2016 BECE INTEGRATED SCIENCE 2 SOLUTIONS

INTEGRATED SCIENCE 2

(a) (i) The aim of the experiment [2 marks] To determine the drainage ability / water-holding capacity of the soils

(ii) Soil with the highest rate of drainage [1 mark] Soil K

(iii) Soil with the highest water retention capacity [1 mark] Soil M

(iv) The soil most likely to lose water and dry faster after rainfall [1 mark] Soil K

(v) The soil most likely to be waterlogged after rainfall [1 mark] Soil M

(vi) Which of the soil types would be suitable for maize cultivation? [1 mark] Soil L

(b) (i) What each of the symbols labelled I, II, III and IV represent
I – Danger
II – Corrosive
III – Highly inflammable / highly flammable
IV – No naked flame

(ii) One substance each that is associated with:
(α) I; DDT, Hydrogen cyanide, Salicylic acid
(β) II; Concentrated Inorganic acids, such as HCl, H_2SO_4, HNO_3,
Concentrated inorganic bases, such as NaOH, KOH, $Ca(OH)_2$
Household bleach
(γ) III. Petrol, Kerosene, LPG, Perfume, Insecticides, Alcohol [3 marks]

(iii) A place where the hazard symbol labelled IV is often displayed [1 mark] Gas Filling stations, Storage places of combustible substances

(iv) Symbol(s) found on chemical containers [3 marks] I, II and III

(c) (i) General name for the devices. [1 mark] Simple machines

(ii) Identification of each of the devices labelled A, B, C and D. [4 marks] A – Wheel barrow
B – Inclined plane
C – Pulley
D – Gear

(iii) The parts labelled I, II and III of device A when it is considered as a lever.
[3 marks] I – Effort
II – Load
III – Pivot

(iv) What the arrow represents in the device labelled B [1 mark] Direction of effort / effort distance

(v) The type of work done with each of the devices labelled:

(α) C; Lifting objects

(β) D; moving a vehicle or parts of an engine efficiently
[2 marks]

(d) (i) Names of the parts labelled I, II, III, IV and V [5 marks] I – Stomach
II – Small intestines
III – Large intestines
IV – Rectum
V – Oesophagus / gullet

(ii) The part(s) of the digestive system where
(α) digestion of food substances occur
I and II
(β) digested food is absorbed into the bloodstream [3 marks] II

(iii) The end-products of the digestion that is absorbed into the bloodstream
[3 marks] Amino acids, glucose, fatty acids and glycerol

2. (a) Four weather measuring instruments. [4 marks] Barometer, rain gauge, anemometer, wind vane, hygrometer, sun dial / lightmeter

(b) The stages in the life cycle of a mosquito. [4 marks] Egg stage, larva stage, pupa stage and adult stage

(c) (i) Two properties of water
• Colourless
• Odourless
• Tasteless
• Boils at 100°C
• Freezes at 0°C

(ii) Why it is advisable to wash clothes with soft water [4 marks] It lathers better with soap, since it does not contain dissolved salts such as calcium carbonate, magnesium hydroxide and calcium sulphate.
There is no production of scum, therefore it makes washing easier and faster.

(d) Three ways in which soil profile is important. [3 marks] • to determine the type of crop to grow
• to determine the most suitable farming system to use
• to determine the type / amount of fertilizer needed
• to determine the cultural practices to use
• to determine the type of tools / equipment to use
• to determine the cost of production

3. (a) Three modes of heat transfer. [3 marks] Conduction, convection and radiation

(b) (i) What a deficiency disease is
A disease that results from the lack or shortage of certain nutrients in the body of an organism

(ii) Three deficiency diseases in humans. [5 marks] Kwashiorkor, goiter, rickets, anaemia, scurvy, night blindness

(c) Two ways in which each of the following factors cause depletion of soil resources:
(i) burning
♣ kills soil micro organism, such as nitrogen-fixing bacteria
♣ makes the land bare, which results in soil erosion
♣ causes faster evaporation of soil water
♣ destroys soil nutrients

(ii) leaching [4 marks] ♣ washes away water-soluble plant nutrients, especially nitrates and sulphur.
♣ leads to soil acidity
♣ affects the texture of the topsoil.

(d) Three processes that can change matter from one state to another. [3 marks] ♣ Freezing
♣ Condensation
♣ Sublimation
♣ Melting
♣ Evaporation
♣ Deposition

4. (a) (i) What a satellite is.
A body that moves around / orbits a planet

(ii) Three uses of artificial satellites. [5 marks] ♣ weather forecasting
♣ communication
♣ scientific exploration
♣ Navigation – using GPS, etc.
♣ television/ radio broadcast
♣ military purposes

(b) The composition of each of the following alloys:
(i) brass
copper and zinc

(ii) steel
iron and carbon

(iii) bronze [3 marks] copper and tin

(c) Three cultural practices used in vegetable production. [3 marks] ♣ Weeding
♣ Pruning
♣ Mulching
♣ Watering
♣ Thinning out
♣ Staking

(d) Four parts of the respiratory system in humans. [4 marks] Nostril, bronchus, bronchioles, alveoli, trachea, pharynx, blood capillaries

5. (a) (i) What a force is
A push or pull on an object

(ii) Two ways in which forces could affect a body [4 marks] A force can:
♣ cause a stationery body to move
♣ cause a moving body to stop
♣ increase the speed of a moving body (acceleration)
♣ decrease the speed of a moving body (deceleration)
♣ change the shape of a body

(b) (i) What a chemical change is
A change in which a new substance is formed and is irreversible, eg, the neutralization reaction between HCl and NaOH

(ii) Three differences between chemical change and physical change.

CHEMICAL CHANGE	**PHYSICAL CHANGE**

A new substance is formed	No new substance is formed
It is irreversible (not reversible)	It is usually reversible
Heat energy is given off or absorbed	No heat energy given off or absorbed
Chemical bonds are broken and new ones form	Chemical bonds are not broken and no new ones are formed

[5 marks]

(c) T**hree** physical properties of soil. [3 marks]

- Soil Texture,
- Soil Structure,
- Water-holding capacity/ permeability / porosity
- Soil colour
- Bulk density
- Soil temperature
- Soil Consistency / Soil strength

(d) T**hree** diseases of the circulatory system in humans. [3 marks]

- Anaemia
- Haemophilia
- Coronary artery disease
- Arteriosclerosis
- Leukemia
- stroke
- hypertension
- heart failure
- heart attack
- Aortic dissection
- Cardiomyopathy, etc

6. (a) The systematic name for each of the following compounds:
(i) H_2O – Dihydrogen monoxide or hydrogen oxide
(ii) MgO – Magnesium oxide
(iii) CaO – Calcium oxide
(iv) $CaCl_2$ – Calcium chloride [4 marks]

(b) The instrument used in measuring the following:
(i) length of a rope –
Metre rule or tape measure
(ii) mass of a stone –
Beam balance, triple beam balance,
(iii) temperature of a liquid-
Mercury-in-glass thermometer, alcohol thermometer
(iv) volume of a liquid –

Measuring/graduated cylinder, beaker, pipette, volumetric flask, measuring cup/jug
[4 marks]

(c) T**hree** factors that influence vegetable crop production. [3 marks]

- Site selection
- Quality of crop variety /planting material
- Nature of soil
- Climate / weather conditions
- Cultural practices
- Harvesting
- Storage
- Marketing

(d) F**our** stages in the life cycle of a flowering plant. [4 marks]

- Germination
- Seedling
- Mature plant
- Flowering
- Pollination
- Fertilization
- Formation of seeds and fruits
- Dispersal of seeds and fruits