  - A. blue.
  - B. red.
  - C. violet.
  - D. yellow.
  
2. Which of the following characters in humans is sex-linked?
  - A. Baldness
  - B. Skin colour
  - C. Eye colour
  - D. Sickle cell
  
3. An example of an abiotic factor in an ecosystem is
  - A. altitude.
  - B. grazing.
  - C. predation.
  - D. shading.
  
4. Alkanoic acids contain
  - A. carbon atoms and hydrogen atoms only.
  - B. carbon atoms and oxygen atoms only.
  - C. carbon atoms, hydrogen atoms and oxygen atoms only.
  - D. carbon atoms, hydrogen atoms and nitrogen atoms only.

5. Which of the following minerals is **not** needed by crops in large quantities?
- A. Calcium
  - B. Iron
  - C. Nitrogen
  - D. Phosphorus
6. A rigid bar that is supported at a point about which turning occurs is
- A. lever.
  - B. pulley.
  - C. wheel and axle.
  - D. inclined plane.
7. One criterion used in the classification of domestic rabbit is the
- A. age.
  - B. eye colour.
  - C. height.
  - D. size.
8. Which of the following chemical substances is toxic?
- A. Potassium cyanide
  - B. Sodium hydroxide
  - C. Hydrogen peroxide
  - D. Calcium oxide
9. The unit of heredity found in the chromosomes is
- A. centriole.
  - B. deoxyribonucleic acid.
  - C. mitochondrion.
  - D. endoplasmic reticulum.
10. Which of the following elements is a constituent of brass?
- A. Iron
  - B. Magnesium
  - C. Tin
  - D. Zinc
11. The process in the hydrological cycle which results in water vapour condensing and falling on the earth surface is
- A. evaporation.
  - B. infiltration.
  - C. precipitation.
  - D. sublimation.

12. The centre of gravity of a body is
- A. always at its centre.
  - B. a point where its total mass is always concentrated.
  - C. always at its end.
  - D. a point where it can be supported to be in equilibrium.
13. Which of the following crops is a root vegetable?
- A. Carrot
  - B. Ginger
  - C. Lettuce
  - D. Onion
14. The aim of the ring experiment in a flowering plant is to demonstrate that
- A. water is transported by the xylem.
  - B. food substances are transported by the phloem.
  - C. food substances are formed in the stem.
  - D. water is excreted from the stem.
15. Which of the following properties is associated with ionic compounds? They
- A. are soluble in organic solvents.
  - B. conduct electricity in the molten state.
  - C. have low melting and boiling points.
  - D. consist of molecules.
16. The sedimentary rock is also referred to as
- A. stratified rock.
  - B. slated rock.
  - C. silical rock.
  - D. separated rock.
17. One similarity of arteries and capillaries is that **both** have
- A. permeable walls.
  - B. muscular walls.
  - C. no valves.
  - D. large lumens.
18. Which of the following instruments is **most** suitable for measuring the thickness of razor blade?
- A. Metre rule
  - B. Micrometer screw gauge
  - C. Vernier callipers
  - D. Surveyor's tape



19. The chemical which is **most** likely to have **highly inflammable** hazard symbol in its container is on
- ethanol.
  - mercury.
  - ammonium hydroxide.
  - sodium hydroxide.
20. The part of the maize grain which grows into the shoot is the
- cotyledon.
  - endosperm.
  - plumule.
  - radicle.
21. An effort of 120 N was used to overcome a load of 80 N. What is the mechanical advantage of the system?
- 0.67
  - 1.50
  - 40.00
  - 200.00
22. Which of the following reactions can produce salt and water **only**?
- $\text{NaOH}_{(\text{aq})} + \text{CH}_3\text{COOH}_{(\text{aq})}$
  - $\text{NaOH}_{(\text{aq})} + \text{NH}_3_{(\text{aq})}$
  - $\text{NH}_3_{(\text{aq})} + \text{H}_2\text{O}_{(\text{l})}$
  - $\text{NaCl}_{(\text{aq})} + \text{AgNO}_3_{(\text{aq})}$
23. The **best** way of harvesting hot pepper is by
- shaking the plant.
  - handpicking the fruits.
  - allowing the fruits to drop naturally.
  - cutting the fruit with a sharp knife.
24. The area occupied by a box placed on a table is  $2.0 \text{ m}^2$ . If the box exerts a pressure of 50 Pa on the table, calculate the mass of the box. [ $g = 10 \text{ ms}^{-2}$ ]
- 2.5 kg
  - 10.0 kg
  - 100.0 kg
  - 1000.0 kg
25. Which of the following substances would have a pH below 7?
- Pure water
  - Milk of magnesia
  - Wood ash
  - Lemon juice

Turn over

Consider the food chain below and use it to answer questions 26 and 27.

Grass → Earthworm → Frog → Hawk

26. Which of the organisms is the primary consumer?
- Earthworm
  - Frog
  - Grass
  - Hawk
27. The organism which obtains the least energy is
- earthworm.
  - frog.
  - grass.
  - hawk.
28. In cattle, anaemia, damaged skin and heart-water disease are caused by
- liver-fluke.
  - roundworm.
  - tapeworm.
  - tick.
29. In a simple machine, the force that overcomes the resistance is
- effort.
  - lever.
  - load.
  - pivot.
30. A molar solution of  $\text{KHSO}_4$  contains [K = 39, H = 1, S = 32, O = 16]
- 80 g of  $\text{KHSO}_4$  in  $1 \text{ dm}^3$  of solution.
  - 100 g of  $\text{KHSO}_4$  in  $100 \text{ cm}^3$  of solution.
  - 120 g of  $\text{KHSO}_4$  in  $1000 \text{ cm}^3$  of solution.
  - 136 g of  $\text{KHSO}_4$  in  $1 \text{ dm}^3$  of solution.
31. Which of the following functions are associated with mammalian skeleton? It
- stores calcium and phosphates.
  - protects vital internal organs.
  - produces red blood cells.
  - stores proteins.
- I and II only
  - III and IV only
  - I, II and III only
  - II, III and IV only

32. The **most** appropriate time to transplant vegetable seedlings is
- dawn.
  - mid day.
  - sunrise.
  - sunset.
33. Rainbow formation is a practical illustration of the light phenomenon known as
- dispersion.
  - interference.
  - mirage.
  - reflection.
34. An example of a metalloid is
- magnesium.
  - potassium.
  - phosphorus.
  - silicon.
35. Which of the following statements about animals are **correct**?
- Movement is quick and visible
  - Chloroplast is absent
  - They have thick cellulose cell wall
- I and II only
  - I and III only
  - II and III only
  - I, II and III
36. The **main** reason for trimming the sides of a vegetable bed is to control
- run-off water.
  - leaching of nutrients.
  - breaking of bed.
  - soil erosion.
37. Which of the following observations is a direct consequence of thermal expansion?
- Cracks in concrete slabs
  - Sagging of electric cables
  - Buckling in railway lines
  - Crackling noise from roofing sheets
- I, II and IV only
  - I, III and IV only
  - II, III and IV only
  - I, II, III and IV

38. A solution of volume  $500 \text{ cm}^3$  contains  $9.80 \text{ g}$  of  $\text{H}_2\text{SO}_4$ . Determine its molar concentration.  
[S = 32, O = 16, H = 1]
- A. 0.10 M
  - B. 0.20 M
  - C. 0.40 M
  - D. 0.50 M
39. A ball and socket joint in the human body does **not** allow
- A. circular movement.
  - B. side to side movement.
  - C. up and down movement.
  - D. gliding movement.
40. The **best** way of controlling endoparasites in cattle is through
- A. rotational grazing.
  - B. early morning grazing.
  - C. dipping the animals.
  - D. spraying the animal with recommended pesticides.
41. An electrical circuit consists of a  $2 \text{ V}$  cell connected to a  $5 \Omega$  resistor. Determine the amount of current through the resistor when the circuit is closed.
- A. 0.4 A
  - B. 1.0 A
  - C. 2.5 A
  - D. 4.0 A
42. Which of the following hydrocarbons is an alkyne?
- A.  $\text{C}_2\text{H}_2$
  - B.  $\text{C}_2\text{H}_4$
  - C.  $\text{C}_3\text{H}_6$
  - D.  $\text{C}_3\text{H}_8$
43. An example of multicellular organism is
- A. Amoeba.
  - B. Euglena.
  - C. Paramecium.
  - D. Rhizopus.

44. Farmers prefer to grow crops on loamy soils because loamy soils
- I. usually contain large amounts of plant nutrients.
  - II. protect the crops from injury.
  - III. have equal amounts of clay and sand.
  - IV. hold plants firmly.

Which of the statements above is/are **correct**?

- A. I only
  - B. I and II only
  - C. I and III only
  - D. I and IV only
45. A precaution that has to be taken when using a liquid-in-glass thermometer is
- A. holding the bulb in hand when in use.
  - B. taking the reading quickly before thermal equilibrium is attained.
  - C. ensuring that the bulb is fully immersed in the substance.
  - D. ensuring that the bulb touches the vessel containing the substance.
46. Soap may itch the skin when it contains excess
- A. acid.
  - B. alkali.
  - C. fat.
  - D. glycerol.
47. The gas in the atmosphere that absorbs ultra violet rays is
- A. carbon (IV) oxide.
  - B. nitrogen.
  - C. oxygen.
  - D. ozone.
48. A soil is considered fertile when it
- A. contains a lot of living organisms.
  - B. is highly aerated.
  - C. has high water retention ability.
  - D. can support adequate crop yield.
49. The energy possessed by a student on top of a building is
- A. chemical energy.
  - B. heat energy.
  - C. kinetic energy.
  - D. potential energy.

**Turn over**

50. Which of the following statements about water is **correct**? It turns blue anhydrous cobalt (II)
- A. green.
  - B. red.
  - C. white.
  - D. yellow.

**END OF PAPER**

thestudentstfellow.com