

INTEGRATED SCIENCE 2

ESSAY

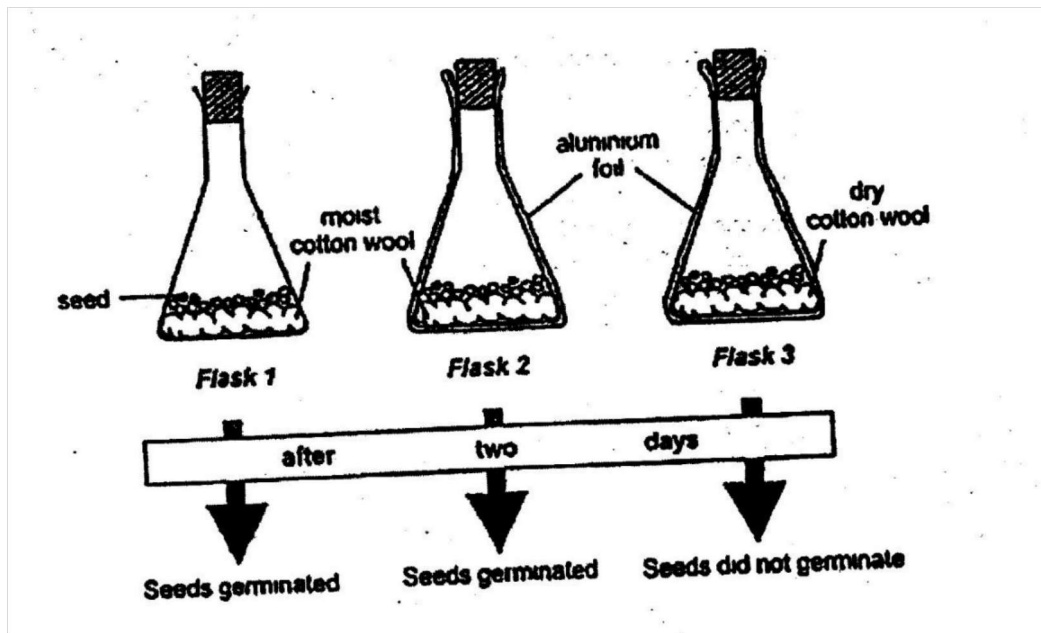
[100 MARKS]

SECTION A

[40 MARKS]

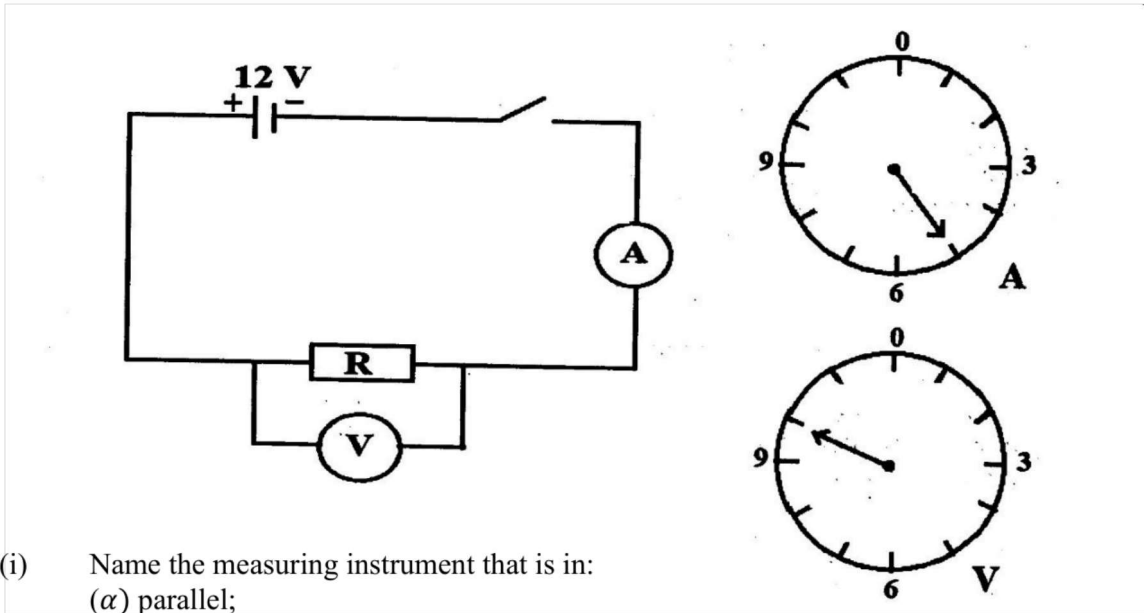
Answer all of Question 1

1. (a) The diagrams below are illustrations of a set-up used to study the conditions for seed germination. The flasks are kept at 25 °C during the experiment. *Study the diagrams carefully and answer the questions that follow.*

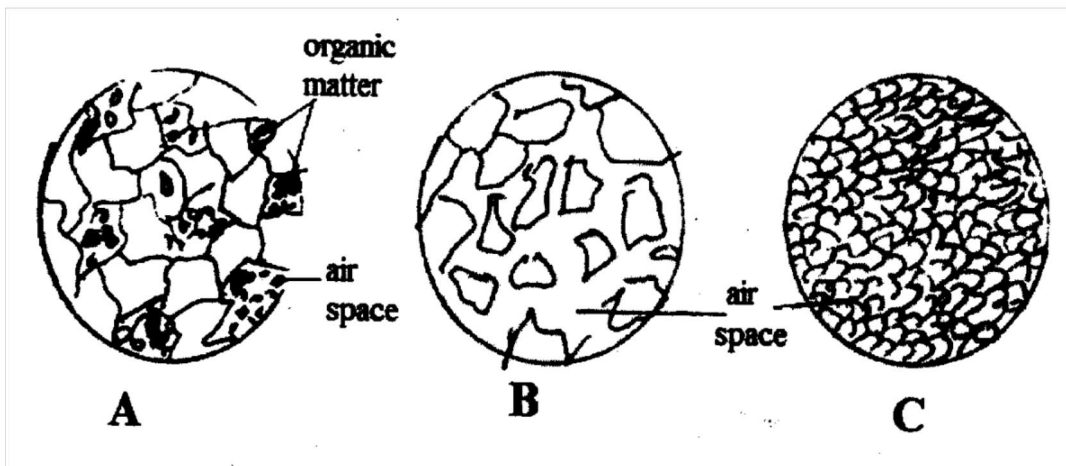


- (i) What conclusion can be drawn from the results of flask 1 and flask 2? [2 marks]
- (ii) What conclusion can be drawn from the results of flask 2 and flask 3? [2 marks]
- (iii) The seedlings in flask 2 died after two weeks. What can be the reasons for this occurrence? [2 marks]
- (iv) A candidate concluded that light was an important factor for the germination. Did the candidate make a **correct** conclusion? [1 mark]
- (v) Give a reason for the answer stated in (iv) and state which of the flasks in the experiment could be used to support your answer. [3 marks]

(b) The diagram below are illustrations of an experimental set-up. *Study the diagrams carefully and answer the questions that follow.*



- (i) Name the measuring instrument that is in:
 (α) parallel;
 (β) series
 With the resistor **R** [2 marks]
- (ii) What quantity does **each** of the named instruments in (i) measure? [2 marks]
- (iii) Read and record the values as indicated on:
 (α) **A** in amperes;
 (β) **V** in volts. [2 marks]
- (iv) Use the values read in (iii) to calculate the value of **R**. [3 marks]
- (v) State **one** precaution to be taken in performing this experiment. [1 mark]
- (c) The diagrams below are illustrations of soil. *Study the illustrations carefully and answer the questions that follow.*



- (i) Identify **each** of the soil types labelled **A, B** and **C**. [3 marks]
- (ii) Describe **each** of the soils under the following properties:
 (α) Particle size

(β) Air space

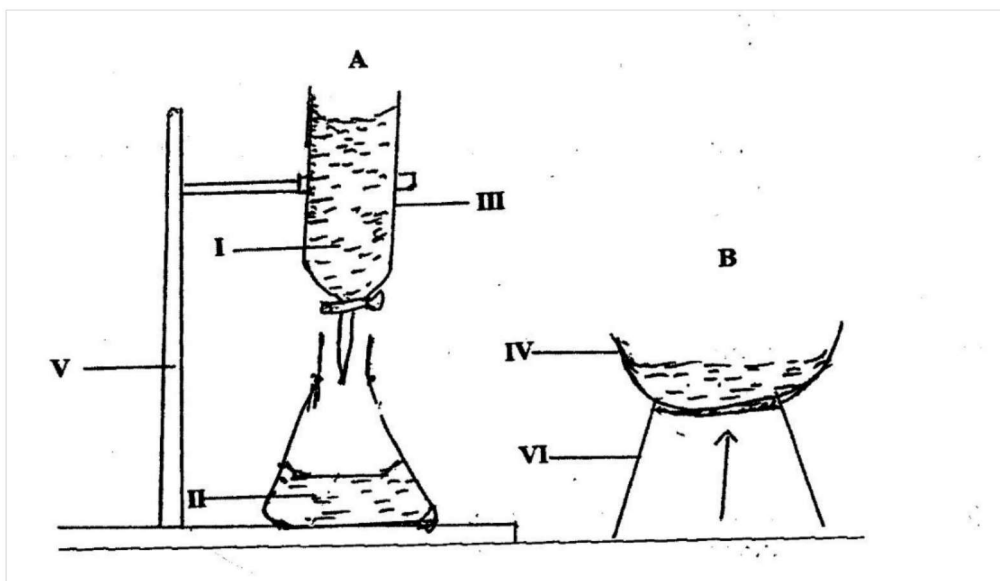
[6 marks]

(iii) Suggest **two** ways of improving soil type **B** for vegetable cultivation.

[2 marks]

(d) The diagrams below is a set-up for preparation of common salt in the laboratory.

Study the diagrams carefully and answer the questions that follow.



(i) Name **each** of the parts labelled **IV**, **V** and **VI**.

[3 marks]

(ii) Name **two** possible solutions that can react to produce salt.

[2 marks]

(iii) Name the process that takes place when the **two** solution named in (ii) react.

[1 mark]

(iv) Name the process that takes place in the set-up **B**.

[1 mark]

(v) Write a balanced chemical equation for the reaction between the **two** solutions named in (ii).

[2 marks]

SECTION B

[60 MARKS]

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

2. (a) (i) State what happens when photosynthesis occurs in a leaf.

(ii) What is pollination?

[3 marks]

(b) Explain **briefly** why the mass of lumpy charcoal remains unchanged when ground into powder but the mass of the same lump changes when heated to burn.

[4 marks]

(c) (i) What is a physical quantity?

(ii) State **two** physical quantities.

[4 marks]

(d) State **two** importance **each** of:

(i) light;

(ii) temperature;

In crop production.

[4 marks]

3. (a) (i) What is hardness of water?
(ii) Give **one** example **each** of a natural source of water that is:
(α) hard water;
(β) soft water; [4 marks]
- (b) What is the end-product of the digestion of **each** of the following?
(i) Meat;
(ii) cassava;
(iii) Palm-oil. [3 marks]
- (c) Give **one** effect of **each** of the following factors considered in vegetable crop production:
(i) soil type;
(ii) nearness to market;
(iii) nearness to source; [3 marks]
- (d) (i) Explain **briefly** why an eclipse occurs.
(ii) Name the **two** types of eclipse. [5 marks]
4. (a) (i) Explain the term *convection* as applied to heat transfer.
(ii) Give **two** reasons why convection does **not** occur in solids. [4 marks]
- (b) Give **two** effects of **each** of the following soil physical properties on maize cultivation:
(i) Texture;
(ii) water holding capacity. [4 marks]
- (c) Use any **three** of the following organisms to construct a food chain:
Hawk, grasshopper, man, grass, toad, grasscutter. [2 marks]
- (d) (i) Consider the following elements and state which element(s) is/are metals:
 $_{11}\text{Na}$, $_{7}\text{N}$, $_{6}\text{C}$, $_{3}\text{Li}$
(ii) Explain **briefly** what is observed when pieces of **each** of the following metals are dropped into **two** separate test tubes **each** containing dilute hydrochloric acid:
(α) magnesium;
(β) silver. [5 marks]
5. (a) State **two** important components **each** of the soils that helps:
(i) Crops to grow well;
(ii) To maintain good soil structure. [4 marks]
- (b) (i) Explain how energy in a windmill is obtained.
(ii) State **one** source of renewable energy. [4 marks]
- (c) (i) Explain why steel is preferred to iron in building construction.
(ii) State **two** ways of preventing rusting. [4 marks]
- (d) State **three** ways of preventing indigestion. [3 marks]
6. (a) State **three** ways by which the atmosphere in an industrial area is polluted. [3marks]

(b) Write the word equation for **each** of the following reactions between:

(α) calcium and oxygen

(β) nitrogen and hydrogen.

(ii) State the hazard that could be prevented when **each** of the following protective materials are used in the laboratory:

(α) gas mask

(β) goggles

[4 marks]

(c) If a cuboid of weight 100 N, has sides 5 cm by 10 cm, calculate the:

(i) Area of the cuboid;

(ii) Pressure exerted by the cuboid when it lies on its side.

[4 marks]

(d) (i) Explain the term *mixed farming*.

(ii) State **two** advantages of mixed farming.

[4 marks]

END OF ESSAY TEST

INTEGRATED SCIENCE 1

OBJECTIVE TEST

- Which of the following substances is a compound?
 - Oxygen
 - Magnesium
 - Water
 - Sodium
- An atom of an element has a neutral charge because the
 - Protons and electrons are the same particles.
 - Proton number and electron number are the same.
 - Neutron number and proton number are equal
 - Electron number and neutron number are equal.
- Which of the following organisms is an ecto-parasite of animals?
 - Fleas
 - Tapeworm
 - Liver fluke
 - Roundworm
- An atom has 20 nucleons and 9 protons. What is its neutron number?
 - 9
 - 10
 - 11
 - 12
- Which of the following statements about aerobic and anaerobic respiration is **not** correct?
 - Water is produced as a by-product in anaerobic respiration.
 - Alcohol or lactic acid is produced in anaerobic respiration.
 - No oxygen is required in anaerobic respiration
 - Very little energy is released in anaerobic respiration.
- An aluminium cube of side 2 m has a mass 24 kg. Determine the density of the aluminium.
 - 3 kg m^{-3}
 - 12 kg m^{-3}
 - 24 kg m^{-3}
 - 48 kg m^{-3}
- An example of the process of osmosis is
 - Selective reabsorption
 - Absorption of digested food
 - The spread of petrol scent
 - Gaseous exchange in living things
- What is the systematic name of the compound CO?
 - Carbon(I)oxide
 - Carbon (II)oxide
 - Carbon dioxide
 - Carbon (IV)oxide
- Which of the following methods can be used to prevent iron from rusting?
 - Painting
 - Alloying
 - keeping the iron in a desiccator
 - keeping iron in a moist environment
 - I and II only
 - II and IV only
 - I,II and III only
 - II, III and IV only
- The proper way of maintaining soil structure and fertility is termed as soil
 - Conservation
 - Depletion
 - Profile
 - erosion
- The instrument that can be used to measure accurately the mass of a substance is
 - Beam balance
 - Spring balance
 - Eureka can
 - Measuring cylinder.
- Which of the following chemical symbols can be used to remove permanent hardness of water?
 - NaHCO_3
 - Na_2CO_3
 - $\text{Ca}(\text{HCO}_3)_2$
 - CaCO_3
- Which of the following chemical symbols is that of an element with seven electrons in the outermost shell?
 - ${}_{20}\text{Ca}$
 - ${}_{17}\text{Cl}$
 - ${}_{10}\text{Ne}$
 - ${}_{16}\text{S}$
- Which of the following statements about the base of a transistor are **correct**? The base is
 - made very thin

- II. made very wide
 III. responsible for activating the transistor
 IV. made of n-type semiconductor
 A. I and III only
 B. II and IV only
 C. I,III and IV only
 D. II,III and IV only
15. Which of the following instruments is connected in parallel across a resistor in an electrical circuit?
 A. Ammeter
 B. Voltmeter
 C. Ohmmeter
 D. Galvanometer
16. Which of the following fruits is dispersed by water?
 A. Coconut
 B. Mango
 C. Maize
 D. Cocoa
17. A farming system which involves the growing of rice and the rearing of fowls is known as
 A. crop rotation.
 B. mixed farming.
 C. mixed cropping.
 D. organic farming.
18. Which of the following activities are cultural practices in vegetable production?
 I. Application of fertilizer
 II. Harvesting
 III. Mulching
 A.I and II only
 B.I and III only
 C.II and III only
 D.I, II and III
19. The function of the white blood cells in humans is to
 A. produce haemoglobin.
 B. ensure blood clot during an injury.
 C. produce antibodies to engulf disease-causing organisms.
 D. produce digestive enzymes.
20. Mosquito pupa breathes through tubes called
 A. trachea.
 B. siphon.
 C. lungs.
 D. gills.
21. An advantage of practicing organic farming is that it
 A. increases soil fertility.
 B. reduces pest infestation.
 C. reduces toxicity levels in plants.
 D. increases resistance to plant disease.
22. Which of the following planets is at the centre of the solar system?
 A. Earth
 B. Venus
 C. Mars
 D. Sun
23. Determine the potential energy of a block of mass 2 kg placed on a building 10 m tall. [$g=10 \text{ m s}^{-2}$]
 A. 20 J
 B. 50 J
 C. 100 J
 D. 200 J
24. Which of the following organisms attacks crops in storage?
 A. Crickets
 B. Grasshoppers
 C. Millipedes
 D. Weevils
25. One of the properties of acids is that they
 A. turn wet blue litmus paper red.
 B. have no effect on blue litmus paper.
 C. turn wet red litmus paper blue.
 D. Are neutral to litmus paper.
26. The instrument used to measure potential difference across a resistor is
 A. ammeter.
 B. Barometer.
 C. Hydrometer.
 D. Voltmeter.
- A machine lifts a load of 100 N through a vertical distance of 2 m in 10 s.
 Use the information to answer questions 27 and 28.
27. What is the work done by the machine?
 A. 50 J
 B. 100 J
 C. 200 J
 D. 400 J
28. What is the power of the machine?
 A. 50 W
 B. 20 W
 C. 10 W
 D. 2 W
29. Which of the following elements is a macro-nutrient of plants?
 A. Copper
 B. Manganese

- C. Molybdenum
D. Sulphur
30. When an atom loses an electron, the ion formed is called
A. an anion
B. a cation
C. a molecule.
D. A compound.
31. Which of the following chemical equations is balanced?
A. $H_2 + Cl_2 \rightarrow HCL$
B. $K_2O \rightarrow K + O_2$
C. $Mg + O_2 \rightarrow MgO$
D. $2NA + Cl_2 \rightarrow 2NaCl$
32. Purple colouration of leaves of plant is a **major** symptom of deficiency in
A. Calcium
B. Nitrogen
C. Potassium
D. phosphorus
33. Which of the following diseases is **not** a deficiency diseases?
A. Scurvy
B. Cholera
C. Beriberi
D. Goiter
34. In an experiment to determine the various particle sizes of soil sedimentation, the particle sizes of soil by sedimentation, the particles above clay suspension are
A. Loam
B. Organic
C. Gravels
D. Silt
35. A person urinates more often in the rainy season than in the dry season because
A. More sweat evaporates from the skin.
B. Less sweat evaporates from the skin
C. His kidneys works faster
D. He drinks less water
36. Heat from the sun by
I. Conduction
II. Convection
III. Radiation
A. I only
B. II only
C. III only
D. I,II and III
37. Which of the following machines are complex machines?
I. Tractor
II. Mist blower
III. Sewing machine
A. I and II only
B. I and III only
C. II and III only
D. I,II and III
38. Calcium oxide and water reacts to form calcium hydroxide. The formula for the product is
A. $Ca_2 OH$
B. $Ca(OH)_2$
C. CaH_2O
D. $Ca(H_2O)_2$
39. The current flowing through a resistor of resistance 10 ohms is 2.5 A. what is the potential difference between the two terminals of the resistor?
A. 4 v
B. 12.5 V
C. 25 V
D. 50 V
40. If a soil is smooth and sticky, it means that the soil has a large amount of
A. Clay
B. Loam
C. Sand
D. Silt