

THE WEST AFRICAN EXAMINATIONS COUNCIL
BASIC EDUCATION CERTIFICATE EXAMINATION FOR SCHOOL
AND PRIVATE CANDIDATES, 2023

FINAL MARKING SCHEME
INTEGRATED SCIENCE 2

Section A

[40 marks]

Rubrics: Answer all the questions in this section

Question 1

(a) (i) Identification of labelled parts

- | | | | |
|------|---|---------------------------|-----|
| I | - | womb (wall) / uterus | (1) |
| II | - | fallopian tube / oviduct | (1) |
| V | - | ovary | (1) |
| VI | - | vas deferens / sperm duct | (1) |
| VII | - | penis | (1) |
| VIII | - | testis | (1) |

6 x 1 = 6 marks

(Correct spelling to score)

(ii) Function of labelled parts

- | | | |
|-----|---|---|
| III | - | contracts / relaxes during child birth / protects foetus |
| IV | - | receives the penis / semen / sperm during sexual intercourse / for sexual intercourse |
| | - | passage of foetus |
| | - | passage of menstrual fluid |

any 1 x = 1 mark

- | | | | |
|-----|---|--|-----|
| VII | - | passage for sperm / semen / for sexual intercourse | (1) |
|-----|---|--|-----|

[3 marks]

(iii) Name of part where

- | | | | |
|-----|-----------------------|--------------------------|-----|
| (α) | fertilization occurs: | fallopian tube / oviduct | (1) |
| (β) | sperm is produced: | testis | (1) |
| (γ) | ovulation occurs: | ovary | (1) |

[3 marks]

(iv) Common infectious diseases

- syphilis
- herpes (simplex virus)
- chancroid
- chlamydia
- gonorrhea / gonorrhoea
- candidiasis / whites / thrush

Any 2 x 1 = 2 marks
(Correct spelling to score)

(b) (i) Common name of devices

- garden / farm tools / farm implements / *Farming tool* [1 mark]

(ii) Name of labelled parts

- A - mattock
- B - Peg
- C - Hand fork

3 x 1 = 3 marks

(iii) Uses of devices

- A - removes of stump roots / for stumping
- cutting off exposed plant roots

Any 1 x 1 = 1 mark

- B - for making spots on land (for correct spacing of plants)

Any 1 x 1 = 1 mark

- C - for removing weeds on garden beds
- to loosen hard soil surface / for stirring
- for mixing fertilizers around plants

Any 1 x 1 = 1 mark
[3 marks]

(iv) Effects of use of C

- improves aeration
- improves water entry / circulation in soil
- improves structure of soil

Any 2 x 1 = 2 marks

(v) Ways of prolonging usefulness of A

- clean tool after use
- use it for the right work / purpose
- repair broken handle
- keep in a cool dry place
- oil metallic part before storage
- sharpen cutting edges
- ensure metallic blade is tightly fitted to wooden handle
- keeping tools in termite free area

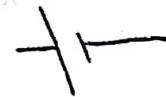
Any 2 x 1 = 2 marks

(c) (i) Symbols of electronic components

α



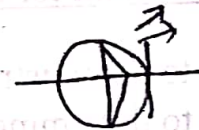
β



γ

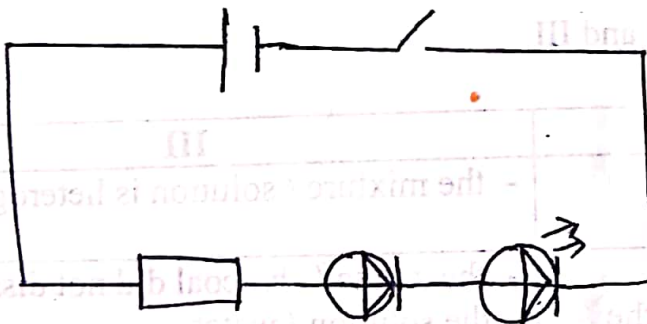


δ



4 x 1 = 4 marks

(ii) Circuit diagram showing forward biasing



Correct diagram CD - (1)

Correct arrangement of diode

CA - (1) and

LED (1) LED

[3 marks]

(iii) Effects of resistor on diode and LED

Resistor limits current in the circuit (1) and thereby protects diode and LED from burning off (1)

2 marks

(d) Observations made in activities I, II and III

- (i) I - the iodated salt dissolved (completely) in the water (forming a miscible solution / mixture)

Any 1 x 1 = 1 mark

- II - the oil is suspended on the surface of the water (forming an immiscible solution / mixture)

- the oil and the water will not mix together

- the oil and the water separates into individual layers

Any 1 x 1 = 1 mark

- III - the charcoal does not dissolve in the water. / It settles on the surface of the water forming mixture

[1 mark]

(ii) Suggested aim for the experiment

- to demonstrate the method of preparation of mixtures
- to determine whether a homogeneous mixture / solution or heterogeneous mixture / solution would be formed
- to prepare a mixture / solution
- to determine if the solute will dissolve / mix with the solvent / water to form a solution / mixture

any 1 x 1 = 1 mark

(iii) Differences between activity I and III

I	III
- the mixture / solution is Homogeneous	- the mixture / solution is heterogeneous
- the solute / iodated salt dissolved (completely) in the solvent / water	- the solute / charcoal did not dissolve in the solution / water

Any 1 x 1 = 1 mark

(differences must correspond to score)

(vi) Method of separation

Use of separating funnel

1 mark

QUESTION 1 TOTAL = [40 MARKS]

SECTION B

Answer four (4) questions only from this section

Question 2

(a) (i) Importance of a fuse in an electrical appliance

- to protect electrical equipment (1) from excessive current (1)
- it is used as safety measures (1) to prevent any hazards to humans (1)

Any 1 x 2 = 2 marks

(ii) Household appliances that have fuse

- electric iron/iron
- washing machine
- kettle
- dishwasher
- microwave
- wall socket
- lamps
- televisions
- computers
- fridges / freezers etc

Any 2 x 1 = 2 marks
[4 marks]

(b) (i) Teenage Pregnancy

A girl under 20 years (1) becoming pregnant (1)

Any 2 x 1 = 2 marks

(ii) Causes of teenage pregnancy

- Poverty
- Single parenthood
- Rape
- Peer pressure etc

Any 2 x 1 = 2 marks
[4 marks]

(c) Precautions against hazards

- wearing protective clothing / gadget
- routine maintenance of equipment / apparatus
- developing right skills for use of equipment
- mounting hazards signs of Don'ts in the laboratory / work place
- carry chemicals in approved containers
- always wash hands after using any unsafe material
- store materials appropriately etc

Any 3 x 1 = 3 marks

(d) (i) Practices that destroy waterbodies

- deforestation / clearing vegetation along the river banks
- bush burning
- farming near water bodies
- galamsey / surface mining activities
- dumping of solid / liquid waste into water bodies
- use of chemicals for fishing
- excessive use of chemical fertilizers etc

Any 2 x 1 = 2 marks

(ii) Methods of conserving water bodies

- use of organic materials for composting
- use of appropriate methods of fishing
- education on effects of galamsey activities
- education on defaecation into water bodies
- use of erosion-control methods in farming
- afforestation etc

Any 2 x 1 = 2 marks
[4 marks]

QUESTION 2 TOTAL = [15 MARKS]

Question 3

(a) (i) What aerobic respiration means

Is the breakdown / oxidation of organic food substance / glucose in the presence of oxygen (1) to release large amount of energy, water carbon dioxide as by-products (1)

[2 marks]

(ii) Main difference between aerobic and anaerobic respiration

- in aerobic respiration oxygen is used / in anaerobic respiration oxygen is not used (1)

(b) (i) Explanation of potential difference

- Is the work done in moving a unit of positive electric charge (1) from one point to another (1)

[2 marks]

(ii) Calculation of current through a resistor

$$V = IR \quad (1)$$

$$I = \frac{V}{R}$$

$$= \frac{250}{100} \quad (1)$$

$$= 2.5 \text{ A} \quad (1)$$

(3 marks)

(deduct ½ for wrong or no units)

[5 marks]

(c) (i) Crop infected by Swollen shoot disease

- Cocoa (1)

(ii) Causative organism

- virus / correctly named virus (1)

(iii) Method of spread of disease

- Virus transmitted by nymphs of mealy bugs from infected plant to healthy plants (1)

(iv) Ways of preventing the spread of disease

- destroy infected trees
- regular inspection of seedlings / planting materials
- use of quarantine / cordon sanitaire (leaving 10m wide cocoa free zone around area)
- barrier cropping
- using partly tolerant hybrids / using resistant varieties
- removing host free species

Any 2 x 1 = 2 marks

[5 marks]

(d) (i) Electron configuration of element Y

Y = 2 : 7 (1)

(ii) Possible ion formed by X

X⁺ (1) / L⁺

1 mark

[2 marks]

QUESTION 3 TOTAL = [15 MARKS]

Question 4

(a) Neutralization reaction

- Is the reaction between an acid and a base (1) to form salt and water only (1)

[2 marks]

(b) Physical properties of soils

- water holding capacity / water retention
- capillary action / capillarity
- drainage ability
- texture / feel
- porosity / air space
- nutrient content
- colour
- structure
- temperature etc

Any 3 x 1 = 3 marks

(c) (i) Definition of power

- is the rate at which work is done / energy is used
- energy used up / work done per unit time

(2 or 0)

(ii) Calculation of power of machine

Work done = potential energy = mgh

= 50 x 10 x 10 (1)

= 5000 J (1)

$$\begin{aligned}\text{Power} &= \frac{\text{Work done}}{\text{Time}} \\ &= \frac{5000}{30} \quad (1)\end{aligned}$$

(4 marks)

$$= 166.67 / 166.7 \text{ W} \quad (1)$$

(deduct ½ for no or wrong units)
[6 marks]

(d) Areas technology is used

- used in irrigation system / construction of dams / canals
- used in communication industries / use of computers / satellites / telephones
- electronic industry
- metallurgical industry / iron and steel industry
- food processing / preservation industry
- energy sector / generation of electricity / nuclear energy
- oil and gas industry
- medicine
- transportation industry / use of vehicles / trains / aeroplanes etc

Any 4 x 1 = 4 marks

Any correctly named area

QUESTION 4 TOTAL = [15 MARKS]

Question 5

(a) Ways mulching restores soil resources

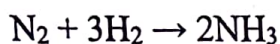
- adds organic matter to soil
- checks erosion
- conserves soil nutrients
- increases water-holding capacity of soil / reduces loss of water through evaporation
- improves activity of soil organisms

Any 3 x 1 = 3 marks

(b) (i) Elements that form ammonia gas

- Nitrogen and hydrogen (1)
(both must be correct to score)
(do not accept symbols)
(correct spelling to score)

(ii) balanced chemical equation



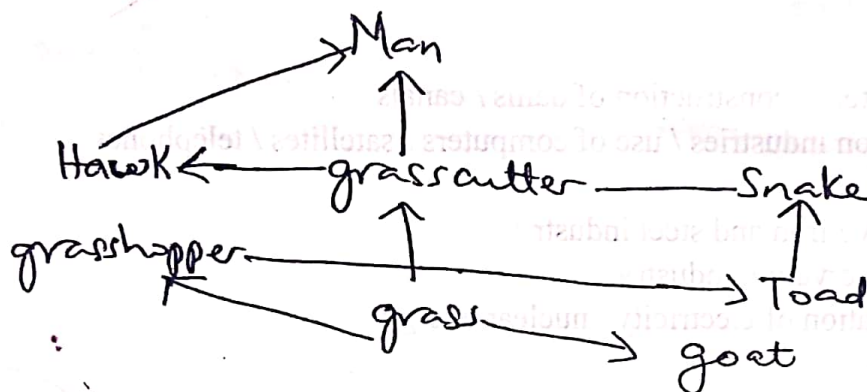
correct reactant and product (1)

balancing (1)

(2 marks)

[3 marks]

(c) Construction of a food web



From the question, each correctly constructed food chain $\times \frac{1}{2} = 4$

[4 marks]

(d) (i) Explanation of a galaxy

- is a group of stars.
- a system of stars, gases, dust / dark matter (1) held together in the heavens / space (1)
- is a collection of billions of stars (1) that show a common gravitational link (1)

any 1 x 2 = 2 marks

(ii) Relationship between stars and galaxies

- galaxies are held together by gravitational attraction much like a solar system while stars in the solar systems combine to form galaxies
- stars makes up the galaxies
- galaxies are made up of several billions of stars

any 1 x 1 = 1 mark

(iii) Explanation of Milky Way

- is the galaxy that contains the solar system (1) and the earth (1)
- a hazy band of light seen in the night sky formed from stars (1) that cannot be individually distinguished by the naked eye (1)

(2 marks)

[5 marks]

QUESTION 5 TOTAL = [15 MARKS]

Question 6

(a) (i) Effects of soil erosion on the growth of crop plants

- poor yield
- death of crop
- poor / stunted growth
- lodging of crop plants
- shows deficiency disease etc

any 3 x 1 = 3 marks

(ii) Method of controlling soil erosion

- mulching
- wind breaks
- crop rotation
- contour ploughing
- terracing
- cover cropping
- strip cropping
- application of organic manure
- minimum / zero tillage
- afforestation etc

any 1 x 1 = 1 mark

[4 marks]

(b) (i) Science related businesses

- blacksmithing
- gari processing
- soap making
- salt production
- kenkey production
- biogas production

- fish smoking etc

any 2 x 1 = 2 marks

(ii) Principles underlying operation of the business stated

- forging / shrinking / bonding / malleability
- fermentation
- saponification
- evaporation
- fermentation
- decomposition
- dehydration / drying etc

any 2 x 1 = 2 marks

(principle must correspond to business stated in (1) to score)

[4 marks]

(c) (i) How female anopheles mosquito transmits malaria

forget about arrangement

- it bites an infected person, takes in blood infected with the malaria parasite (1)
- the parasite grows and matures in the mosquito's gut, then travels to the salivary glands (1)
- when the mosquito bites another person, it releases the parasites into the victim's body (1)

3 marks

(ii) Chemical control of mosquito

- adding oil / kerosene on surface of stagnant water
- spraying with insecticide
- using treated mosquito nets
- use of mosquito coil

any 1 x 1 = 1 mark

[4 marks]

(d) (i) Fundamental units of measurement

- metre
- second
- kilogram
- degree celcius / kelvin etc
- candela

any 2 x 1 = 2 marks

correct spelling to score

(ii) Physical quantity measured by the fundamental units

- length
- time
- mass
- temperature

Current (named unit must correspond to physical quantity to score)
Luminous intensity etc. any 1 x 1 = 1 mark
[3 marks]

QUESTION 6 TOTAL = [15 MARKS]

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