2014 BECE – INTEGRATED SCIENCE [PAPER 2] SOLUTIONS

ESSAY

SOLUTIONS

1. (a)

(i) Name of each stage

I. Egg
II. Larva
III. Pupa
IV. Adult / Imago

(ii) How stage **II** obtains oxygen

The larva comes to the surface of the water body to obtain oxygen from the air through a structure called the siphon.

(iii) Methods of controlling **each** of the stages labeled **III** and **IV**

Controlling stage III

- Adding oil to cover the water surface
- Introduction of fish into the water body
- Spraying the water body with pesticides
- Adding kerosene to cover the water surface

Controlling stage IV

- The use of lethal ovitraps
- The use of mosquito spray / insecticide
- The use of mosquito coil
- Clearing mosquito breeding grounds such as choked gutters, stagnant pools of water, etc

(b)

(i) Name of the part labeled

I. Beaker
II. Evaporating disc
III. Candle
IV. Inverted funnel
V. Tripod stand

(ii) Name the separation method represented by **each** diagram.

A- Filtration
B- Evaporation
C- sublimation

(iii) The set-up used to obtain clear water from muddy water

Set up A

(iv) The set-up used to obtain salt from salt solution?
Set-up B

(c)

(i) Identification of the instruments labeled **I, II, III, IV** and **V**

I. Tape measure
II. stop clock
III. Thermometer
IV. Weighing scale/ Top pan balance
V. Measuring cylinder

(ii) State **one** use of **each** of the instruments labeled **I, II, III** and **IV**

I. to measure length of materials
II. to measure time
III. to measure temperature
IV. to measure the mass of materials
V. to measure the volumes of liquid substances

(iii) Read and record the volume of the liquid in the instrument labeled **V**
Volume of liquid = 160 cm^3

(d)

(i) Name **each** of the parts labeled **I, II, III** and **IV**

I. - Gullet
II. - Gizzard
III. - Liver
IV. - Crop

(ii) State **one** function **each** of the parts labeled **II** and **IV**

I. - used to grind food
II. - used to store food temporarily

(iii) Name **two** farm animals that possess this type of digestive system.

Turkey, fowl, duck, ostrich, geese, guinea fowl.

(iv) Mention **two** diseases which affect this class of farm animals.
Coccidiosis, fowl typhoid, fowl pox, newcastle disease, pneumonia.

PART II
[60 marks]

2. (a) (i) Name the **two** elements that combine to form water.

Hydrogen and oxygen

(ii) Write a balanced chemical equation to show how the water is formed from the named elements

$H_2 + ½ O_2 \longrightarrow H_2O$ **OR**
$2H_2 + O_2 \longrightarrow 2H_2O$

(b) State **two** ways of maintaining a balance in an ecosystem.

- Stopping indiscriminate felling of tress
- By enforcing environmental protection laws; United Nation resolutions on release of poisonous gases should be adhered to.
- Activities of mining industries should be strictly monitored.
- Poaching of animals for their parts should be stopped

(c) (i) What is a *fertile soil*?

Soil that has the ability to supply the required nutrients needed for plant growth

(ii) State **two** factors that cause loss of soil fertility.

- Soil erosion,
- leaching,
- excessive irrigation,
- over cropping,
- surface compacting.

(d) Classify the following items as *magnetic* or *non-magnetic* substance:
wood, steel blade, rubber and glass jar.

Magnetic substance - steel blade
Non-magnetic substance - wood, rubber and glass jar.

3. (a) (i) What is *germination of seed*?
The process by which a viable seed grows/develops into a seedling.

(ii) State **two** conditions necessary for the germination of seed.

- Presence of air

- Presence of water
- Viable seed
- Optimum temperature

(b) State **four** methods used in identifying farm animals
Tagging, tattooing, branding, tonging, ear notching

(c) Explain why it is easier to cut a piece of yam with a sharp knife than with a blunt knife
The cutting edge of a sharp knife has very small surface area so requires smaller force to yield the pressure needed to cut the yam - making cutting easy, but the cutting edge of a blunt knife has a relatively larger surface area so it needs a larger force to yield the pressure needed to cut the yam.

(d) State **three** differences between a *metal* and a *non-metal*.

Metals	**Non-metals**
Have high melting point	Have low melting point
Are lustrous	Are not lustrous
Are malleable	Are not malleable
Have high density	Have low density
Are ductile	Are brittle
Are good conductors of heat and electric current	Are poor conductors of heat and electric current

4. (a) (i) What is *debeaking*?
The process by which about half the beak of a bird is removed
or
The process of removing the upper part of the beak of a bird

(ii) Give **two** reasons why debeaking in poultry birds is important.
- To prevent wasting of food
- To prevent egg eating
- To prevent vent pecking
- To prevent injuring other birds

(b) (i) A steel needle carefully placed on the surface of water floats. What type of force made the steel needle to float?
Surface tension

(ii) Name **three** substances that could be added to the water to make the steel needle to sink.
Oil, detergent, grease, kerosene, soap

(c) (i) Explain why gold is preferred to iron in the making of jewelleries.

It does not react with substances like water and oxygen.
It does not rust
It is very malleable

(ii) State **one** way of preventing rusting.

- Applying oil to the surface of the metal
- Galvanizing the metal
- Keeping the metal inside a desiccator
- Alloying the metal

(d) (i) State **two** elements of climate

Temperature,
rainfall,
relative humidity,
light intensity,
wind speed,
wind direction,
atmospheric pressure

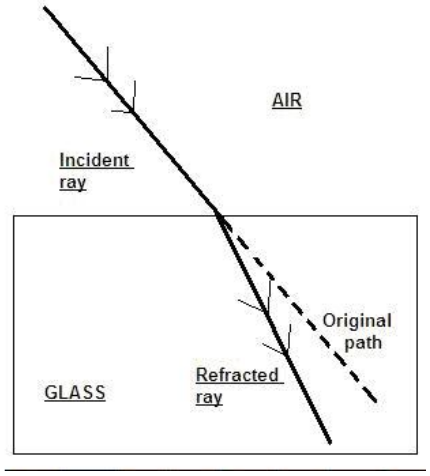
(ii) Name the equipment used to measure **each** of the elements stated in (i) above.

ELEMENT	EQUIPMENT
Temperature	Thermometer
rainfall,	rain gauge
relative humidity,	hygrometer
light intensity,	photometer
wind speed,	wind vane
wind direction,	anemometer
atmospheric pressure	barometer

5. (a) (i) What is *refraction of light*?

The bending of light rays as it travels from an optically less dense medium to an optically more dense medium

(ii) Sketch a diagram to show the path of a light ray when it travels from air to glass.



(b) Explain why it is difficult to separate iron and sulphur mixture after strong heating.
This is because after strong heating, the iron and sulphur react to form iron (II) sulphide which cannot be separated by physical means

(c) (i) Give **two** example of digestive enzymes produced in humans.
Salivary amylase,
pepsin,
renin,
lipase,
trypsin,
pancreatic amylase,
maltase

(ii) For **each** of the enzymes given in (i), name the part of the human body where the enzyme is produced.

ENZYME	PART WHERE ENZYME IS PRODUCED
Salivary amylase	Mouth
pepsin,	stomach
rennin	stomach
lipase	pancreas
trypsin	pancreas
pancreatic amylase	pancreas
maltase	small intestine

(d) List **four** methods of applying fertilizers to crops.
Drilling, broadcasting, side dressing , top dressing, ringing,

6. (a) Consider the substance listed below:
carbon dioxide, gold, bronze, iron, oxygen and ink

From the list, select the substance that:
(i) supports burning - oxygen

(ii) is used as jewellery; - gold
(iii) is used for making statues - bronze

(b) (i) Name **two** diseases associated with the circulatory system of humans.
Arteriosclerosis, coronary thrombosis, heart cancer, leukimea, high blood pressure, piles, varicose vein

(ii) State **one** way of preventing **each** of the diseases named in (i)
Arteriosclerosis-
- regular exercising of the body
- avoid smoking
- low fat intake

Piles-
- intake a lot of water
- eat a lot of vegetables and fruits

High blood pressure-
- regular exercising of the body
- low salt intake
- low fat intake

Varicose vein- surgical removal of vein

(c) Give two examples of **each** of:
(i) **major** plant nutrients;
Nitrogen, phosphorus, sulphur, potassium, calcium, magnesium.

(ii) **minor** plant nutrients.
Chlorine, iron, fluoride, manganese, molybdenum

(d) (i) State **two** properties of a good thermometric liquid.
- Remains a liquid within a wide temperature range
- It must not wet class
- Expands uniformly with a rise in temperature
- It must not vaporize easily

(ii) Give **two** examples of a good thermometric liquid.
Mercury and alcohol

END OF ESSAY TEST