May / June WASSCE (WAEC) Integrated Science Past Questions (Paper 1, 2013) -
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SS171 WASSCE
May/June 2013
INTEGRATED SCIENCE 1
2½ hours

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. 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
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.

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 dm³. Determine its molarity.
   \[ \text{Molar mass of glucose, } C_6H_{12}O_6 = 180 \]  
   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
   A. harvest cereal crops.
   B. transplant seedlings.
   C. spread liquid pesticides in tiny droplets.
   D. sprinkle water on plants.

21. Which of the following pollutants is produced by petrol driven vehicles?
   A. Carbon (II) oxide
   B. Carbon (IV) oxide
   C. Nitrogen (II) oxide
   D. Sulphur (VI) oxide

22. The presence of villi in the ileum of the digestive system of a mammal is to
   A. secrete digestive enzymes.
   B. speed up the process of digestion.
   C. keep food in the ileum for longer time.
   D. increase the surface area of the ileum for absorption.

23. Which of the following characteristics are associated with sound waves?
   I. Diffraction
   II. Interference
   III. Polarization
   IV. Reflection
   
   A. I and II only
   B. III and IV only
   C. I, II and III only
   D. I, II and IV only

24. Long exposure of the human body to X-rays may cause
   A. skin burns.
   B. sickle cell anaemia.
   C. high blood pressure.
   D. fungal growth on the skin.

25. Which of the following characteristic features in flowering plants favours cross-pollination most?
   A. Flowers are bisexual.
   B. Male and female parts mature at same time.
   C. Male and female parts are on separate plants.
   D. Flowers remain closed until pollination has taken place.

26. In poultry production, temperature is an important factor during brooding because the chicks
   A. have to overcome stress of transportation.
   B. need adequate ventilation.
   C. have no access to natural vegetation.
   D. 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.
   A. 0.25 Ω
   B. 4.00 Ω
   C. 10.00 Ω
   D. 16.00 Ω
28. Which of the following industries is operated as a small-scale industry in Ghana?
   A. Aluminium production
   B. Computer production
   C. Soap production
   D. Petrol production

29. One major advantage of crop rotation is the
   A. control of insect pests and diseases of crops.
   B. increase in the amounts of seeds in the seed bank.
   C. faster absorption of nutrients by the soil.
   D. emergence of weeds.

30. Cusma-shaped bacteria are known as
    A. bacilli.
    B. cocci.
    C. spirilla.
    D. vibros.

31. Which of the following groups of organic compounds is represented by — \( \text{C} \equiv \text{C} \) —
    A. Alkenes
    B. Alkanols
    C. Alkynes
    D. Alkanoic acids

32. When an object is placed beyond the focus of a diverging lens, the image formed will be
    A. inverted and enlarged.
    B. inverted and diminished.
    C. erect and diminished.
    D. erect and enlarged.

33. Which of the following actions must be taken first when there is an electrical fault in a home?
    A. Calling the fire service
    B. Switching off the electrical mains
    C. Calling the electrical engineer
    D. Vacating the building

34. Organs in the human body which are involved in homeostasis are
    A. heart, pancreas and skin.
    B. lungs, pancreas and skin.
    C. kidneys, lungs and skin.
    D. kidneys, lungs and heart.

35. Which of the following physical properties are possessed by metals?
    I. Good conductor of electricity
    II. Low tensile strength
    III. High melting point
    IV. Good conductor of heat

    A. I and II only
    B. II and IV only
    C. I, II and III only
    D. 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 decorication
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 as 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 °C.
C. temperature at which ice melts is –273 °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
   A. sound is a longitudinal wave.
   B. sound needs a material medium for its propagation.
   C. light is a transverse wave.
   D. light travels faster.

45. Drainage in a clayey soil can be improved by
   A. addition of organic manure.
   B. addition of chemical fertilizer.
   C. application of mulching material.
   D. application of wood ash.

46. A quadrat is used in ecological studies to sample
   A. land animals.
   B. land vegetation.
   C. floating organisms of marine habitat.
   D. floating organisms of freshwater habitat.

47. Ships sink more easily in freshwater than in sea water because
   A. sea water is denser.
   B. sea water does not flow.
   C. currents are absent in freshwater.
   D. there are a lot of organisms in sea water.

48. The most effective way of preventing disease among farm animals is
   A. immunizing.
   B. quarantining the animals.
   C. observing farm hygiene.
   D. breeding disease resistant varieties.

49. The structure in a mammal that acts as a shock absorber for the embryo is known as the
   A. chorion.
   B. placenta.
   C. amniotic fluid.
   D. umbilical cord.

50. A by-product obtained from the manufacture of soap is
   A. glycerol.
   B. nylon.
   C. polythene.
   D. vegetable oil.

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 raw materials used in the manufacture of indigenous soap. [5 marks]
   (ii) State three ways of improving upon the quality of indigenous soap.

   (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. [6 marks]
   (ii) List two types of tissues found in a green plant.
   (iii) State one function each of the tissues listed in (ii) above.

   (b)  
   (i) State the law of conservation of energy. [5 marks]
   (ii) In a simple machine, the energy input is 120 J. If the efficiency of the machine is 80%, calculate the energy output.

   (c)  
   (i) What is a chemical compound? [6 marks]
   (ii) State four differences between a covalent and an ionic compound.

   (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. [5 marks]
   (ii) State one difference between a musical note and noise.

   (b)  
   (i) Give the reason for the treatment of water for domestic use. [4 marks]
   (ii) State three methods of improving upon the quality of water for domestic use.

   (c)  
   (i) Explain the term artificial insemination as used in animal production? [5 marks]
   (ii) State three benefits of artificial insemination.

   (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. 

(b) Explain the following ecological terms:
(i) community;
(ii) population;
(iii) habitat. 

(c) (i) What is dispersion of light?
(ii) Name the
(a) natural phenomenon that involves dispersion of light,
(b) dispersing medium for the phenomenon named in (a) above. 

(d) Describe how a pure sample of sodium chloride could be obtained from a mixture of sodium chloride and sand. 

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. 

(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. 

(c) (i) Name three sources of electric power.
(ii) An electric stove is rated 1000 W, 240 V. Explain this statement. 

(d) (i) What is a crop pest?
(ii) State three harmful effects of crop pests in agriculture. 

6. (a) Consider the chemical reaction below:

\[
\text{CH}_3\text{COOH} + \text{CH}_3\text{OH} \xrightleftharpoons{\text{conc. H}_2\text{SO}_4, \text{Heat}} \text{CH}_3\text{COOCH}_3 + \text{H}_2\text{O}
\]

(i) Name the type of reaction illustrated.
(ii) What is the role of the concentrated \( \text{H}_2\text{SO}_4 \)?
(iii) What is the scent of the organic product formed?
(iv) Name the organic product formed. 

(b) (i) Name the causative organism of malaria.
(ii) State four ways of controlling the incidence of malaria in a community. 

Turn over
(c) (i) Define force.
(ii) Name the forces which are at play during the following activities:
   (a) an object is placed on a table;
   (b) 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