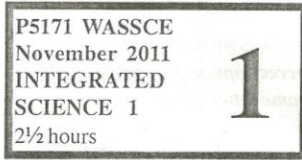


Nov / Dec 2011 WASSCE (WAEC) Integrated Science Past Question Paper 1
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Name.....

Index Number.....

THE WEST AFRICAN EXAMINATIONS COUNCIL

West African Senior School Certificate Examination

November 2011

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
[60 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 November', '2011', '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 Fekameme Ama AKOLGO. Her *index number* is 7102143958 and she is offering *Integrated Science 1*

**THE WEST AFRICAN EXAMINATIONS COUNCIL
ANSWER SHEET**

PRINTED IN BLOCK LETTERS	
Name: AKOLGO FEKAMEME AMA	GHA
Examination: WASSCE November	Year: 2011
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 space blank if the answer space provided are more than you need.

INDEX NUMBER											
7	0	0	1	2	3	4	5	6	8	9	
1	0	0	1	2	3	4	5	6	7	8	9
0	0	0	1	2	3	4	5	6	7	8	9
2	0	0	1	2	3	4	5	6	7	8	9
1	0	0	1	2	3	4	5	6	7	8	9
4	0	0	1	2	3	4	5	6	7	8	9
3	0	0	1	2	3	4	5	6	7	8	9
9	0	0	1	2	3	4	5	6	7	8	9
5	0	0	1	2	3	4	5	6	7	8	9
8	0	0	1	2	3	4	5	6	7	8	9

SUBJECT CODE											
5	0	0	1	2	3	4	5	6	7	8	9
1	0	0	1	2	3	4	5	6	7	8	9
7	0	0	1	2	3	4	5	6	7	8	9
1	0	0	1	2	3	4	5	6	7	8	9
1	0	0	1	2	3	4	5	6	7	8	9
3	0	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 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 answer you wish to change.

Do all rough work on this question paper.

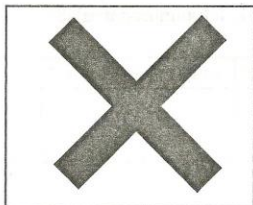
Now answer the following questions:

1. Which of the following conditions is a symptom of food poisoning?
 - A. Worm infestation
 - B. Stomach ache
 - C. Presence of blood in urine
 - D. Reduction in body temperature
2. The number of positive charges on an alpha particle is
 - A. 2.
 - B. 3.
 - C. 4
 - D. 6.
3. A farming practice that is **most** effective for the maintenance of soil fertility is
 - A. monocropping.
 - B. ploughing.
 - C. terracing.
 - D. weeding.
4. Which of the following parts of a computer is peripheral?
 - A. Keyboard
 - B. Monitor
 - C. Mouse
 - D. Processor
5. A chemical substance that can be used in the laboratory to distinguish an alkane from an alkene is
 - A. hydrochloric acid.
 - B. bromine water.
 - C. cobalt chloride paper.
 - D. anhydrous copper sulphate.

6. A particle changes its velocity from 10 m s^{-1} to 15 m s^{-1} in 8 seconds. Determine its acceleration.
- A. 0.63 m s^{-2}
 - B. 1.25 m s^{-2}
 - C. 1.66 m s^{-2}
 - D. 4.00 m s^{-2}
7. Which of the following bones form the axial skeleton in mammals?
- I. Limb and limb girdles
 - II. The vertebral column
 - III. The skull
 - IV. Ribs and sternum
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. III and IV only
8. A farming method that is regarded as environmentally friendly is
- A. bush burning.
 - B. land rotation.
 - C. organic farming.
 - D. shifting cultivation.
9. Which of the following statements about the absorption of heat by a substance are **correct**?
- I. The quantity of heat in the substance increases.
 - II. The molecules of the substance move faster.
 - III. The volume of the substance changes.
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
10. A homozygous black rabbit is mated to a white mouse. If the black colour is dominant to white colour, determine the colour of the young rabbit.
- A. All will be black.
 - B. All will be white.
 - C. Some will be black and some will be white.
 - D. They will be partly white and partly black.
11. A simple electrical circuit has a voltage supply of 12 V. If the total resistance in the circuit is 6Ω , determine the current in it.
- A. 0.5 A
 - B. 2.0 A
 - C. 6.0 A
 - D. 18.0 A
12. Steel is preferred to pure iron for constructional work because
- A. steel is more shiny than iron.
 - B. iron poses more health hazard than steel.
 - C. steel is malleable while iron is brittle.
 - D. steel is cheaper than iron.

13. Which of the following relationships represents a food chain in a fish pond?
- Phytoplankton → zooplankton → tilapia → cat fish
 - Zooplankton → phytoplankton → tilapia → cat fish
 - Phytoplankton → zooplankton → cat fish → tilapia
 - Zooplankton → phytoplankton → cat fish → tilapia

Use the illustration of the hazard symbol below to answer questions 14 and 15.



14. If the hazard symbol is shown on a reagent bottle, it implies that the content is
- corrosive.
 - irritant.
 - oxidizing.
 - radioactive.
15. An example of a chemical substance that is associated with this symbol is
- ethanol.
 - calcium oxide.
 - mercury.
 - potassium hydroxide.
16. A sharp knife cuts deeper into a piece of meat than a blunt one because the
- sharp knife exerts less pressure.
 - sharp knife has a greater area of contact.
 - blunt knife has a smaller area of contact.
 - blunt knife exerts less pressure.
17. If the cock to hen ratio on a farm is 1:15, determine the number of cocks required to serve 60,000 hens.
- 840
 - 3,750
 - 4,000
 - 9,000
18. Heat is generated in the human body during the process of
- defaecation.
 - expiration.
 - shivering.
 - sweating.

Use the ornamental plants listed below to answer questions 19 and 20.

- Croton
- Hibiscus
- Flamboyant
- Snow plant

19. Which of the plants are grown for their beautiful flowers?
- I and II only
 - I and III only
 - II and III only
 - II and IV only
20. The plant labelled I is propagated by
- seed.
 - stem cutting.
 - hardened cutting.
 - offset.
21. An observer sees a distant flash of lightning before hearing the accompanying thunder because
- light travels at a faster speed than sound.
 - light waves have a lower frequency than sound waves.
 - sound waves experience resistance in the cloud.
 - the source of the thunder is farther away from the observer.
22. Which of the following substances is present in both glomerular filtrate and urine of a healthy person?
- Amino acids
 - Blood proteins
 - Glucose
 - Urea
23. A solution of 250 cm^3 HCl has a concentration of 2 mol dm^{-3} . Determine the number of moles of the acid.
- 0.25 moles
 - 0.50 moles
 - 1.00 moles
 - 1.50 moles
24. A soft magnet is the type which
- maintains its magnetism permanently.
 - can be demagnetized with ease.
 - can easily be cut into smaller pieces.
 - attracts other magnetic materials.
25. Which of the following conditions in humans is a symptom of schistosomiasis?
- Blood in urine
 - Cataract
 - Chest pains
 - Constipation
26. Seed is the planting material for the propagation of **all** the following crops **except**
- citrus.
 - cocoa.
 - oil palm.
 - plantain.
27. Which of the following substances is a naturally occurring weak acid?
- Ammonia
 - Carbon dioxide
 - Citric acid
 - Hydrochloric acid

28. The level of classification that embraces the **largest** number of organisms is the
- class.
 - genus.
 - order.
 - phylum.
29. All the following characteristics of a poultry egg are determined by the feed **except** the
- shape.
 - shell colour.
 - size.
 - yolk colour.
30. Carbon monoxide is poisonous to humans when inhaled because it
- enters the brain and kills the nerves.
 - enters the stomach and induces vomiting.
 - blocks the path of oxygen with the blood.
 - causes severe headache.
31. When ammonium salt is heated gently, it changes from
- gas to liquid.
 - liquid to gas.
 - solid to gas.
 - solid to liquid.
32. An important factor that influences the choice of the site for a fish pond is
- nature of the soil.
 - gradient of the landscape.
 - availability of shade.
 - nearness to a settlement.
33. A quantity of water of mass 4.0 g at a temperature 50 °C was mixed thoroughly with 6.0 g water at 15 °C. Determine the final temperature of the mixture.
[Specific heat capacity of water is 4200 J kg⁻¹ °C⁻¹]
- 29 °C
 - 35 °C
 - 44 °C
 - 65 °C
34. Which of the following statements about anaerobic respiration is **correct**?
- Carbon dioxide and water are produced.
 - Oxygen gas is released.
 - Oxygen gas is used up.
 - Glucose is broken down.
35. Soap may produce an itching effect on skin when it contains excess
- alkali.
 - alkanol.
 - glycerol.
 - oil.

36. Which of the following devices allows computers to communicate with one another over telephone lines?
- Keyboard
 - Modem
 - Monitor
 - Mouse
37. Aluminium is used in
- the extraction of gold.
 - making coins.
 - the manufacture of ammonia.
 - making household utensils.
38. An example of biotechnological process is
- esterification.
 - fermentation.
 - hydrogenation.
 - neutralization.
39. Which of the following layers of the soil contains the **largest** population of living organisms?
- Top soil
 - Subsoil
 - Parent material
 - Bedrock.
40. If the temperature of a substance is $30\text{ }^{\circ}\text{C}$, determine its equivalent temperature on the Kelvin scale.
[Take *absolute temperature to be* 273 K .]
- 240 K
 - 270 K
 - 300 K
 - 330 K
41. The part of the brain responsible for involuntary activities is
- cerebral cortex.
 - hypothalamus.
 - optic lobe.
 - pituitary gland.
42. Which of the following conditions is likely to cause an epidemic in a community?
- Poor ventilation
 - Living in a room with pests
 - Poor sanitation
- I and II only
 - I and III only
 - II and III only
 - I, II and III
43. Water is heated in a saucepan from $20\text{ }^{\circ}\text{C}$ to $80\text{ }^{\circ}\text{C}$. The heating results in increase in the
- rate of evaporation.
 - mass of water.
 - density of water.
 - number of water molecules.

44. Fingerlings are stored for 24 hours before transportation in order to
- reduce faecal contamination.
 - reduce overcrowding.
 - ensure healthy growth.
 - enhance pond fertilization.
45. When a potted seedling is stored in a cupboard for about 12 hours, it loses all the starch in its leaves because
- the starch is converted to glucose in the dark.
 - the starch is oxidized to liberate energy.
 - heat in the cupboard causes the starch to melt.
 - darkness destroys the starch completely.
46. Immunization of farm animals results in the production of
- antibodies.
 - antigens.
 - red blood cells.
 - white blood cells.
47. Which of the following factors can affect the boiling and freezing points of water?
- Adhesive forces between molecules and container
 - Density of water
 - Atmospheric pressure
 - Surface tension
48. The **main** reason for conducting blood tests on patients before carrying out blood transfusion is to
- select blood which has enough antibodies.
 - determine the percentage of active red blood cells.
 - avoid giving them incompatible blood.
 - diagnose the disease in them.
49. When a cube of sugar is treated with concentrated sulphuric acid, a black product is formed due to
- dehydration.
 - esterification.
 - oxidation.
 - neutralization.
50. Poor sanitation enhances the spread of the disease known as
- asthma.
 - bilharzia
 - cholera.
 - onchocerciasis.
51. Which of the following services are provided by farm animals?
- Traction for farm work
 - Raw materials for shoe factory
 - Raw materials for herbicides
- I and II only
 - I and III only
 - II and III only
 - I, II and III

52. A wave of wavelength 40.0 m moves at a speed of 440 m s^{-1} . Determine the frequency of the wave.
- A. 0.01 Hz
 - B. 11.00 Hz
 - C. 99.00 Hz
 - D. 440.00 Hz
53. Which of the following diseases is associated with the liver in humans?
- A. Appendicitis
 - B. Arteriosclerosis
 - C. Bronchitis
 - D. Cirrhosis
54. A metal block is raised to a height above the ground level. The type of energy possessed by the block at that height is
- A. chemical.
 - B. kinetic.
 - C. heat.
 - D. potential.
55. Given that Avogadro constant is 6.02×10^{23} , determine the number of atoms in 0.001 mole of a substance.
- A. 6.02×10^{20} atoms
 - B. 6.02×10^{21} atoms
 - C. 6.02×10^{23} atoms
 - D. 6.02×10^{26} atoms
56. The gestation period in the reproductive cycle of mammals refers to the period between
- A. ejaculation and fertilization.
 - B. fertilization and birth.
 - C. birth and lactation.
 - D. fertilization and implantation.
57. Which of the following compounds is a hydrocarbon?
- A. C_2H_6
 - B. $\text{C}_6\text{H}_{12}\text{O}_6$
 - C. $\text{C}_2\text{H}_5\text{OH}$
 - D. CH_3COOH
58. A hedge plant can be made to grow more lateral branches by
- A. watering the plant regularly.
 - B. applying fertilizers to the plant.
 - C. erecting a fence to support the plant.
 - D. pruning the plant regularly.
59. Which of the following characteristics is an example of continuous variation?
- A. Blood group
 - B. Sickle cell
 - C. Skin colour
 - D. Tongue rolling

60. The electron configuration of sodium is
- A. 2,1,8.
 - B. 2,2,7.
 - C. 2,7,2.
 - D. 2,8,1.

END OF OBJECTIVE TEST

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** sources of organic matter in the soil?
(ii) State **two** ways in which organic matter is important to the soil. [4 marks]
- (b) Explain **three** ways in which the respiratory system of humans ensures that inhaled air is purified. [6 marks]
- (c) (i) Explain the term *oxidation number* of an atom.
(ii) Determine the oxidation number of manganese (*Mn*) in potassium permanganate (KMnO_4). [5 marks]
- (d) (i) Explain the term *potential energy*.
(ii) A body of mass 70 kg is placed 2.0 m above the ground. Calculate its potential energy. [$g = 10 \text{ m s}^{-2}$] [5 marks]
2. (a) (i) What is an *alloy*?
(ii) State **three** advantages of alloys. [5 marks]
- (b) State
(i) **two** causes of tooth decay.
(ii) **two** ways of preventing tooth decay. [4 marks]
- (c) (i) Name **three** pieces of equipment used for harvesting fish from a pond.
(ii) The stocking rate of fingerlings in a fish pond is 300 fingerlings per 150 square metre. How many fingerlings are required for a pond measuring 25 m x 10 m? [5 marks]
- (d) (i) Draw and label mercury-in-glass thermometer.
(ii) Explain why it is **not** advisable to sterilize a clinical thermometer using boiling water. [6 marks]
3. (a) (i) Explain the term *hand mating* as applied to livestock breeding.
(ii) State **two** advantages of hand mating method of breeding livestock. [4 marks]
- (b) (i) What is *ovulation*?
(ii) Explain how the human embryo obtains oxygen. [5 marks]

- (c) (i) Explain the term *solution*.
 (ii) An aqueous solution of volume 5.0 dm^3 contains 36.4 g sodium chloride. Calculate the concentration of the solution in mol dm^{-3} . [NaCl = 58.5] [5 marks]
- (d) (i) State **two** characteristics of an image formed by a convex mirror when an object is placed in front of it.
 (ii) Explain why convex mirrors are preferred to plane mirrors as driving mirrors. [4 marks]
- (e) State **two** functions of the mouse of a computer. [2 marks]
4. (a) (i) State **one** function **each** of the following cells in the blood:
 (α) red blood cells;
 (β) white blood cells.
 (ii) State **three** structural differences between *red blood cells* and *white blood cells*. [5 marks]
- (b) (i) Explain the term *culling* as applied to poultry management practice.
 (ii) State **two** advantages of the culling method. [4 marks]
- (c) (i) Explain the term *radioactivity*.
 (ii) Name the **three** radiations produced by radioactivity.
 (iii) Arrange the radiations named in (ii) in order of increasing penetrating power. [6 marks]
- (d) (i) What is an *electromagnetic wave*?
 (ii) State **three** differences between *electromagnetic waves* and *mechanical waves*. [5 marks]
5. (a) An ammeter, *A*, a cell of emf 8 V and two resistors of resistances 4Ω and 5Ω are connected in series. A voltmeter, *V*, is then connected across the 4Ω resistor.
 (i) Draw a circuit diagram to illustrate the arrangement.
 (ii) Calculate the current in the circuit. [5 marks]
- (b) State **four** pieces of evidence that support the theory of evolution. [4 marks]
- (c) (i) What are *grain legumes*?
 (ii) State **two** uses of a named grain legume. [5 marks]
- (d) Describe **briefly** how small amount of an ester is prepared in the laboratory. [4 marks]
- (e) Explain the term *database* as applied to computers. [2 marks]

6. (a) (i) What is a *salt* ?
 (ii) Write a balanced chemical equation to illustrate the reaction between **each** of the following pairs of substances:
 (α) NaOH and H_2SO_4 ;
 (β) Zn and HCl.

[6 marks]

- (b) (i) Copy and complete the table below.

	<i>Disease</i>	<i>Causative agent</i>	<i>Mode of transmission</i>	<i>Prevention/Control</i>
(α)	Cerebrospinal meningitis			
(β)	Onchocerciasis			

[6 marks]

- (c) Explain **each** of the following methods of identification in animal production:
 (i) tattooing;
 (ii) branding.

[4 marks]

- (d) (i) What is *inertia*?
 (ii) Give **two** practical examples of inertia.

[4 marks]

END OF PAPER

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