# BECE

# Integrated Science

## Past Questions& Solutions

# INTEGRATED SCIENCE 1

## OBJECTIVE TEST

## 45 minutes

**1.** Which of the following types of teeth is used by mammals to tear food material?
A. Canines
B. Incisors
C. Molars
D. Premolars

**2.** The eclipse formed when the moon comes between the sun and the earth is known as
A. annular eclipse
B. lunar eclipse
C. solar eclipse
D. total eclipse

**3.** The element with the chemical symbol **S** is
A. silicon
B. silver
C. sodium
D. sulphur

**4.** The term leaching in soils refers to
A. accumulation of organic matter
B. decomposition of plant material.
C. fixation of nitrogen
D. removal of soil nutrients by water.

**5.** Which of the following statements about a plant cell is **correct**? It
A. does not have a nucleus
B. contains large vacuoles
C. is surrounded by the cell membrane only
D. does not have a definite shape

**6.** An example of a *derived quantity* is
A. length
B. mass
C. temperature
D. volume

**7.** Solid non-metals normally break into pieces when hammered because they are
A. brittle
B. ductile

C. lustrous
D. malleable

**8.** Young rabbits are called
A. bunnies
B. cubs
C. fingerlings
D. kids

**9.** Producers in an ecosystem are plants that
A. attract insects
B. feed on other plants
C. feed on dead materials
D. manufacture their own food.

**10.** The form of energy produced from the nucleus of an atom is termed
A. chemical energy
B. mechanical energy
C. nuclear energy
D. thermal energy

**11.** Which of the following elements is a semi-metal?
A. Carbon
B. Nitrogen
C. Silicon
D. Sodium

**12.** A system of farming that leads to continuous destruction of virgin forest is
A. mixed farming
B. mixed cropping
C. pastoral farming
D. shifting farming

**13.** The by-products of respiration are
A. carbon dioxide and heat
B. carbon dioxide and water
C. oxygen and heat
D. oxygen and water.

**14.** Which of the following statements about a force are **correct**? It
I is measured in newtons
II is measured in newton-metre
III can start a motion
IV can change the direction of a moving body.

A. I and II only
B. I and III only
C. I, III and IV only

D. I, II, III and IV

**15.** Which of the following substances is a solid-gas mixture?
A. Lather
B. Bronze
C. Steel
D. Smoke

**16.** Weeds on a school farm could be controlled by
A. handpicking
B. mowing
C. ploughing
D. tilling

**17.** An example of a non-living tissue used in osmosis experiment is
A. cellophane
B. filter paper
C. potato
D. polythene

**18.** Kerosene is poured on the surface of a pond in order to
A. make it unsafe for human consumption
B. make it safe for animal consumption
C. increase the surface tension
D. break the surface tension

**19.** Which of the following processes is used to separate insoluble solids from liquids?
A. Crystallization
B. Evaporation
C. Filtration
D. Sublimation

**20.** The process of removing unproductive poultry birds from a flock is referred to as
A. candling
B. culling
C. dehorning
D. drenching

**21.** Which of the following pairs of diseases can be spread easily when food is exposed to houseflies?
A. Dysentery and malaria
B. Malaria and tuberculosis
C. Dysentery and cholera
D. Cholera and tuberculosis

**22.** The pressure in fluids
A. acts differently in all directions
B. acts upwards at any point
C. decreases with depth

D. increases with depth

**23.** Which of the following processes involve a change in the state of matter from liquid to solid?
A. Beans
B. Bread
C. Cabbage
D. Egg

**24.** Which of the following food items contains the **highest** amount of dietary fibre?
A. Beans
B. Bread
C. Cabbage
D. Egg

**25.** An example of a disease vector is
A. earthworm
B. liver fluke
C. tapeworm
D. tick

**26.** Which of the following devices is made of semiconductor?
A. Capacitor
B. Inductor
C. Resistor
D. Transistor

**27.** Which of the following statements about the properties of water are **correct**? It
I. is colourless and tasteless
II. is neutral to litmus paper
III. turns red litmus paper blue
IV. is a universal solvent

A. I and II only
B. I and III only
C. I, II and IV only
D. I, III and IV only

**28.** The study of the soil profile of an area helps the farmer to
A. control weed growth
B. determine the soil temperature
C. determine the types of crop to grow.
D. know the pesticides to use.

**29.** When a green leaf is placed in a test tube containing ethanol and heated over a water bath, the leaf
A. becomes soft
B. changes colour to brown
C. changes colour to blue-black
D. is decolourized.

**30.** Which of the following sources of energy is / are renewable?

I. Solar
II. Crude oil
III. Wind

A. I only
B. I and II only
C. I and III only
D. I, II and III

**31.** Which of the following substances is a compound?

A. Hydrogen
B. Nitrogen
C. Oxygen
D. Water

**32.** A disease-causing organism that is **most** difficult to control in crop production is

A. bacterium
B. fungus
C. nematode
D. virus

**33.** Which of the following organisms is/ are multicellular?

I. Amoeba
II. Paramecium
III. Onion

A. I only
B. III only
C. I and III only
D. II and III only

**34.** In electronic circuits, LEDs are used to indicate the absence or presence of

A. emitter and collector
B. electric current
C. p-n junction
D. voltage source.

**35.** Steel is an alloy of iron and

A. aluminium
B. carbon
C. silicon
D. gold

**36.** Soil aeration could be improved through

A. mulching
B. irrigation

C. soil drainage
D. fertilizer application

**37.** Which of the following pairs of structures are part of the respiratory system of humans?
A. Fallopian tube and alveoli
B. Pharynx and oesophagus
C. Trachea and alveoli
D. Trachea and duodenum

**38.** Which of the following effects is **not** a result of illegal connection of electricity? It can
A. lead to fire outbreak
B. lead to frequent power cut-off
C. increase the flow of current in the supply chain.
D. cause damage to electrical appliance

**39.** Which of the following statements about the scientific method is / are **correct**? It provides
I. logical procedure for arriving at knowledge.
II. knowledge that can be verified
III. knowledge that can never be changed

A. I only
B. I and II only
C. I and III only
D. II and III only

**40.** An entrepreneur's decision as to what to produce is a/ an
A. co-ordinating function
B. organizing function
C. planning function
D. supervising function.

**END OF PAPER**

# INTEGRATED SCIENCE 1

## OBJECTIVE TEST

## SOLUTIONS

**1.** A. canines
**2.** C. solar eclipse
**3.** D. sulphur
**4.** D. removal of soil nutrients by water
**5.** B. contains large vacuoles
**6.** D. volume
**7.** A. brittle
**8.** A. bunnies
**9.** D. manufacture their own food
**10.** C. nuclear energy
**11.** C. silicon
**12.** D. shifting farming
**13.** B. carbon dioxide and water
**14.** C. I, III and IV only
**15.** D. smoke
**16.** A. handpicking
**17.** A. cellophane
**18.** D. break the surface tension
**19.** C. filtration
**20.** B. culling
**21.** C. Dysentery and cholera
**22.** D. increases with depth
**23.** B. freezing
**24.** A. Beans
**25.** D. tick
**26.** D. Transistor
**27.** C. I, II and IV only
**28.** C. determine the types of crop to grow
**29.** D. decolourized
**30.** C. I and III only

**31.** D. water

**32.** A. Bacterium

**33.** B. III only

**34.** B. electric current

**35.** B. carbon

**36.** D. fertilizer application

**37.** C. trachea and alveoli

**38.** C. increase the flow of current in the supply chain

**39.** B. I and II only

**40.** C. planning function

# INTEGRATED SCIENCE 2

## ESSAY

## 1 ¼ hours

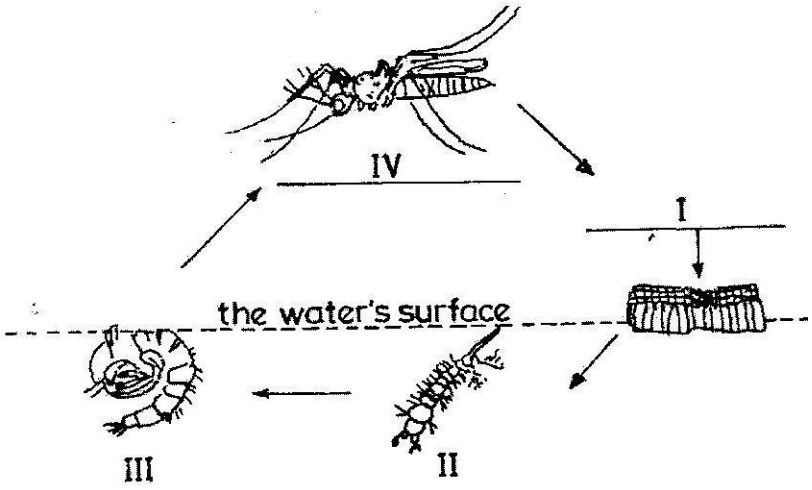
**PART I**

**[40 marks]**

Answer **all** of Question **1**

**1.** (a) The diagrams below represent the stages in the life cycle of a mosquito

Study the diagrams carefully and answer the questions that follow

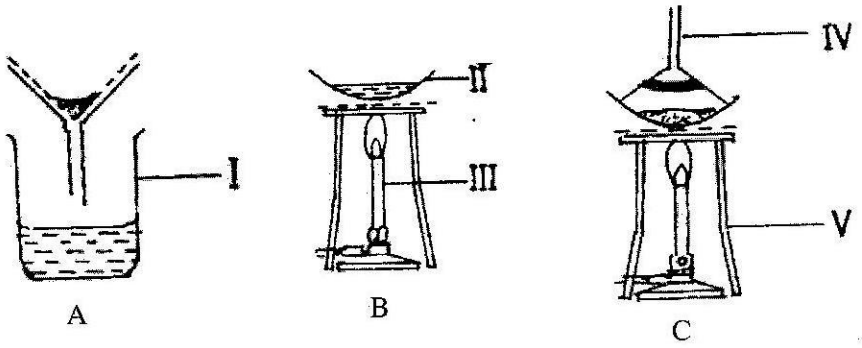



(i) Name **each** of the stages labeled **I, II, III** and **IV**

(ii) State how stage **II** obtains oxygen

(iii) State **two** methods of controlling **each** of the stages labeled **III** and **IV**

(b) The diagrams below are different laboratory set-ups used in the separation of mixtures. *Study the diagrams carefully and answer the questions that follow*



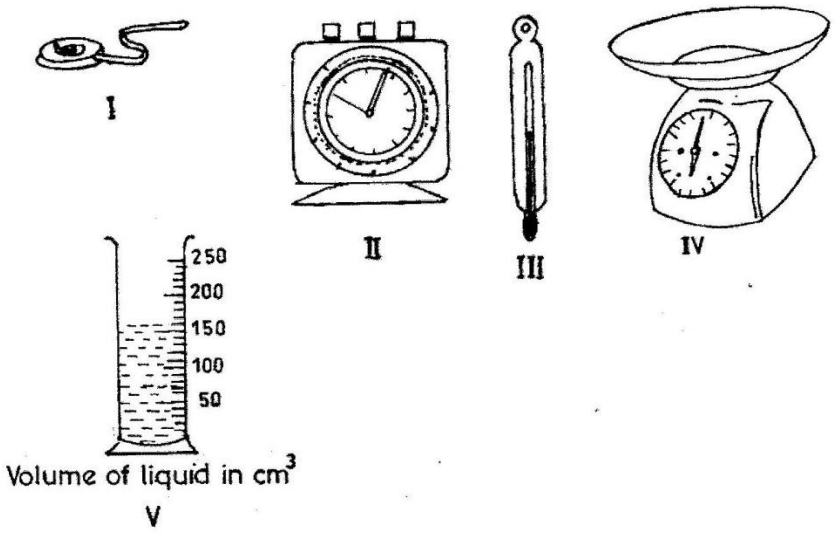

(i) Name **each** of the parts labeled **I, II, III, IV** and **V**.

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

(iii) Which of the set-ups is used to obtain clear water from muddy water?

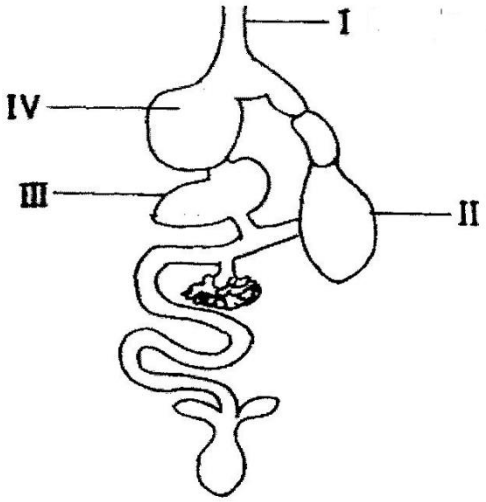
(iv) Which of the set-ups is used to obtain salt from salt solution?

(c) The diagrams below show some instruments used in the laboratory.
*Study the diagrams carefully and answer the questions that follow*




(i) Identify **each** of the instruments labeled **I, II, III, IV** and **V**
(ii) State **one** use of **each** of the instruments labeled **I, II, III** and **IV**
(iii) Read and record the volume of the liquid in the instrument labeled **V**

(d) The diagram below shows the digestive system of a class of farm animals.
*Study the diagrams carefully and answer the questions that follow*




(i) Name **each** of the parts labeled **I, II, III** and **IV**
(ii) State **one** function **each** of the parts labeled **II** and **IV**
(iii) Name **two** farm animals that possess this type of digestive system.
(iv) Mention **two** diseases which affect this class of farm animals.

[10 marks]

## PART II
## [60 marks]

Answer **four** questions only from this part.

**2.** (a) (i) Name the **two** elements that combine to form water.
(ii) Write a balanced chemical equation to show how the water is formed from the named elements

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

(c) (i) What is a *fertile soil*?
(ii) State **two** factors that cause loss of soil fertility.

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

**3.** (a) (i) What is *germination of seed*?
(ii) State **two** conditions necessary for the germination of seed.

(b) State **four** methods used in identifying farm animals

(c) Explain why it is easier to cut a piece of yam with a sharp knife than with a blunt knife

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

**4.** (a) (i) What is *debeaking*?
(ii) Give two reasons why debeaking in poultry birds is important.

(b) (i) A steel needle carefully placed on the surface of water floats. What type of force made the steel needle to float?
(ii) Name **three** substances that could be added to the water to make the steel needle to sink.

(c) (i) Explain why gold is preferred to iron in the making of jewelleries.
(ii) State **one** way of preventing rusting.

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

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

(c) (i) Give **two** example of digestive enzymes produced in humans.
(ii) For **each** of the enzymes given in (i), name the part of the human body where the enzyme is produced.

(d) List **four** methods of applying fertilizers to crops.

**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
(ii) is used as jewellery;
(iii) is used for making statues

(b) (i) Name **two** diseases associated with the circulatory system of humans.
(ii) State **one** way of preventing **each** of the diseases named in (i)

(c) Give two examples of **each** of:
(i) **major** plant nutrients;
(ii) **minor** plant nutrients.

(d) (i) State **two** properties of a good thermometric liquid.
(ii) Give **two** examples of a good thermometric liquid.

***END OF ESSAY TEST***

# INTEGRATED SCIENCE 2

## 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 Nationresolutions 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

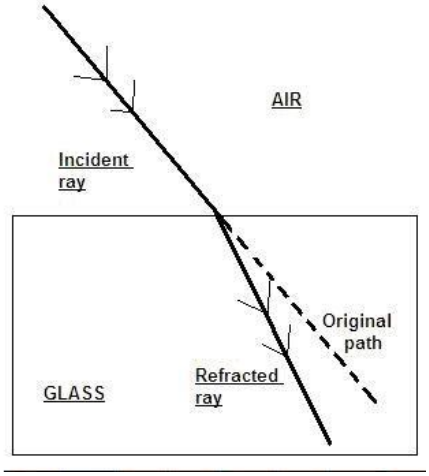
(ii) Name the equipment used to measure **each** of the elements stated in (i) above.

| 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***