EDUCATION-NEWS CONSULT
JUNE 2023 BECE HOME MOCK
SUPER MOCK 2
INTEGRATED SCIENCE 1 & 2

MARKING SCHEME

INTEGRATED SCIENCE

QUESTION 1

a. i. A - Capillary
B - Vein
C - Artery 1 mark each x 3 = 3 marks

ii. I - Lumen
II - Muscle and elastic tissue
III - Endothelium
IV - Outer coat 0.5 mark each x 4 = 2 marks

iii.

Structure B (Vein)	Structure C (Artery)
Veins have wider lumen	Arteries have smaller lumen
Veins have valves	Arteries have no valves
Veins have thick and inelastic walls	Arteries have thicker and elastic walls

0.5 marks each x 2 = 2 marks

iv. * Structure B carries deoxygenated blood 1 mark
* Structure C carries oxygenated blood 1 mark

v. Structure A (Capillary) 1 marks

b. **i. Observations made immediately the clip is removed**

1. Immediately the clip is removed, the level of water in glass container A decreases or falls while the level of the red liquid in glass container B increases or rises. 1 mark

2. Molecules of the red liquid diffuses into the water and vise versa. 1 mark

ii. Explanation of observations made in (i)

1. Pressure in the water in glass container A is higher than that of pressure in red liquid in glass container B. Because of this, water moves into the red liquid. 2 marks

2. Molecules of red liquid is at higher concentration while that of water molecules is at a lower concentration. Because of the difference in concentration, molecules of red liquid diffuses into the water. 2 marks

iii. <u>Two observations made after a long time</u>

1. The level of the water and that of red liquid will be the same. This is because the two liquids, water and the red liquid will exert the same pressure. 2 marks

2. The colour of the two liquids will be the same. This is because the two liquids will have the same concentration. 2 marks

c. <u>i. Name of parts of the diagrams</u>

I - First foliage leaf
II - Radicle
III - Cotyledon
IV - Hypocotyl
V - Cotyledon
VI - Epicotyl 0.5 mark each x 6 = 3 marks

ii. Germination of seed E is Hypogeal germination . This is because the Cotyledon remained in the group after germination. 2 marks

iii. <u>Seeds that undergo germination D</u>

* Mango seeds
* Bean seeds
* Cocoa seeds 1 mark each x 2 = 2 marks

iv. The plumule develops to form part IV. 2 marks
v. The seedlings will dry out and die. 1 mark

d. i. Substance **X** is bile 2.5 marks

ii. Emulsification of fat. 2.5 marks

iii. The process breaks down large fat molecules into smaller units thereby increasing the surface for the action such as the action of the enzyme lipase.
3 marks

iv. Liver. 2 marks

QUESTION 2

a. i. Hypotension refers to abnormally low blood pressure which occurs when the force exerted by the blood against the walls of the arteries is lower than the normal range whiles Hypertension, commonly known as high blood pressure, is a medical condition in which the force of blood against the walls of the arteries is consistently too high. **3 marks**

ii. Three differences between arteries and veins

Arteries	Veins
* Transports blood away from the heart	* Transports blood towards the heart
* Carries oxygenated blood	* Carries deoxygenated blood
* Transports blood under high pressure	* Transports blood under low pressure
* They have thick walls	* They have thin walls
* They do not have valves	* They have valves

0.5 each x any 6 = 3 marks

b. Functions of parts of a tilapia

i. Lateral line - It the fish to detect vibrations caused by changes in pressure in the water. **1 mark**

ii. Caudal fin - It helps the fish in forward movement. **1 mark**

c. i. Law of refraction of light

The law of refraction of light states that, the incident and refracted rays are on the the opposite sides of the normal at a point of incidence all lie in the same plane.

2 marks

ii. Process of fertilization in plants

A matured pollen grains lands on a matured stigma. The stigma produces a sticky sugary liquid. The pollen grains absorb the liquid, germinates and sends out a tube called pollen tube. The nucleus in the pollen tube divides into two male nuclei. The pollen tube grows into the stigma, through the style to the ovary. The pollen tube enters an ovule through the micropyle. One of the male nuclei fuses with the ovum in the ovule.

2 marks

d. i. Soil texture refers to the composition and relative proportions of different mineral particles present in a soil sample. **1.5 marks**

ii. Soil structure refers to the way individual soil particles are arranged and aggregated in a soil mass. **1.5 marks**

QUESTION 3

a. Functions of cells in plants

i. Xylem cells - They transport water and dissolved mineral salts from the soil to the leaf of plants. **1.5 marks**

ii. Phloem cells - They carry food that is made in the leaf to other parts of the plant.

1.5 marks

b. i. What is a magnetic field ?

A magnetic field is a region in space around a magnet where a magnetic force can be observed. **2 marks**

ii. Properties of magnetic field lines

* They move in a circuit from the north pole to the south back to the north pole
* They do not intersect or cross each other
* They can pass through non-magnetic substances placed in their path
* They are close together at the poles

1 mark x any 3 = 3 marks

c. Calculation of efficiency of machine

Solution

Work input = 200 J

Work output = Work input – Friction

= 200 J – 40 J

= **160 J**

$$\text{Efficiency} = \frac{\text{Work output}}{\text{work input}} \times 100\ \%$$

$$= \frac{160\ \text{J} \times 100\%}{200\text{J}} = \frac{16000\ \%}{200} = \mathbf{80\ \%}$$

4 marks

d. Three ways high temperature affects agriculture

* High temperature increases the rate of evaporation of water causing the soil to dry out more rapidly.
* High temperature leads to reduction in crop yields
* High temperature leads to crop failure
* High temperature leads to changes in crop phenology.

1 mark each x any 3 = 3 marks

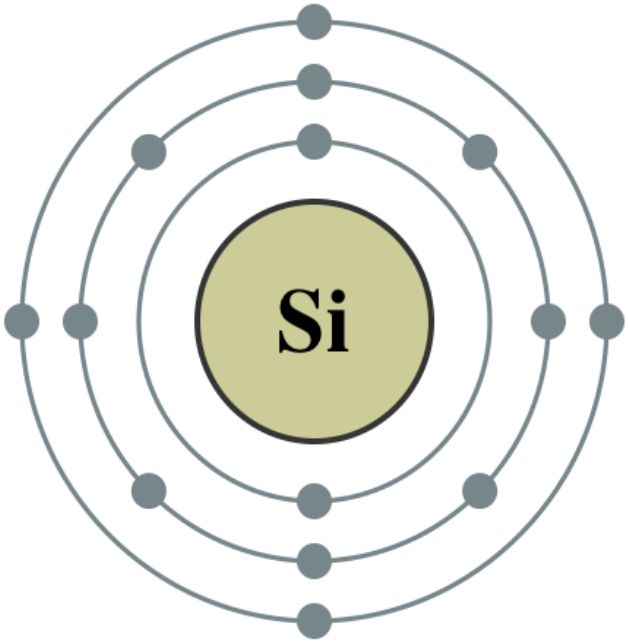
QUESTION 4

a. <u>Steps involved in testing for starch</u>

i. Leaf is put in boiling water for sometime.
ii. Boiled leaf is dipped into alcohol warmed in a hot water bath
iii. Leaf is washed in cold water
iv. Leaf is dipped into iodine solution and the leaf turns blue black.

<u>1 mark for each step = 4 marks</u>

b. <u>i. Diagram of to show the distribution of electrons in the atom</u>



<u>2 marks</u>

ii. The name of the element is Silicon. **<u>1 mark</u>**

c. **<u>How air gets to the lungs.</u>**

Air gets to the lungs first through the nostril, then passes through the nasal cavity, then to the larynx, moves into the trachea, from there to the bronchus and then to the bronchioles before it finally reaches the alveoli of the lungs.

<u>3 marks</u>

d. <u>i. What is Earthing up</u>

Earthing up is the process of heaping topsoil around the base of stem of a plant to cover any exposed roots and tubers. **<u>2 marks</u>**

ii. Importance of Earthing up

* It provides additional support to the crop especially during strong wind.
* Its supplies direct nutrients for crop use
* It prevents crop pest like rodents (rat and grass cutter) from attacking the tubers.
* It helps to increase increase crop yield especially root tubers like cassava.

1 mark each x any 3 = 3 marks

QUESTION 5

a. i. What is Chlorophyll

Chlorophyll is the green colouring matter in a leaf which is used by the plant to trap energy from sunlight. 2 marks

ii. Balanced equation for how plants manufacture their food

3 marks

b. i. State the Ohm's Law.

Ohm's Law states that the current flowing through a conductor between two points is directly proportional to the voltage across the two points, while inversely proportional to the resistance of the conductor.

OR

Mathematically, Ohm's Law can be expressed as:

V = I * R

Where:

V is the voltage across the conductor in volts (V),

I is the current flowing through the conductor in amperes (A),

R is the resistance of the conductor in ohms (Ω). 2 marks

ii. Calculation of potential difference across a resistor

Data

Current (I) = 12 A

Resistance (R) = 15 Ω

V = I x R

= 12 x 15

= 180 V 2 marks

c. i. Two types of plant parasites.

* Mistletoe 1 mark

* Dodder 1 mark

ii. Examples of physical methods of controlling pests and parasites.

* Fencing of farms using wire-netting to prevent pests from entering farms and attacking crops
* Traps can be set in farms to catch rodents
* Scare-crows can be set up in farms to frighten birds and other rodents
*Ectoparasites like tick can be controlled by hand picking and burning them.

1 mark each x any 2 = 2 marks

d. What is hererodont dentition

A hererodont dentition is a dentition in which teeth are of different sizes and shapes and perform function. 2 marks

QUESTION 6

a. i. Three differences between Technology and Science

Technology	Science
* The products of technology can be seen and felt	* The products of science cannot be seen or felt
* Technology can be used without understanding	* Science can be understood
* Technology can be bought and used	* Science can only be demonstrated
* Changes in technology occur within a short time	* Changes in scientific knowledge occur gradually

0.5 mark each x any 6 = 3 marks

ii. Examples of warning safety signs on chemical containers in the laboratory

* Corrosive
* Highly flammable
* Explosive
* Harmful / Irritant
* Oxidizing 1 mark each x 2 = 2 marks

b. i. Importance of fruits and seeds dispersal

* Dispersal prevents overcrowding
* Dispersal reduces competition for water, light and nutrients
* Dispersal enables plants to grow in new places
* Dispersal minimizes epidemic diseases among crowded seedlings

1 mark each x any 3 = 3 marks

ii. <u>Explain one way fruits and seeds are dispersed by animals</u>

1. **<u>Ingestion:</u>** Many animals eat fruits for their nutritional value, and as they consume the fruit, they also swallow the seeds within. The seeds pass through the animal's digestive system and are later excreted in a different location. This process helps the seeds travel away from the parent plant. Examples of animals that disperse seeds through ingestion include birds, mammals, and reptiles.

2. **<u>External attachment:</u>** Some fruits have adaptations that allow them to attach to an animal's fur, feathers, or skin. These fruits often have hooks, barbs, or sticky substances that cling to the animal's body as it moves around. As the animal moves, it unintentionally carries the fruit or seed with it. This method is common in plants like burdock or stickseed, which rely on animals to transport their seeds.

3. **<u>Adhesion</u>**: Certain fruits are sticky or have adhesive properties. When an animal comes into contact with these fruits, they adhere to its body. As the animal moves around, the fruits or seeds get detached and are transported to a different location. This method is seen in plants such as mistletoe or jewelweed.

2 marks x any 1 = 2 marks

c. <u>i. What is plant propagation</u>

Plant propagation is the process of increasing the number of plants of a particular species.
2 marks

ii. <u>Advantages of propagation by seeds</u>

* Seeds are easily transported and planted at different places
* Seeds can be stored for longer period of time before they are planted
* It tends to be cheaper to propagate from seed.
* The majority of seeds are readily available

1 mark each x any 3 = 3 marks

OBJECTIVES

1.A	2.B	2.C	4.B	5.C	6.A	7.D	8.D	9.B	10.A
11.A	12.C	13.D	14.D	15.A	16.A	17.D	18.A	19.C	20.D
21.C	22.D	23.D	24.D	25.D	26.B	27.C	28.A	29.C	30.B
31.A	32.B	33.B	34.D	35.D	36.D	37.D	38.B	39.C	40.A