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| STUDENT ENROLMENT NUMBER (SEN) |  |  |  |  |  |  |  |
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# SECONDARY ENTRANCE EXAMINATION

## 2022

### SCIENCE

#### QUESTION AND ANSWER BOOKLET

Time Allowed: 2 Hours + 10 minutes reading

#### INSTRUCTIONS

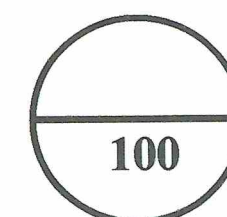
1. This paper has **FIVE** Sections. ALL Sections are **COMPULSORY**.

| SECTION     | TOPICS                  | MARKS |
|-------------|-------------------------|-------|
| ONE         | SCIENCE SKILLS          | 20    |
| TWO         | LIVING WORLD            | 24    |
| THREE       | MATERIAL WORLD          | 24    |
| FOUR        | PHYSICAL WORLD          | 20    |
| FIVE        | PLANET EARTH AND BEYOND | 12    |
| TOTAL MARKS |                         | 100   |

2. Write your **Student Enrolment Number (SEN)** on the top right hand corner of this page and on page **27**.
3. Answer **ALL** questions in the spaces provided.
4. Use a black or blue ball point pen for your written answers. Use a pencil **ONLY** for drawings.
5. Write legibly and work neatly.
6. Check that this booklet contains **27** pages in the correct order and that pages 24 - 26 have been deliberately left blank.
7. If you need more spaces for answers, ask the supervisor for extra paper and write your SEN on the extra page(s).

**YOU MUST HAND IN THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

TOTAL MARKS



SECTION ONE:

SCIENCE SKILLS

(20 MARKS)

Part A: Multiple Choice Questions

(3 marks)

Circle the letter of the **BEST** answer.

1. Which of the following instrument will produce the most accurate measure of a given volume of water?
- A. Beaker

B. Flask

C. Measuring cylinder

D. Cup
2. A fair test is an investigation where
- A. only one variable is tested.

B. the test is carried out only once.

C. more than one variable is tested.

D. the test is carried out in a laboratory.
3. An experiment report gave this statement: “*Based on my observations, soft water is better for washing than hard water.*”
- In a lab report, this statement is the:
- A. result of the experiment

B. conclusion drawn from the test

C. method or how the experiment was done

D. aim of the experiment

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SECONDARY ENTRANCE EXAMINATION

2022

SCIENCE

(FOR MARKERS USE ONLY)

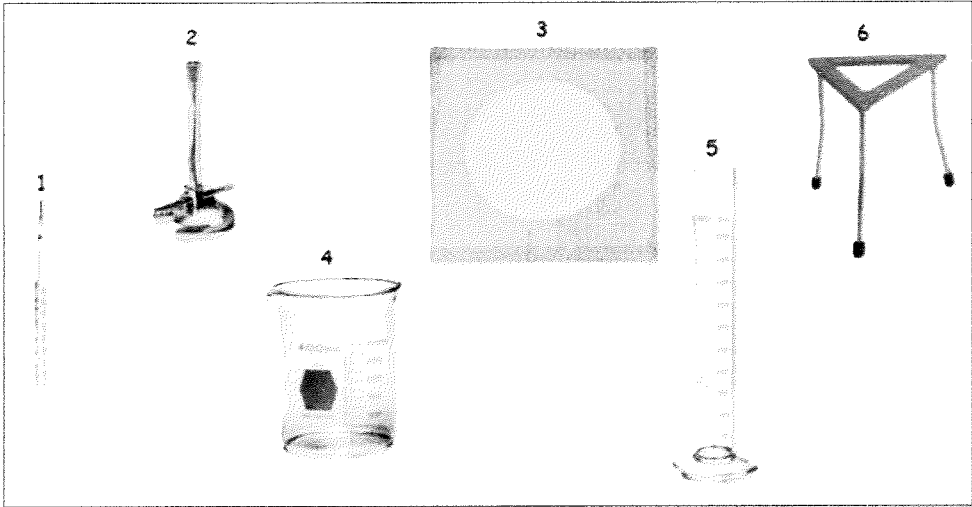
| SECTION     |                         | MARKS | CHECK MARKS | TOTAL MARKS |
|-------------|-------------------------|-------|-------------|-------------|
| ONE         | SCIENCE SKILLS          |       |             | 20          |
| TWO         | LIVING WORLD            |       |             | 24          |
| THREE       | MATERIAL WORLD          |       |             | 24          |
| FOUR        | PHYSICAL WORLD          |       |             | 20          |
| FIVE        | PLANET EARTH AND BEYOND |       |             | 12          |
| TOTAL MARKS |                         |       |             | 100         |

Part B:Extended Answers(17 marks)

Answer all the questions in the spaces provided.

1. Sita wanted to carry out an experiment. She needed to find out how long will it take for 30 ml of water to reach 90°C.

These are some of the equipment that she will use:



- a. Name equipment 1 and 2. (2 marks)

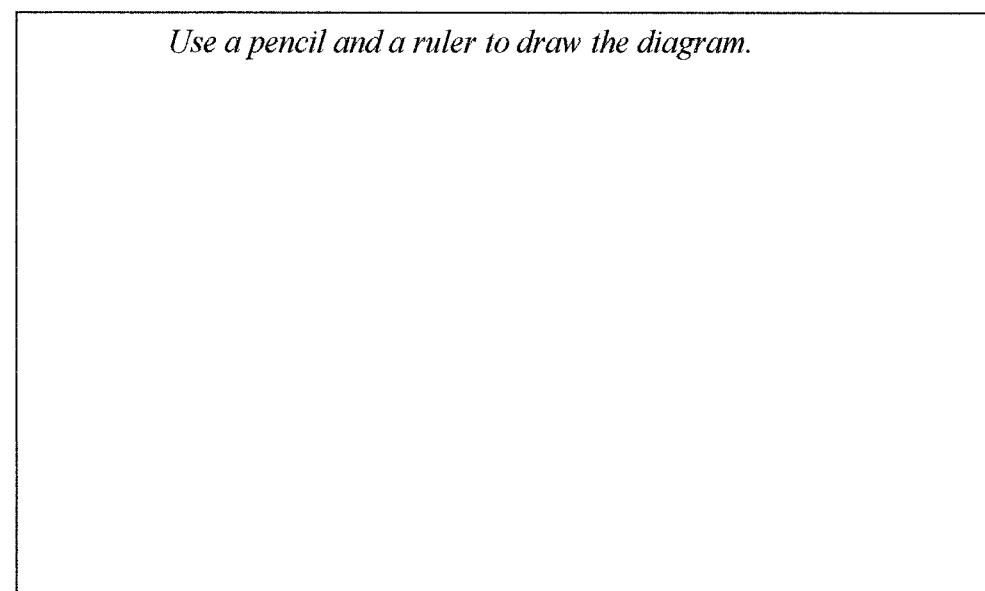
Equipment 1: \_\_\_\_\_

Equipment 2: \_\_\_\_\_

- b. Give the uses of equipment 3, 4 and 5. (3 marks)

| Apparatus | Use |
|-----------|-----|
| 3         |     |
| 4         |     |
| 5         |     |

- c. **Draw** and **label** a scientific diagram of how Sita will set up the apparatus for the experiment. (3 marks)



- d. Write down **ONE** (1) safety rule that Sita needs to follow during the experiment. (1 mark)

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2. Saia used a pen to write his name on a plastic envelope. He tried to remove the writing using water, then bleach and finally methylated spirits. He found out that only the methylated spirit could remove the writing.

- a. Write an **aim** for Saia's experiment. (1 mark)

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- b. State a **conclusion** for the experiment. (1 mark)

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3. Billy decided to investigate the reaction between acid and magnesium. He observed that when magnesium metal was dissolved in dilute hydrochloric acid, a colourless gas was released:  
He made the following hypothesis:

Magnesium dissolves faster in dilute hydrochloric acid as the temperature of the acid increases.

- a. Identify **ONE** (1) **dependent** and **independent variable** in this experiment. (2 marks)
- i. dependent variable: \_\_\_\_\_
- ii. independent variable: \_\_\_\_\_
- b. Name **TWO** (2) variables that should be kept constant (controlled) during the experiment. (2 marks)
1. \_\_\_\_\_
2. \_\_\_\_\_

4. State the scientific rules that these symbols represent. (2 marks)

|    |                                                                                       |  |
|----|---------------------------------------------------------------------------------------|--|
| a) |  |  |
| b) |  |  |

SECTION TWO:

LIVING WORLD

(24 MARKS)

Part A:

Multiple Choice Questions

(4 Marks)

Circle the letter of the **BEST** answer.

1. Scientists classify organisms into groups according to:
- A. their appearances.

B. what they eat.

C. where they live.

D. their similar characteristics.
2. Which of the following diseases is caused by bacteria?
- A. Influenza

B. Covid-19

C. Tinea

D. Sore throat
3. A part of the human digestive system have the following characteristics:
- i. largest organ in the digestive system

ii. it produces bile, which is a digestive chemical

iii. located above and in front of the stomach.
- The part of the digestive system described above is the:
- A. Pancreas

B. Gall bladder

C. Liver

D. Small intestine
4. Which of these equations BEST represents the process of respiration?
- A. Carbon Dioxide + Water + Energy  $\longrightarrow$  Glucose + Oxygen

B. Glucose + Carbon Dioxide + Energy  $\longrightarrow$  Oxygen + Water

C. Glucose + Oxygen  $\longrightarrow$  Carbon Dioxide + Water + Energy

D. Carbon Dioxide + Water  $\longrightarrow$  Glucose + Oxygen + Energy

P.6

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- b. In the table below, draw the shape of the moon as it is visible from Earth.
- (3 marks)

| Position of the moon | Shape of the moon |
|----------------------|-------------------|
| C                    |                   |
| E                    |                   |
| H                    |                   |

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S.FIVE

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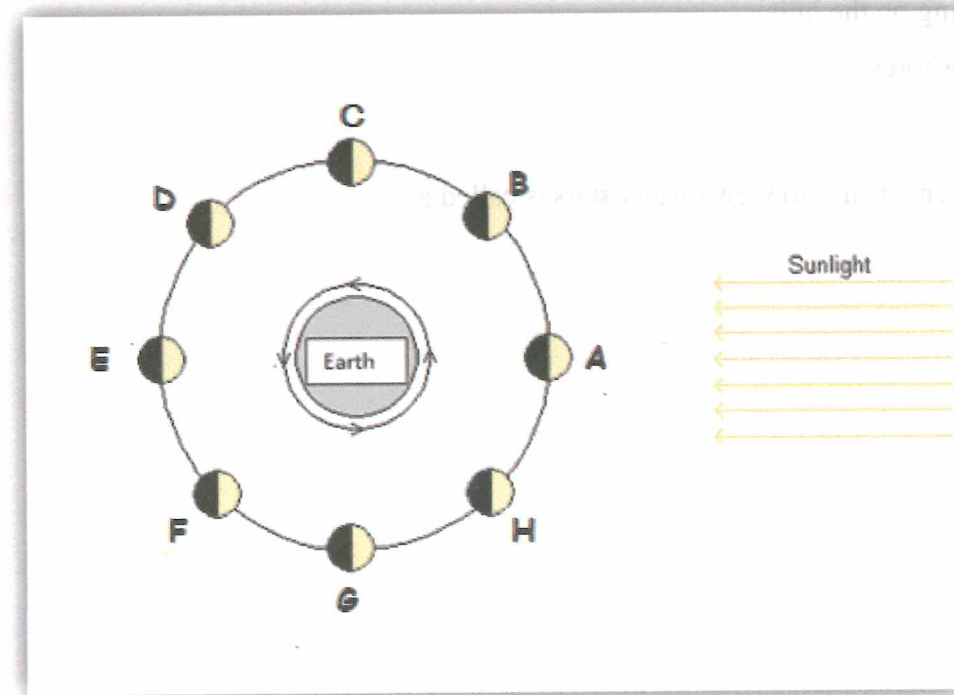
**Part B: Extended Answers (9 marks)**

Answer all the question in the spaces provided.

1. Complete each statement with the most correct word. (4 marks)

- An \_\_\_\_\_ happens when the Earth's shadow moves across the moon.
- Earth make one complete \_\_\_\_\_ around the sun every year.
- Our solar system belongs to a group of stars called the \_\_\_\_\_.
- A star's brightness depends on its \_\_\_\_\_ from the Earth and the amount of heat the star gives off.

2. The diagram below shows the Earth and the orbiting moon.



a. Describe clearly what causes spring tides. (2 marks)

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**Part B: Extended Answers (20 marks)**

Answer all the questions in the spaces provided.

1. Ecosystem (5 marks)

The diagram below shows a whale.



a. Which animal groups do whales belong to? (1 mark)

b. Give **TWO** (2) characteristics of whales that classifies them in the group mentioned above. (2 marks)

- \_\_\_\_\_
- \_\_\_\_\_

c. What are the adaptive features of whales that allow them to survive in water? (2 marks)

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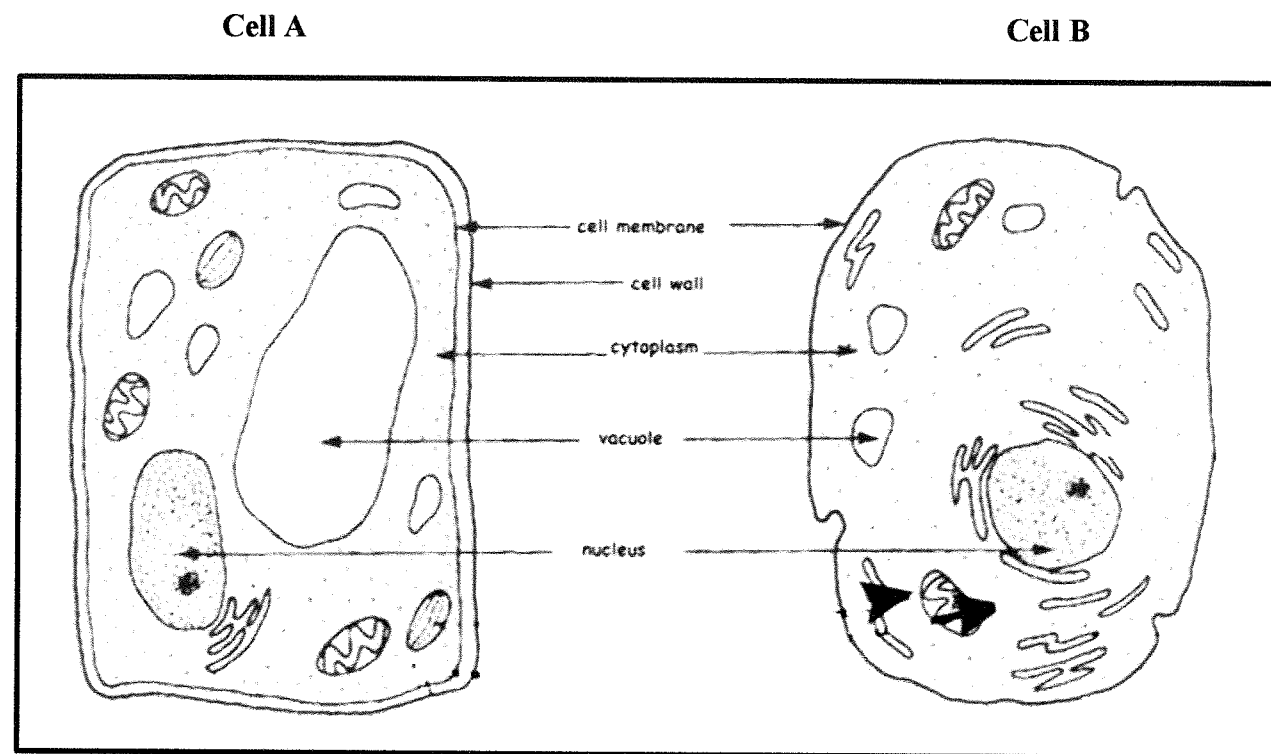


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## 2. Cell

(4 marks)

The diagram below shows two labelled cells.



- a. Which cell is an animal cell? (1 mark)

\_\_\_\_\_

- b. Give **TWO** (2) reasons for your answer in a. above. (2 marks)

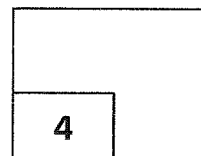
i. \_\_\_\_\_

ii. \_\_\_\_\_

- c. State the function of the nucleus. (1 mark)

\_\_\_\_\_

P.8



## SECTION FIVE: PLANET EARTH and BEYOND

(12 MARKS)

## Part A: Multiple Choice Questions

(3 marks)

Circle the letter of the **BEST** answer.

1. What type of soil forms when sandstone and granite weather?

- A. Clay soil
- B. Loam soil
- C. Silt soil
- D. Sandy Soil

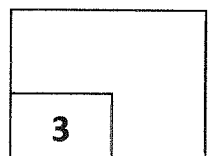
2. All of the following prevents soil erosion **EXCEPT**;

- A. cover soil with plants
- B. removing all plants from the hillside
- C. contour ploughing on the hills
- D. building of foreshores

3. An instrument that scientists use to view distant stars is called a:

- A. microscope
- B. telescope
- C. satellite
- D. stethoscope

P.21



3. Wind energy is a renewable source of energy. It is described as an environment friendly type of energy.

a. Define the term **renewable energy**. (1 mark)

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b. Why is wind described to be 'environment friendly'? (2 marks)

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4. The diagram below shows human activities that contributes to environmental problems.



a. Describe the environmental problem caused by the type of human activity above. (2 marks)

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b. Explain why the environmental problem described above is a concern to the society. (2 marks)

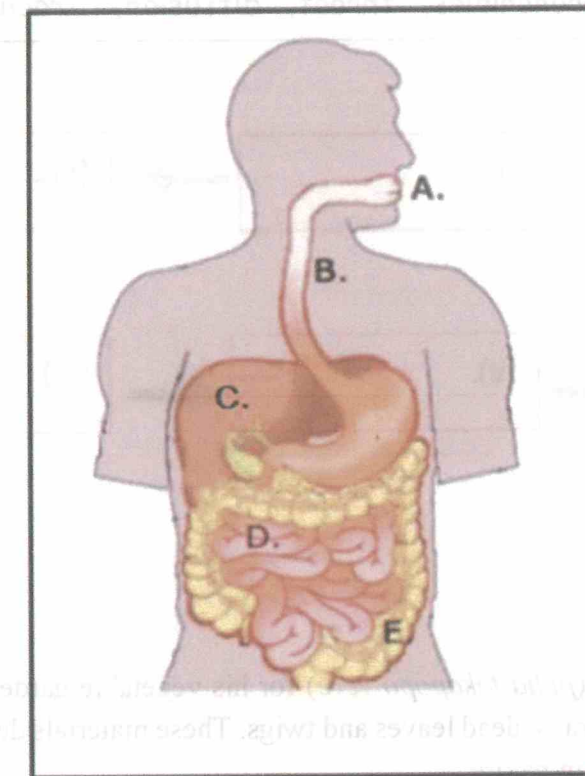
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### 3. Human Body System (7 marks)

The diagram shows an organ system in the human body.



a. Name the organs labelled **D** and **E**.

i. **D:** \_\_\_\_\_ (1 mark)

ii. **E:** \_\_\_\_\_ (1 mark)

b. State the function of organ **C**. (1 mark)

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c. Tube **B** connects the mouth to the stomach. Explain what will happen if there is a blockage to this tube. (2 marks)

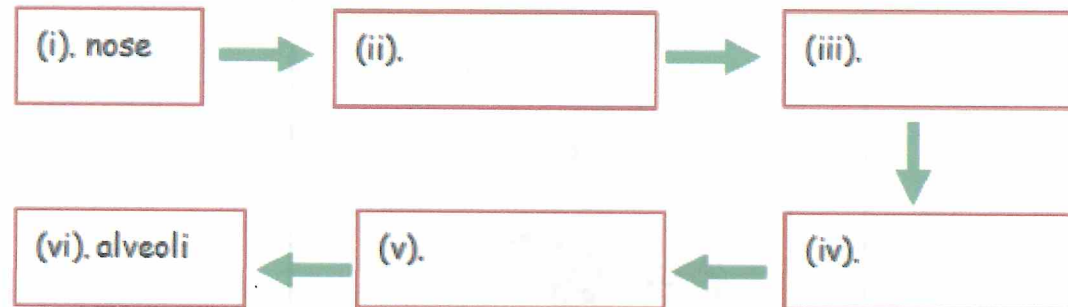
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- d. Choose a term from the list below to fill in the boxes in the following diagram to show the flow of air in the respiratory system during inhalation. (2 marks)

bronchi, bronchioles, throat, diffusion, trachea



#### 4. Micro-organisms

(4 Marks)

Austin built a compost bin (*puha fakapopo veve*) for his vegetable garden. He says this is the best way to dispose of kitchen scraps, dead leaves and twigs. These materials decompose quickly and help in the recycling of nutrients in nature.



- a. Name **TWO** (2) micro-organisms that help in the recycling of nutrients in nature. (2 marks)

\_\_\_\_\_ and \_\_\_\_\_

P.10

#### Part B: Extended Answers

(16 marks)

Answer all the questions in the spaces provided.

1. Ana bikes to school every morning. The total combined weight of Ana and her bike is 60kg.

- a. Calculate the **weight** of Ana and her bike. (2 marks)

- b. Draw and label the two forces acting on the bike as it moves. (2 marks)



- c. Give **ONE** (1) method in which air resistance is reduced when Ana rides the bike. (1 mark)

\_\_\_\_\_

- d. Explain the reason why. (2 marks)

\_\_\_\_\_

\_\_\_\_\_

2. Identify the forms of energy shown in the following diagrams. (2 marks)

- a) When a ball rolls on the ground



\_\_\_\_\_ energy

- b) When a person plays a violin



\_\_\_\_\_ energy

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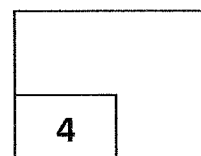
**SECTION FOUR: PHYSICAL WORLD (20 MARKS)**

**Part A: Multiple Choice Questions (4 Marks)**

Circle the letter of the **BEST** answer.

1. The energy transformation that occurs when an electric lamp is turned on is:
  - A. Electrical energy to mechanical and heat energy.
  - B. Electrical energy to light and heat energy.
  - C. Heat energy to electrical and light energy.
  - D. Light energy to electrical and sound energy.
  
2. Which of the following is one way of conserving energy in Tonga?
  - A. Always leave lights on day and nights.
  - B. Walk to places instead of driving your car.
  - C. Use plenty of water for home activities.
  - D. Use only enough resources if needed.
  
3. Energy is best defined as:
  - A. a change from one form to another.
  - B. the ability to do work.
  - C. something that cannot be destroyed.
  - D. a chemical stored in matter.
  
4. The law of conservation of energy states that:
  - A. Energy can be changed from one form to another.
  - B. Energy is lost when it changes from one form to another.
  - C. More energy is produced during energy changes.
  - D. Energy can neither be created or destroyed.

P.18



- b. Austin believes that there is no live pathogenic viruses in the compost containing kitchen wastes and dead leaves.

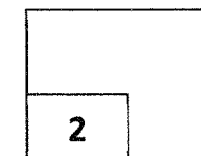
Do you agree or disagree? Give a reason for your answer. (2 marks)

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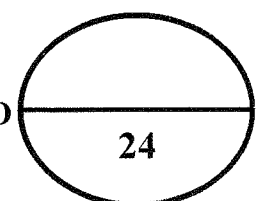


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S.TWO



SECTION THREE:

MATERIAL WORLD

(24 MARKS)

Part A:

Multiple Choice Questions

(5 Marks)

Circle the letter of the **BEST** answer.

1.
- The technique of “measuring mass by difference” can be used to find out the mass of a solid, liquid and gas.

The table below shows some measurement of a plastic bag filled with air. Use the table to find the mass of air.

| Things to measure | Mass (g) |
|-------------------|----------|
| Plastic Bag + Air | 0.578    |
| Plastic Bag       | 0.234    |
| Air               | _____    |

The mass of air is equal to \_\_\_\_\_.

- A.

0.344g
- B.

0.812g
- C.

0.135g
- D.

0.055g
2.
- How many grams are in a bag of potato with a mass of 11.0284 kg?
- A.

0.0110284g
- B.

1102.84g
- C.

11028.4g
- D.

110284g
3.
- When a certain substance melts, it occupies more space. Which of the following is **TRUE** about its density?
- A.

It is greater.
- B.

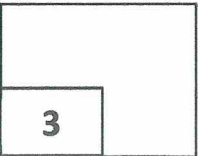
It remains the same.
- C.

It decreases.
- D.

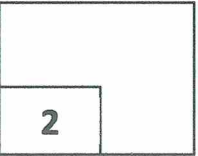
It cannot be determined.

- c.
- What is the **volume** of the stone? Give a reason for your answer.
- (2 marks)

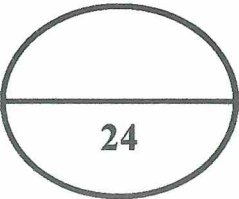
P.12



P.17



S.THREE



The density of water in room temperature is  $1\text{g/cm}^3$ .

- c. Determine if the box will sink or float in water. Explain your answer. (2 marks)

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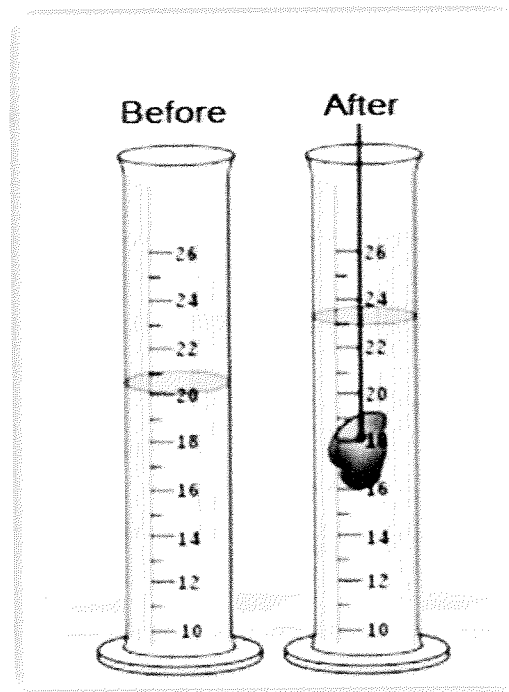


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4. The picture below shows a measuring cylinder that contains 20 ml of water. When a stone is placed in the cylinder, its water level rises to 23ml.



- a. What do you call the method above? (1 mark)

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- b. What is the difference in the water level before and after the stone was added? (1 mark)

P.16

4

4. Which of the following is not an example of a physical change?

- A. Condensation
- B. Filtration
- C. Evaporation
- D. Decomposition

5. A gas in a syringe is squeezed from 10 ml to 5 ml. The only thing that remains unchanged is the

- A. number of particles per ml.
- B. mass of the gas.
- C. volume of the gas.
- D. density of the object.

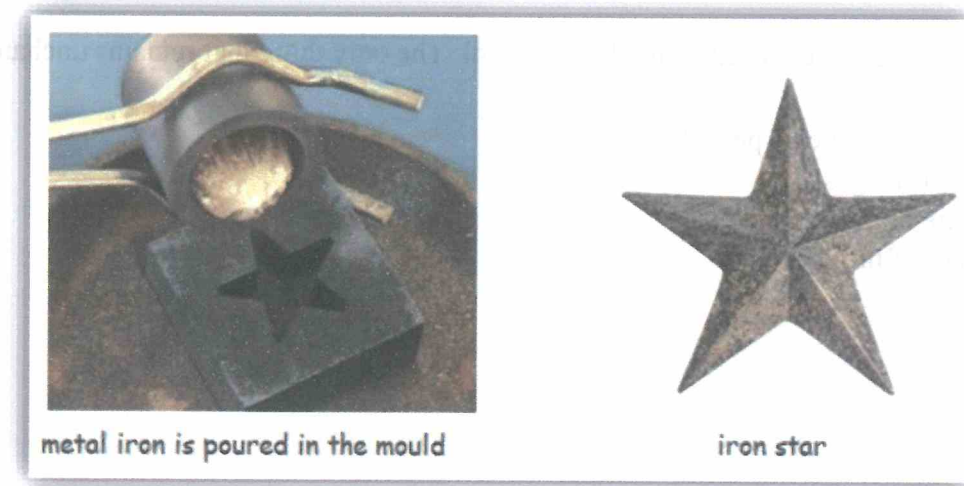
P.13

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**Part B: Extended Answers (19 marks)**

Answer all the questions in the spaces provided.

1. Iron is a metal. A 200g of iron was melted and poured into a mould to make an iron star as shown in the picture below.



- a. What is the **mass** of the iron metal in kilogram? (1 mark)

- b. Calculate the **weight** of the iron star. (2 marks)

During the process, liquid iron is cooled to become a solid. This is an example of a physical change.

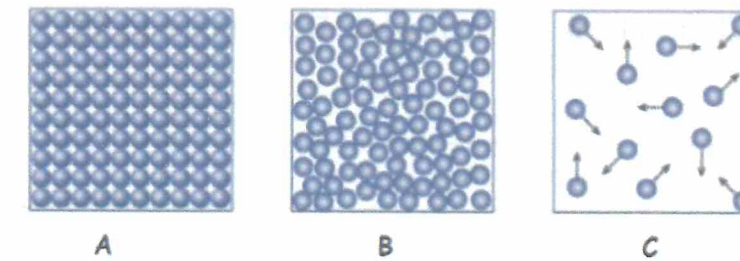
- c. Explain what **physical change** means. (2 marks)


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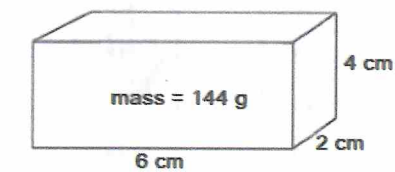
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2. The diagram below shows the arrangement of particles in each state of matter.



- a. Name the state of matter in **B**. (1 mark)
- \_\_\_\_\_
- b. What is the change of state in **A** to **C** called? (1 mark)
- \_\_\_\_\_
- c. Describe the behaviour of particles when there is a change in state from **A** to **C**. (2 marks)
- \_\_\_\_\_
- \_\_\_\_\_

3. Siale measured a box and had the following measurements.



- a. Calculate the **volume** of the box. (*Show all working and units*) (2 marks)

- b. Calculate the **density** of the box. (*Show all working and units*) (2 marks)

P.15

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