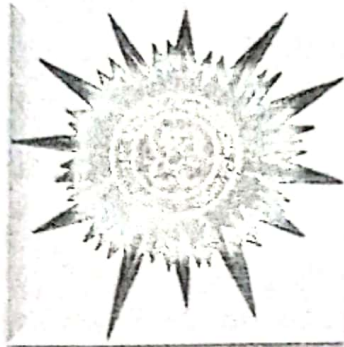# THE WEST AFRICAN EXAMINATIONS COUNCIL

BECE FOR SCHOOL AND PRIVATE CANDIDATES, 2022

INTEGRATED SCIENCE 2

FINAL MARKING SCHEME

THE WEST AFRICAN EXAMINATIONS COUNCIL
BASIC EDUCATION CERTIFICATE EXAMINATION FOR SCHOOL CANDIDATES, 2022

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	-	beaker	**(1)**
II	-	residue/ particles / cotton wool / mixture / filter paper	**(1)**
III	-	filtrate	**(1)**

[3 marks]

Correct Spelling sise

(ii)   Method of Separation

(α)	A	-	filtration	**(1)**
(β)	B	-	magnetization	**(1)**

[2 marks]
Correct spelling to score

(iii)   Class of mixtures in set-up A

- Solid – liquid mixture
- Liquid – solid mixture

Any 1 x 1 = 1 mark

(iv)   Reasons for stated class of mixture

Because there is a residue (1) on the filter paper and a filtrate (1) in the beaker

2 x 1 = [2 marks]

(v)   Component of the mixture in set-up B

-    iron filings / any magnetic substance
-    powdered sulphur
-    sand
-    powered charcoal   *powdered*
-    powered chalk   *powdered*
-    any solid substance

Any 1 x 1 = 1 mark

(vi)   Function of part labelled IV

Is to hold the funnel in place / holds the clamp

[1 mark]

(b)   (i)   Name of system illustrated

Respiratory alone
Respiratory system   *1 mrk*   [1 mark]

(ii)   Name of labelled parts

I   -   Larynx / *voice box*
II   -   Trachea / windpipe
III   -   Bronchus
IV   -   lung   *Left lung — I*

Right lungs — O
lungs = O

1 x 4 = 4 marks
Correct spelling to score

(iii)   Role of part labelled I

-    allows air to pass through it
-    prevent food and drink from blocking the airways
-    produces sound / phonation

Any 1 x 1 = 1 mark

(iv)   Diseases that affect the system

-    Pneumonia
-    Tuberculosis / T.B.
-    Bronchitis
-    Whooping cough
-    Lung cancer
-    Influenza
-    Asthma

Infection
Common cold / upper respiration   Any 3 x 1 = 3 marks
Correct spelling to score
pulmonary disease / pulmonary fibrosis
Bronchi ectasis
Covid—19
Laryngitis

Correct spelling to score.

(c) (i) <u>Identification of apparatus</u>

Rain gauge   [1 mark]
                              Correct spelling to score

(ii) <u>Name of parts labelled</u>

I   -   funnel
II   -   measuring cylinder
III   -   rain water / water

                              3 x 1 = 3 marks
                         Correct spelling to score

(iii) <u>Use of parts I and II</u>

I   -   directs rain water into measuring cylinder
                                            1 mark
II   -   use to measure the amount / volume of rain water / collect
            rain water
                                            1 mark
                                            [2 marks]

(iv) <u>Ecological factor measured</u>

Rainfall / amount of rainfall / rain
                                            [1 mark]

(v) <u>Importance of ecological factor</u>

-   an agent of weathering of rocks in the soil
-   dissolves plant nutrients for easy absorption
-   aids in easy tillage of soil
-   promotes activities of soil organisms
-   needed for seed germination
-   protects plant roots from injury
-   causes leaching
-   causes erosion
    etc.
-   make soil fertile
-   Determine the type of crops to grow   **Any 3 x 1 = 3 marks**
-   Used for photosynthesis

3

(vi)   Farm tool that aids ecological factor

        Handfork / any tool that can be used to dig soil hoe etc / ~~~ / ~~~
                                                                    1 mark

(vii)   Use of farm tool

        -       Is used to loosen hard soil surface (1) after heavy rainfall (1)
                                                                    [2 marks]

(d)   (i)   Name of components

                I   -   cell
                II   -   switch / key
                III -   lamp / bulb

                                                [3 marks]
                                        Correct spelling to score

       (ii)   type of arrangement of resistors in B

                                                [1 mark]
                -       parallel

       (iii) Effect of arrangement of resistors on III

                A   -   makes III / bulb dim   (1)
                B   -   makes III / bulb bright   (1)
                                                [2 marks]

       (iv)   Reasons / Explanation

                A   -   the resistors in series have an increased resistance (1)

                B   -   resistors in parallel have decrease resistance (1) hence keeps the
                         bulb bright
                                                [2 marks]

                QUESTION 1 TOTAL = [40 MARKS]

                                    4

Answer four (4) questions only from this section

Question 2

(a)   Differences between metals and non-metals

Metals	Non-metals
- Conduct heat / good conductor of heat	- does not conduct heat / non-conductor of heat / poor conductor
- Conducts electricity	- does not conduct electricity / poor conductor
- Malleable	- non-malleable
- Ductile	- brittle
- high density	- low density
- high melting point	- low melting point
- generally hard	- generally soft
- lustrous	- dull

Nm~ductile .   0

Nm~ lustrous - 0

Any 3 x 1 = 3 marks
(differences must correspond to score)

(b)   (i)   Explanation of active region

When base-emitter junction is forward biased **(1)** and base – collector junction is reserve biased **(1)**
reverse

(ii)   What happens in active region

Transistor behaves as an amplifier   **(1)**

[3 marks]

5

(c)   (i)   <u>Effect of lack of protein</u>

- weakness and fatigue
- stunted growth
- affects the formation of enzymes / hormones
- leads to kwashiorkor
- marasmus
- anaemia
- metabolism slows down
- swelling in the legs / feet
- hair and nail problem
- slow healing of wounds
- greater risk of bone fracture
- makes it harder to keep one's balance
- Loss of weight

                                            Any 2 x 1 = 2 marks

(ii)   <u>Chemical test for glucose</u>

Fehling's / Benedict's solution is added to the test sample / substance (1) and heated (1) a brick red / reddish brown colouration (1) indicates the presence of glucose

                                            (3 marks)

                                            [5 marks]

(d)   (i)   <u>Explanation of soil resources</u>

These are materials / components in the soil (1) that support plant growth (1)

                                            [2 marks]

(ii)   <u>Activities that make soil lose its nutrients</u>

- excessive drainage / run off
- continuous cropping / over cropping
- burning of organic matter / crop of residue / bush burning
- irrigation leading to leaching
- crop removal
- over grazing
- poor tillage practices
- etc   Excessive use of chemical fertilizer   Any 2 x 1 = 2 marks

                                            [4 marks]

QUESTION 2 TOTAL = [15 MARKS]

Question 3

(a) Correct order for the passage of food

gullet   Duodenum   Colon

Mouth → oesophagus → stomach → small intestine → large intestine → anus

ileum

$\frac{1}{2}$ x 4 = [2 marks]

(Correct order to score)

(b) Components of a balanced ration

- carbohydrates
- protein
- fats and oil
- minerals
- vitamins
- water

Any 4 x 1 = [4 marks]

(c) Products formed

(i) Magnesium chloride and hydrogen / $MgCl_2$ and H_2

(ii) Potassium hydroxide and hydrogen / KOH and H_2

2 x 2 = 4 marks

CSTS

(d) (i) Effect of heat on a substance

- change of state / melts / vapourises
- expansion / contraction / shape   change in
- increasing temperature / decreasing temperature

Any 2 x 1 = 2 marks

(ii) (α) Observation made when potassium permanganate crystals are dropped into warm water

warm coloured water moves from the bottom of the beaker **(1)** upwards **(1)**

(2 marks)

(β) Phenomenon demonstrated

Heat transfer by convection **(1)** / diffusion (1)

[5 marks]

QUESTION 3 TOTAL = [15 MARKS]

Question 4

(a) (i) <u>Stages in the life-cycle of a mosquito</u>

- egg
- larva
- pupa
- adult   *Imgo*   O

(handwritten: Ignore the order)

4 x 1 = 4 marks
Correct spelling to score

(ii) <u>Stages at which feeding does not take place</u>

- pupa

1 mark
[5 marks]

CSTS

(b) <u>Explanation of air as a mixture</u>

- air contains different elements **(1)** which are physically combined **(1)**

OR **(1)**

- consist of different substances which can be separated by physical means / methods **(1)**

Any 2 x 1 = 2 marks

(c) (i) <u>Pole of a magnet</u>

They are point / area on a magnet **(1)** where the magnetic force is greatest **(1)** / where all lines of force appear to come out from or appear to enter. **(1)**

(2 marks)

(ii) <u>Uses of temporary magnets</u>

- electric bell
- loudspeaker
- telephone earpiece
- generators / electric motors / dynamo

Any 2 x 1 = 2 marks
[4 marks]

(d)   Reasons for planting crops in rows

- it improves drainage
- it keeps plant roots evenly spaced
- machines can be used on the farm
- easy to replace ungerminated seeds
- facilitate easy movement on the farm
- enable larger plant population per unit of plot
- easy to know plant population on farm
- easier to carry out other activities on the farm / any other cultural practice
- allow free movement of air
- better access to sunlight
- for more yield
- for easy control of pest
- for easy control of diseases

Any 4 x 1 = 4 marks

QUESTION 4 TOTAL = [15 MARKS]

Question 5

(a)   (i)   Elements that make teeth strong

- calcium   (1)
- phosphorus (1)
- fluorine   (1)

Any 2 x 1 = (2 marks)

CSTS

(ii)   Common diseases of the human teeth

- Dental caries / cavity / tooth decay   (1)
- Gum disease / gingivitis / periodontal disease (1)
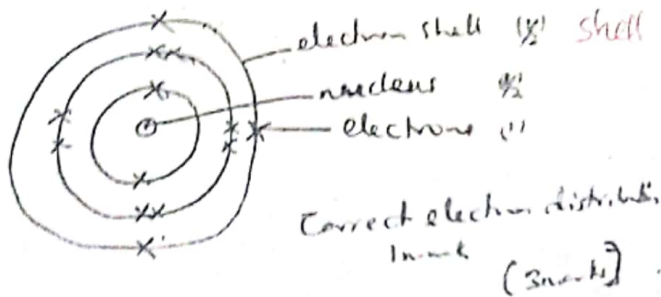- Plague
- Cancer

(2 marks)
[4 marks]

CSTS

(b)   Reasons why sandy soil cannot support plant growth

- easily eroded
- heats up very easily / can easily dry out
- poor in nutrient content / less fertile
- susceptible to leaching
- cannot hold enough water / easy for water to filter out

Any 3 x 1 = 3 marks

(c) (i) Explanation why steel is preferred to iron

(c) (i) labelled structure of an atom

electron shell (½) shell ✓ ½
nucleus ½
electrons (1)

Correct electron distribution
In mark (3 marks) 2,8,3

C3TS

ES – ½
N – ½
E – 1
CED - 1
[3 marks]

(ii) Valency of the atom

3 (three)   1 mark
                             [4 marks]

(d) (i) Application of fluid pressure

- water pumps
- car brakes
- syringes
- siphon
- drinking straw
- enema
- pumping tyre

Any 3 x 1 = 3 marks

(ii) Substances that are insulators

- dry wood
- air
- glass
- plastic
- rubber
- cloth
  etc

Any 1 x 1 = 1 mark

QUESTION 5 TOTAL = [15 MARKS]

10

Question 6

(a)   Explanation of mixed cropping

different

Is a system of farming where two or more crops are grown on the same piece of land **(1)** at the same time / simultaneously **(1)**

[2 marks]

(b)   (i)   Explanation of an alloy

A solid solution / uniform mixture / substance **(1)** of two or more metals / a non-metal and a metal **(1)**

(2 marks)

(ii)   Constituent elements in brass

Copper and Zinc

(1 mark)
(both must be correct to score)
[3 marks]
Correct spelling to score

(c)   (i)   Effects of dumping waste materials into water bodies

- decompose to give the water bad odour
- makes the water dirty / cloudy / pollutes water / unsafe for drinking
- reduces oxygen level in the water
- introduces germs / diseases into the water
- flooding
  etc

Any 3 x 1 = 3 marks

(ii)   Functions of the listed factors

(α)   chlorophyll   -   for absorption of sunlight / converts CO_2 and H_2O into glucose **(1)**

(β)   water   -   used to produce glucose / produces oxygen   **(1)**

(2 marks)

[5 marks]

(d). (i) Explanation of work

Work is the product of force and the distance moved **(1)** in the direction
of the force **(1)**
When a force moves a body through a distance **(1)** in the direction of force **(1)**

(2 marks)

(ii) Calculation of work done

Work done = Force x Distance   **(1)**   No formule but substitute ✓ 2
        = 20 x 3.2   **(1)**
        = 64 joules /J   **(1)**

(3 marks)
(-½ for wrong units or no units)
[5 marks]

QUESTION 6 TOTAL = [15 MARKS]

12