



EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE
NAME

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CENTRE
NUMBER

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NUMBER

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Science

Paper 2

414/02

October/November 2019

1 hour 45 Minutes

Additional Materials required: Calculators may be used.

READ THESE INSTRUCTIONS FIRST

Write your name, Centre number and candidate number in the spaces provided.

Write in dark blue or black ink pen in the spaces provided on the Question Paper.

You may use an HB pencil for any diagrams, graphs, tables or rough working.

Do **not** use staples, paper clips, highlighters or correction fluid.

This paper consists of two sections (Section **A** and **B**).

Answer **all** questions in both sections **A** and **B**.

The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 80.

Question	Examiner's use
Section A	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Section B	
12	
Total	

This documents consists of **13** printed pages and **3** blank pages.

Section A

- 1 Fig. 1.1 shows a beetle moving across the floor of a classroom from line A to line B.



Fig. 1.1

- Fig. 1.2 shows the reading when the beetle leaves point A.
- Fig. 1.3 shows the reading when the beetle reaches line B.

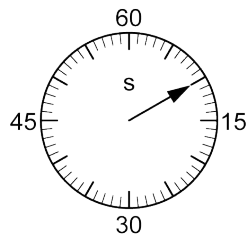


Fig. 1.2

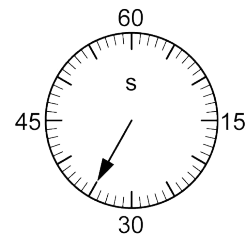


Fig. 1.3

- (a) Name the appropriate instrument used to measure the distance of 40cm.

..... [1]

- (b) Determine, using Fig. 1.2 and Fig. 1.3, the time taken by the beetle to cover the distance of 40cm.

..... [2]

- (c) Calculate the average speed of the beetle in m/s.

.....m/s [3]

[Total: 6]

2 A student wants to separate a mixture of salt and water in a laboratory.

(a) Describe how the student can obtain both salt and water from the salt solution.

.....

.....

.....

.....

.....

..... [3]

(b) Mixing of salt and water is an example of a physical change.

State **two** properties of a physical change.

1

2 [2]

[Total: 5]

3 The Periodic Table is used to classify elements into metals and non-metals.

(a) State **two** physical properties of a metal.

1

2 [2]

(b) State the symbol of fluorine element.

..... [1]

(c) Hydrogen gas is a non-metal and can be prepared in a laboratory.

Explain why hydrogen gas is collected over water.

.....

.....

..... [2]

[Total: 5]

- 4 (a) Fig. 4.1 shows a plant cell.

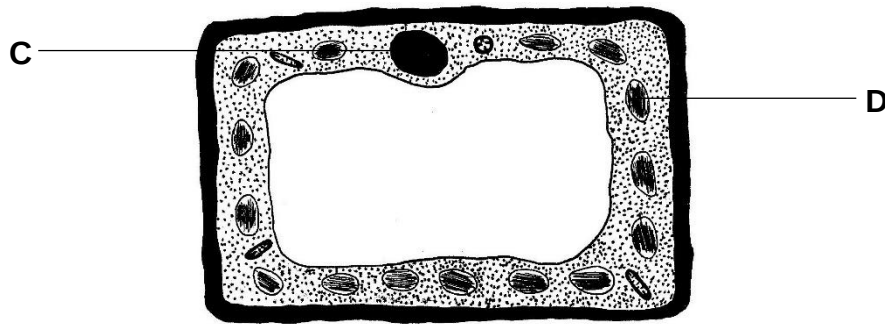


Fig. 4.1

- (i) Name the type of plant cell shown in Fig. 4.1.

..... [1]

- (ii) Name the part labelled **C** on Fig. 4.1.

..... [1]

- (iii) State the function of the part labelled **D**.

..... [1]

- (b) Explain why a leaf is an example of an organ.

.....

 [2]

- (c) Describe **two** features of a leaf that will identify it as a dicotyledonous leaf.

1

2 [2]

[Total: 7]

- 5 (a)** Convection is the transfer of heat in fluids by movement of the fluid itself.

Explain how the movement of the fluid occurs during convection.

.....

.....

.....

..... [3]

- (b)** Fig. 5.1 shows a diagram of a vacuum flask with labelled features.

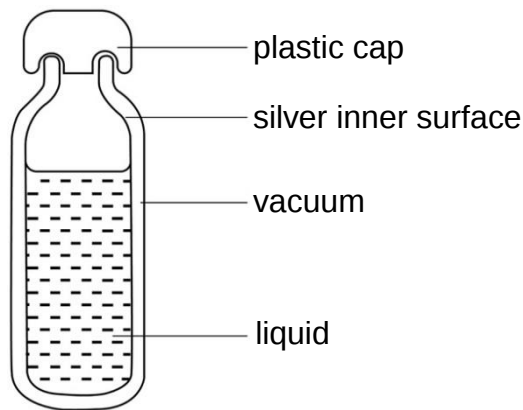


Fig. 5.1

- (i)** Which labelled feature reduces heat transfer/loss by both conduction and convection?

..... [1]

- (ii)** Explain why the named feature in **(i)** reduces heat transfer by conduction and convection.

.....

.....

..... [2]

- (c)** Explain in terms of electron movement, what happens when a plastic ruler becomes negatively charged by rubbing it with a piece of cloth.

.....

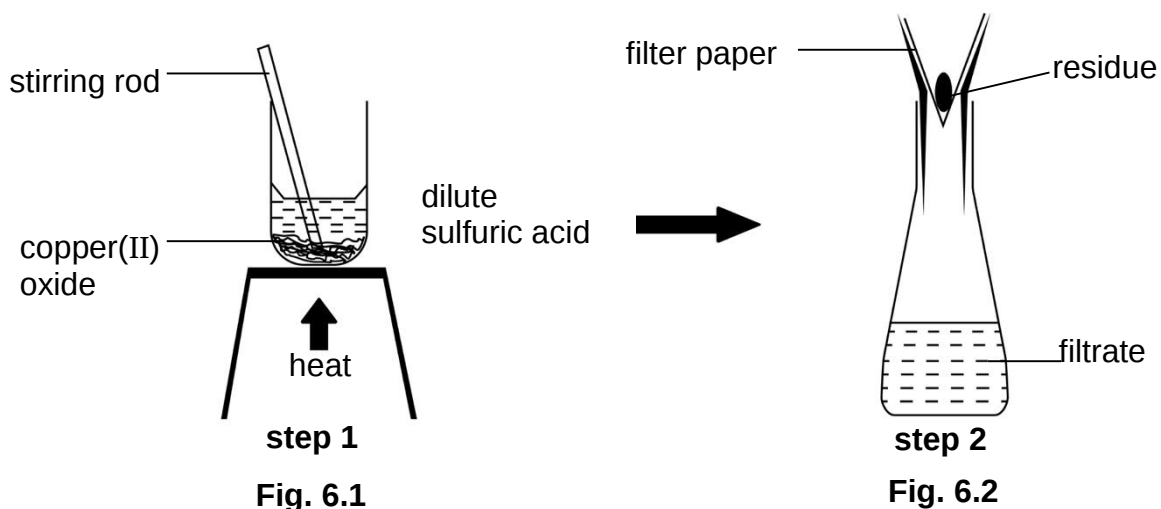
.....

..... [2]

[Total: 8]

- 6 A student prepares copper(II) sulfate by reacting dilute sulfuric acid with excess copper(II) oxide.

Fig. 6.1 shows the steps used in the preparation of the salt.



Complete Table 6.1 by providing a description and explanation for each step.

Table 6.1

steps	description	explanation
step 1		
step 2		

[4]

- (b) Complete the following equations by stating the products and the starting materials for producing the salts.

1 calcium + dilute sulfuric acid $\rightarrow$ + hydrogen

2 + $\rightarrow$ potassium chloride + water

[3]

[Total: 7]

- 7 (a) Fig. 7.1 shows the male reproductive system.

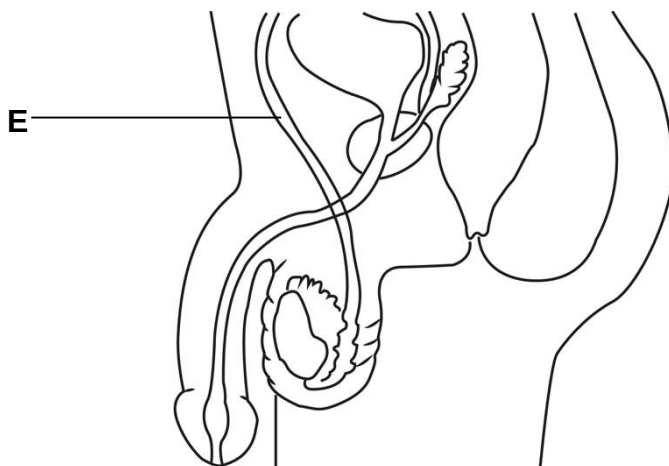


Fig. 7.1

- (i) Name the part labelled **E** in Fig. 7.1.
 [1]
- (ii) Label on Fig. 7.1, using the letter **F**, the part which produces sperms. [1]
- (b) Name the hormone responsible for secondary sexual characteristics in males.
 [1]
- (c) Unprotected sexual intercourse can result in the spread of sexually transmitted infections such as HIV infections.
 State **two** examples of opportunistic infections due to HIV infection.
- 1
 2 [2]

[Total: 5]

8 Fig. 8.1 shows magnets placed in pairs next to each other.

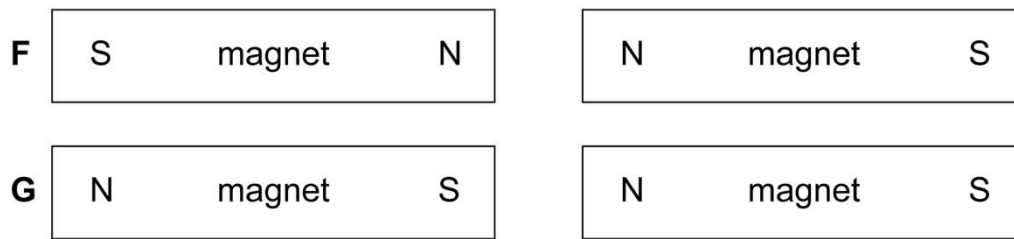


Fig. 8.1

(a) State what happens in each pair of the magnets labelled **F** and **G**.

F

G [2]

(b) Fig. 8.2 shows a bar magnet.



Fig. 8.2

Draw on Fig. 8.2, the magnetic field lines around the bar magnet. [2]

(c) Describe how dropping a magnet on the floor causes the magnet to lose its magnetism.

.....

.....

..... [2]

[Total: 6]

- 9 (a) A student puts water into a syringe as shown in Fig. 9.1.

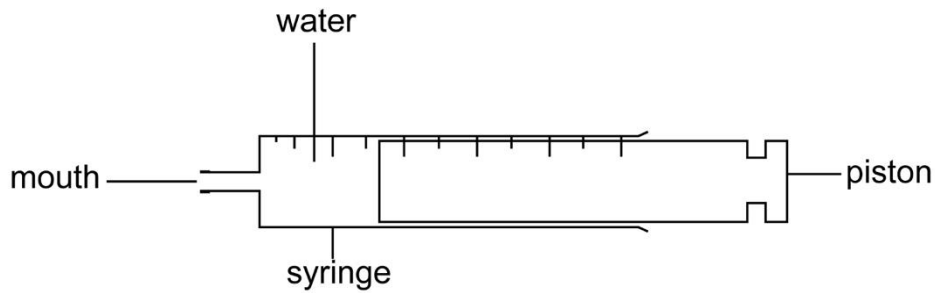


Fig. 9.1

The student closes the mouth of the syringe and pushes the piston.

Explain why the piston does not move when pushed.

.....
 [1]

- (b) Thabo smells aroma from his mother's kitchen before he enters the kitchen.

Explain how the smell of the aroma reaches Thabo before he enters the kitchen.

.....

 [3]

[Total: 4]

- 10 Fig.10.1 shows a longitudinal section of the human skin.

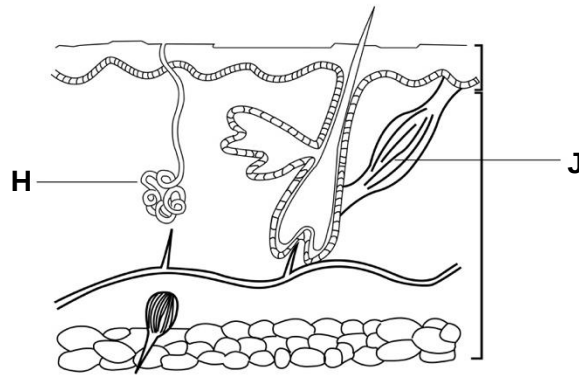


Fig. 10.1

- (a) Name the part labelled **J** in Fig. 10.1.

..... [1]

- (b) Explain the role of the part labelled **H** in cooling the body during hot weather.

.....

 [3]

[Total: 4]

- 11 Fig. 11.1 shows a circuit diagram connected by a Form 3 class.

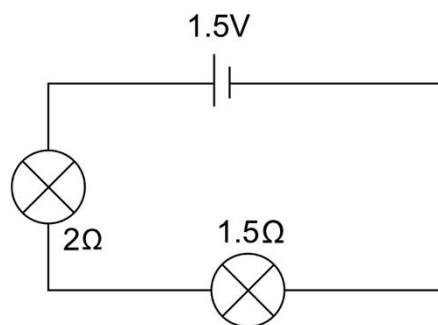


Fig. 11.1

Calculate the current passing through the cell.

..... [3]

[Total: 3]

SECTION B

- 12 (a)** Musa wants to determine the density of an irregularly shaped stone. He puts water in a measuring cylinder and records its volume.

- Fig.12.1 **A** shows the measuring cylinder with the water.
- Fig.12.1 **B** shows the scale of a balance he used during the experiment.

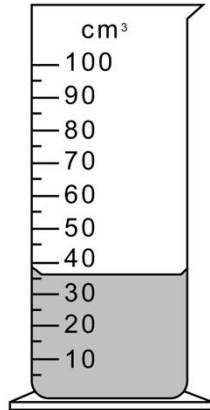


Fig. 12.1A

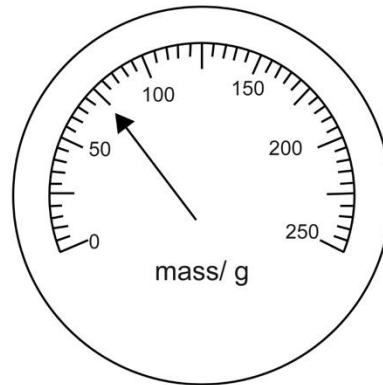


Fig. 12.1B

- (i) Record the volume of the water in the measuring cylinder and the mass shown in the balance.

volume:

mass: [2]

- (ii) State **one** precaution to ensure accurate measurement of the volume.

.....

..... [1]

- (b) Describe how Musa can determine the density of the stone.

.....

.....

.....

.....

..... [4]

- (c) Another student wants to investigate the effect of changing the amount of light on the rate of photosynthesis in a plant.

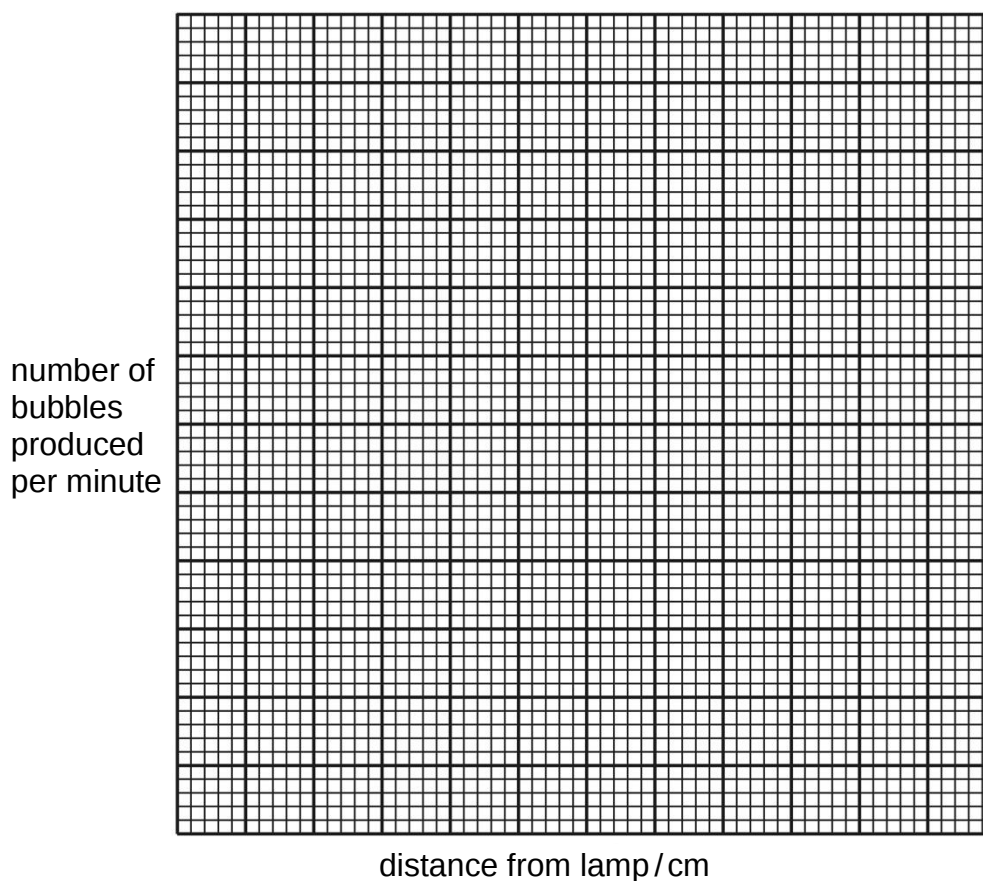
A lamp is used to vary the amount of light received by the plant and the number of bubbles is recorded. The experiment is repeated a number of times and the average number of bubbles recorded.

Table 12.1 shows the average number of bubbles produced per minute at different distances from the light source.

Table 12.1

distance from the lamp (cm)	2	4	6	8	10	12
number of bubbles per minute	45	40	30	25	15	5

- (i) Draw a graph to represent the data shown in Table 12.1.



[4]

- (ii) Use the graph to estimate the number of bubbles produced at a distance of 7cm.

.....
..... [1]

- (iii) Describe the relationship between the number of bubbles produced by the plant and the distance from the lamp.

.....
..... [1]

- (iv) Describe how you would carry out a test to prove that the gas produced is oxygen.

test

result [2]

- (v) Explain why the student repeated the experiment at the different distances to get the average number of bubbles.

.....
..... [1]

- (vi) Describe how you can carry out an investigation to find out if chlorophyll is necessary for photosynthesis.

.....
.....
.....
.....
.....
..... [4]

[Total: 20]

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