

May / June WASSCE (WAEC) Integrated Science Past Questions (Paper 1, 2013) -

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S5171 WASSCE May/June 2013 INTEGRATED SCIENCE 1 2½ hours	1
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Name.....

Index Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

May/June 2013

INTEGRATED SCIENCE 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 paper consists of two sections, A and B. Answer Section A on your Objective Test answer sheet and Section B in your answer booklet. Section A will last 1 hour after which the answer sheet will be collected. Do not start Section B until you are told to do so. Section B will last 1½ hours.

SECTION A
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 May/June', '2013', 'INTEGRATED SCIENCE', and '1' in that order.
 - (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 Nasadi Maku BOADI. Her *index number* is 7102143958 and she is offering *Integrated Science 1*

THE WEST AFRICAN EXAMINATIONS COUNCIL

PRINTED IN BLOCK LETTERS	
Name: BOADI NASADI MAKU	GHA
Examination: WASSCE May/June	Year: 2013
Subject: INTEGRATED SCIENCE	Paper: 1

INSTRUCTIONS TO CANDIDATES
 1. Use grade 2B pencil throughout.
 2. Answer each question by choosing one letter and shading it like this: A B C D 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	
7	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
0	0 1 2 3 4 5 6 7 8 9
2	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
4	0 1 2 3 4 5 6 7 8 9
3	0 1 2 3 4 5 6 7 8 9
9	0 1 2 3 4 5 6 7 8 9
5	0 1 2 3 4 5 6 7 8 9
8	0 1 2 3 4 5 6 7 8 9

SUBJECT CODE	
5	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
7	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
1	0 1 2 3 4 5 6 7 8 9
3	0 1 2 3 4 5 6 7 8 9

For Supervisors only
If candidate is absent

Answer **all** the questions.

Each question is followed by **four** options lettered A to D. Find out 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. A piece of iron rusts when it comes into contact with
 - A. air only.
 - B. moisture only.
 - C. oil only.
 - D. air and moisture only.
2. Vegetative propagation method is commonly used in the cultivation of
 - A. banana.
 - B. cocoa.
 - C. cowpea.
 - D. pawpaw.
3. Which of the following devices alters an alternating current?
 - A. Diode
 - B. Dynamo
 - C. Rectifier
 - D. Transformer
4. It is obligatory to wear goggles in the laboratory when handling substances that
 - A. are corrosive.
 - B. are highly flammable.
 - C. are poisonous.
 - D. emit sparks.
5. The function of the pinna of the human ear is to
 - A. receive and transmit sound waves.
 - B. receive and refract sound waves.
 - C. change sound waves into electrical impulses.
 - D. change sound waves into radiations.

6. An atom of an element X has 23 protons and 26 neutrons. Determine the number of electrons.
- A. 3
 - B. 23
 - C. 26
 - D. 49
7. Diseases that are easily transmitted from one organism to another through a vector are said to be
- A. contagious.
 - B. endemic.
 - C. infectious.
 - D. viral.
8. An effort of 100.0 N is applied to a machine to raise a load of 400.0 N. Determine the mechanical advantage of the machine.
- A. 0.25
 - B. 4.00
 - C. 300.00
 - D. 500.00
9. Which of the following characteristic features in leaves of flowering plants ensure efficient photosynthesis?
- I. Narrow leaves with small surface area
 - II. Presence of veins
 - III. Presence of stomata
 - IV. Thick leaves
- A. I and II only
 - B. II and III only
 - C. I, II and III only
 - D. I, III and IV only
10. The vacuum between the two silvered surfaces of a thermos flask prevents heat loss by
- A. conduction only.
 - B. convection only.
 - C. conduction and convection only.
 - D. convection and radiation only.
11. A soil may lose its fertility through
- A. leaching.
 - B. overcooling.
 - C. shifting cultivation.
 - D. ridging.
12. The function of the solar thermal collector in a solar panel is to
- A. trap heat from the solar radiations.
 - B. use radiant energy.
 - C. store solar energy.
 - D. convert photons into electrical energy.

13. Which of the following factors affect the rate of evaporation from the skin of humans?

- I. Humidity
- II. Pressure
- III. Temperature
- IV. Wind speed

- A. I and II only
- B. III and IV only
- C. I, II and III only
- D. I, III and IV only

14. Blood vessels in the mammalian skin constrict during

- A. hot weather.
- B. humid weather.
- C. dry humid weather.
- D. cold weather.

15. An example of a root tuber is

- A. cassava.
- B. groundnut.
- C. onion.
- D. yam.

16. A total eclipse of the sun is seen when the observer is in the

- A. umbra region of the sun's shadow.
- B. penumbra region of the moon's shadow.
- C. umbra region of the moon's shadow.
- D. umbra region of the earth's shadow.

17. A solution contains 18.0 g of glucose per dm^3 . Determine its molarity.

[Molar mass of glucose, $\text{C}_6\text{H}_{12}\text{O}_6 = 180$]

- A. 0.01 M
- B. 0.02 M
- C. 0.10 M
- D. 0.20 M

18. Which of the following methods could be used to demagnetize a strong magnet?

- A. Leaving it in water for few days
- B. Heating it to red-hot
- C. Placing it in a deep freezer overnight
- D. Putting it in a solenoid with a direct current.

The diagram below illustrates a farm equipment. Use the diagram to answer Questions 19 and 20.



19. The diagram illustrates a

- A. dibber.
- B. sickle.
- C. knapsack sprayer.
- D. watering can.

20. The equipment illustrated is used to
- harvest cereal crops.
 - transplant seedlings.
 - spread liquid pesticides in tiny droplets.
 - sprinkle water on plants.
21. Which of the following pollutants is produced by petrol driven vehicles?
- Carbon (II) oxide
 - Carbon (IV) oxide
 - Nitrogen (II) oxide
 - Sulphur (VI) oxide
22. The presence of villi in the ileum of the digestive system of a mammal is to
- secrete digestive enzymes.
 - speed up the process of digestion.
 - keep food in the ileum for longer time.
 - increase the surface area of the ileum for absorption.
23. Which of the following characteristics are associated with sound waves?
- Diffraction
 - Interference
 - Polarization
 - Reflection
- I and II only
 - III and IV only
 - I, II and III only
 - I, II and IV only
24. Long exposure of the human body to X-rays may cause
- skin burns.
 - sickle cell anaemia.
 - high blood pressure.
 - fungal growth on the skin.
25. Which of the following characteristic features in flowering plants favours cross-pollination **most**?
- Flowers are bisexual.
 - Male and female parts mature at same time.
 - Male and female parts are on separate plants.
 - Flowers remain closed until pollination has taken place.
26. In poultry production, temperature is an important factor during brooding because the chicks
- have to overcome stress of transportation.
 - need adequate ventilation.
 - have no access to natural vegetation.
 - have not developed feathers.
27. An electrical circuit has a voltage supply of 8 V. If a current of 2 A flows through the circuit, determine its total resistance.
- 0.25 Ω
 - 4.00 Ω
 - 10.00 Ω
 - 16.00 Ω

28. Which of the following industries is operated as a small-scale industry in Ghana?
- Aluminium production
 - Computer production
 - Soap production
 - Petrol production
29. One **major** advantage of crop rotation is the
- control of insect pests and diseases of crops.
 - increase in the amounts of seeds in the seed bank.
 - faster absorption of nutrients by the soil.
 - emergence of weeds.
30. Comma-shaped bacteria are known as
- bacilli.
 - cocci.
 - spirilla.
 - vibros.
31. Which of the following groups of organic compounds is represented by $\text{— C} \equiv \text{C —}$
- Alkenes
 - Alkanols
 - Alkynes
 - Alkanoic acids
32. When an object is placed beyond the focus of a diverging lens, the image formed will be
- inverted and enlarged.
 - inverted and diminished.
 - erect and diminished.
 - erect and enlarged.
33. Which of the following actions must be taken first when there is an electrical fault in a home?
- Calling the fire service
 - Switching off the electrical mains
 - Calling the electrical engineer
 - Vacating the building
34. Organs in the human body which are involved in homeostasis are
- heart, pancreas and skin.
 - lungs, pancreas and skin.
 - kidneys, lungs and skin.
 - kidneys, lungs and heart.
35. Which of the following physical properties are possessed by metals?
- Good conductor of electricity
 - Low tensile strength
 - High melting point
 - Good conductor of heat
- I and II only
 - II and IV only
 - I, II and III only
 - I, III and IV only

36.



If the hazard warning sign shown above is seen on a reagent bottle, it implies that the content is

- A. corrosive.
 - B. highly inflammable.
 - C. irritant.
 - D. oxidizing.
37. Which of the following post-harvest practices are associated with maize?
- A. Threshing and milling
 - B. Shelling and decortication
 - C. Dehusking and shelling
 - D. Decortication and dehusking
38. An example of a simple machine which can be classified as a third class lever is
- A. wheel barrow.
 - B. nutcracker.
 - C. a pair of tongs.
 - D. a pair of scissors.
39. Which of the following livestock parasites can be controlled by drenching?
- A. Mites
 - B. Roundworm
 - C. Tsetse fly
 - D. Ticks
40. The skin of a mammal excretes
- A. salts and water only.
 - B. water and urea only.
 - C. water and carbon dioxide only.
 - D. salts, urea and water.
41. An atom is said to be electrically neutral when it contains equal numbers of electrons and
- A. isotopes.
 - B. neutrons.
 - C. nucleons.
 - D. protons.
42. Offspring tend to have the same characteristics of their parents because
- A. they must replace their like.
 - B. they inherit their genes for the traits.
 - C. a different appearance will result in extinction.
 - D. they feed on the same food as their parents.
43. Which of the following statements about the absolute scale is **correct**? The
- A. temperature scale starts at 273 K.
 - B. absolute zero point is equivalent to $-273\text{ }^{\circ}\text{C}$.
 - C. temperature at which ice melts is $-273\text{ }^{\circ}\text{C}$.
 - D. temperature at which water boils is 100 K.

44. Thunder and lightning occur at the same time but lightning is seen before sound is heard because
- sound is a longitudinal wave.
 - sound needs a material medium for its propagation.
 - light is a transverse wave.
 - light travels faster.
45. Drainage in a clayey soil can be improved by
- addition of organic manure.
 - addition of chemical fertilizer.
 - application of mulching material.
 - application of wood ash.
46. A quadrat is used in ecological studies to sample
- land animals.
 - land vegetation.
 - floating organisms of marine habitat.
 - floating organisms of freshwater habitat.
47. Ships sink more easily in freshwater than in sea water because
- sea water is denser.
 - sea water does not flow.
 - currents are absent in freshwater.
 - there are a lot of organisms in sea water.
48. The most effective way of preventing disease among farm animals is
- immunizing.
 - quarantining the animals.
 - observing farm hygiene.
 - breeding disease resistant varieties.
49. The structure in a mammal that acts as a shock absorber for the embryo is known as the
- chorion.
 - placenta.
 - amniotic fluid.
 - umbilical cord.
50. A by-product obtained from the manufacture of soap is
- glycerol.
 - nylon.
 - polythene.
 - vegetable oil.

END OF OBJECTIVE TEST

10
SECTION B
ESSAY
[80 marks]

1½ hours

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) List **two** raw materials used in the manufacture of indigenous soap.
(ii) State **three** ways of improving upon the quality of indigenous soap. [5 marks]
- (b) Explain **three** ways in which the human sperm cell is adapted to its function. [6 marks]
- (c) State **four** human activities that result in the depletion of soil resources. [4 marks]
- (d) Describe how the relative density of a salt solution can be determined using the hydrometer. [5 marks]
2. (a) (i) Explain the term *tissue* as applied to living organisms.
(ii) List **two** types of tissues found in a green plant.
(iii) State **one** function **each** of the tissues listed in (ii) above. [6 marks]
- (b) (i) State the *law of conservation of energy*.
(ii) In a simple machine, the energy input is 120 J. If the efficiency of the machine is 80%, calculate the energy output. [5 marks]
- (c) (i) What is a *chemical compound*?
(ii) State **four** differences between a *covalent* and an *ionic compound*. [6 marks]
- (d) State **three** features of the intensive system of keeping animals. [3 marks]
3. (a) (i) Describe **briefly** the production of sound in **each** of the following instruments:
(α) trumpet;
(β) drum.
(ii) State **one** difference between a *musical note* and *noise*. [5 marks]
- (b) (i) Give the reason for the treatment of water for domestic use.
(ii) State **three** methods of improving upon the quality of water for domestic use. [4 marks]
- (c) (i) Explain the term *artificial insemination* as used in animal production?
(ii) State **three** benefits of artificial insemination. [5 marks]
- (d) Describe the processes involved when the human eye views an object. [6 marks]

4. (a) (i) List **three** methods of fertilizer application.
 (ii) State **three** factors to be considered before the application of fertilizer to crops. [6 marks]
- (b) Explain the following ecological terms:
 (i) community;
 (ii) population;
 (iii) habitat. [6 marks]
- (c) (i) What is *dispersion of light*?
 (ii) Name the
 (α) natural phenomenon that involves dispersion of light,
 (β) dispersing medium for the phenomenon named in (α) above. [4 marks]
- (d) Describe how a pure sample of sodium chloride could be obtained from a mixture of sodium chloride and sand. [4 marks]
5. (a) (i) State **two** characteristics of a concentrated acid.
 (ii) State **three** precautions to be taken when diluting concentrated sulphuric acid in the laboratory. [5 marks]
- (b) A man heterozygous for the rhesus factor marries a woman of the same genotype. Determine the proportion of the children who would carry the rhesus factor. Illustrate your answer with a genetic diagram. [5 marks]
- (c) (i) Name **three** sources of electric power.
 (ii) *An electric stove is rated 1000 W, 240 V.* Explain this statement. [5 marks]
- (d) (i) What is a *crop pest*?
 (ii) State **three** harmful effects of crop pests in agriculture. [5 marks]
6. (a) Consider the chemical reaction below:

$$\text{CH}_3\text{COOH} + \text{CH}_3\text{OH} \xrightleftharpoons[\text{Heat}]{\text{conc. H}_2\text{SO}_4} \text{CH}_3\text{COOCH}_3 + \text{H}_2\text{O}$$
 (i) Name the type of reaction illustrated.
 (ii) What is the role of the concentrated H_2SO_4 ?
 (iii) What is the scent of the organic product formed?
 (iv) Name the organic product formed. [4 marks]
- (b) (i) Name the causative organism of malaria.
 (ii) State **four** ways of controlling the incidence of malaria in a community. [5 marks]

Turn over

- (c) (i) Define *force*.
(ii) Name the forces which are at play during the following activities:
(α) an object is placed on a table;
(β) a passenger jerks forward when a moving car comes to a sudden stop. [6 marks]
- (d) (i) Name **two** tools which could be used in the preparation of a nursery bed.
(ii) State **three** factors which must be considered when selecting a site for vegetable production. [5 marks]

END OF PAPER

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