EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE NAME								
CENTRE NUMBER					CANDIDATE NUMBER			

SCIENCE **414/02**

Paper 2 **October/November 2025**

1 hour 30 minutes

Additional Materials: Calculator

READ THESE INSTRUCTIONS FIRST

Write your name, centre number, candidate number and name 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.

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.

For Examiner's use	
SECTION A	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
SECTION B	
11	
12	
13	
Total	

This document consists of **15** printed pages and **1** blank page.

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SECTION A

Answer **all** questions

1 Alcohol is a drug that leads to alcoholism when abused.

(a) State the meaning of the term *drug*.

……

……..…….... [1]

(b) Describe the term alcoholism.

……

……..…….... [1]

(c) Heroin is another drug that can lead to the spread of human immnunodeficiency virus, HIV.

Describe how heroin leads to the spread of human immnunodeficiency virus, HIV.

……..……..…

……..……...…….

……..……...…….

……..…….…… [3]

(d) Explain how HIV leads to the development of acquired immnunodeficiency syndrome, AIDS.

……..……..

……..……...……..

……..……..

……..……...…… [3]

[Total: 8]

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2 Fig. 2.1 is a diagram of an electrical appliance used in most homes.

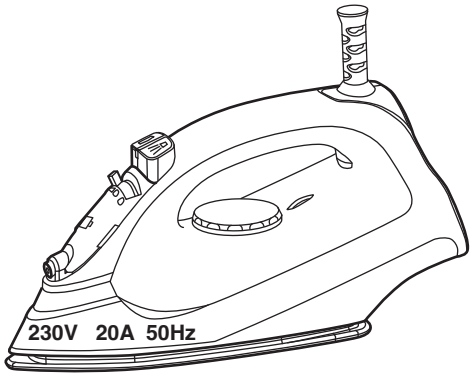

Fig. 2.1

(a) State **one** use of electricity in the appliance shown in Fig. 2.1.

…… [1]

(b) Describe the term power of an appliance?

……

…… [1]

(c) Calculate the power of the appliance.

Show your working. State the correct unit.

power = …… [3]

[Total: 5]

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[Turn over

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3 Fig. 3.1 shows the arrangement of particles in a moth ball.

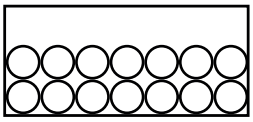


Fig. 3.1

(a) Describe the arrangement of the particles in Fig. 3.1.

……

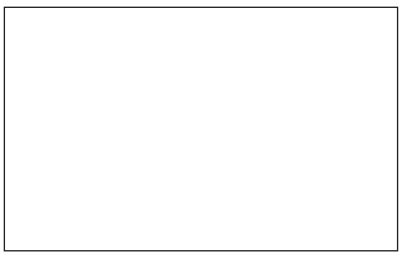
…… [1]

(b) When the moth ball is heated, it changes directly to a gas.

(i) State the name of the process by which the solid changes to a gas.

…… [1]

(ii) Draw, in Fig. 3.2, the arrangement of moth ball particles after heating.



[2]

Fig. 3.2

(c) Describe, using the kinetic particle theory, how the kinetic energy and intermolecular forces change when the moth ball is heated.

kinetic energy……

……

intermolecular forces……

…… [2]

[Total: 6]

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4 Fig. 4.1 is a diagram that shows blood circulation in a human body.

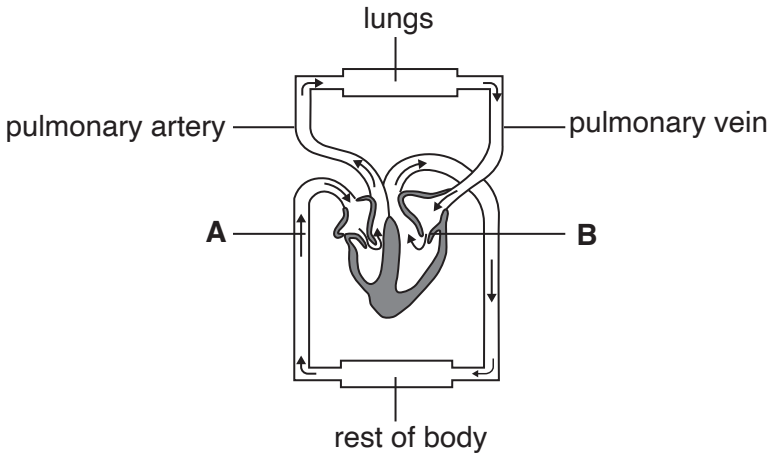

Fig. 4.1

(a) Name the blood vessel labelled **A**.

..... [1]

(b) Describe the function of the part labelled **B** in Fig. 4.1.

.....

..... [1]

(c) Describe **two** differences between the composition of blood in the pulmonary artery and the pulmonary vein.

	pulmonary artery	**pulmonary vein**
difference 1	....	....
difference 2	....	....

[2]

(d) Describe, with reference to Fig. 4.1, the role of the lungs.

.....

.....

.....

..... [2]

[Total: 6]

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For Examiner's Use

5 Fig. 5.1 shows a girl playing on a swing.

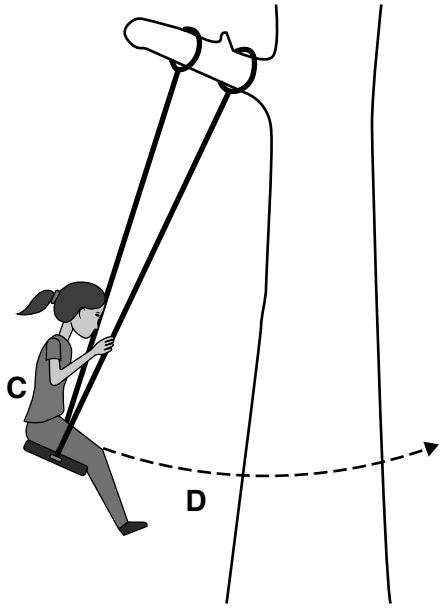

Fig. 5.1

(a) State the energy changes that occur as the girl swings from position **C** to position **D**.

……

……

…… [2]

(b) The girl then climbs up the tree to adjust the strings of the swing.

(i) Name the type of force that enables the girl to climb up the trunk of the tree.

…… [1]

(ii) Suggest how the girl can reduce the size of the force needed to climb up the trunk of the tree.

……

…… [1]

(iii) State **one** disadvantage of the force you mentioned in **(b)(i)**.

……

…… [1]

[Total: 5]

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6 Potassium chloride and sodium chloride are compounds.

A student dissolves potassium chloride in water to form a solution.

(a) Using these examples, define a compound.

……

……

……

…….... [2]

(b) Describe how you can obtain large crystals of potassium chloride from its solution.

……

……

……

……

……..… [3]

(c) State the chemical formula of sodium chloride.

……..……. [1]

[Total: 6]

7 Plants absorb water from the soil. The water moves up the stem to the leaves.

The water moves up the stem to the leaves.

(a) Name the tissue that transports water up the stem.

……..……. [1]

(b) Plants use water during photosynthesis.

(i) Name the transparent tissue on the leaves that allows light to pass through to the palisade cells.

……..……..... [1]

(ii) Write the word equation for photosynthesis.

.....

……..……..... [2]

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[Turn over

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(c) Describe how the other parts of the plant obtain the products of photosynthesis.

……

…… [2]

[Total: 6]

8 Fig. 8.1 shows a lever used to lift a heavy load.

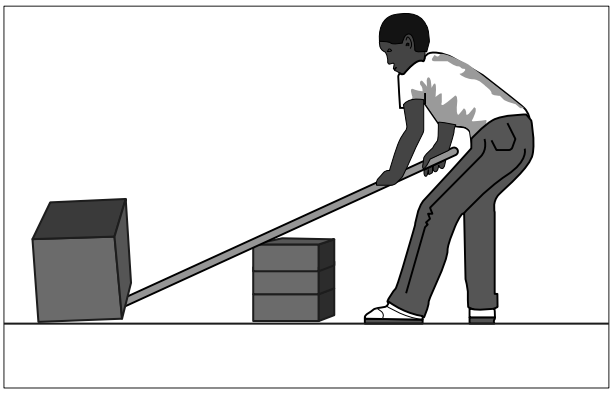

Fig. 8.1

(a) Define the term lever.

……

…… [1]

(b) Mark and label the fulcrum in Fig. 8.1. [1]

(c) The load has a weight of 100 N.

Calculate the moment produced by the load when placed 80 cm away from the fulcrum.

moment =…… [3]

[Total: 5]

For Examiner's Use

9 The Periodic Table is used to classify elements.

(a) State the name given to the rows of elements of the Periodic Table.

…… [1]

(b) Fig. 9.1 shows a piece of sodium, a Group I metal, being cut.

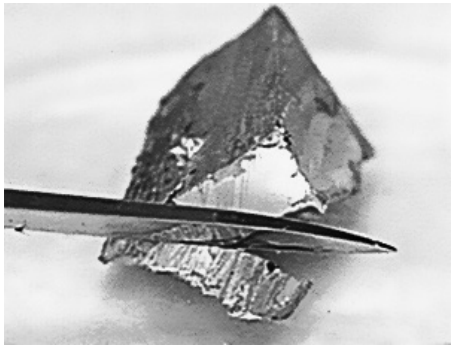

Fig. 9.1

State one physical property of Group I metals shown in Fig. 9.1.

…… [1]

(c) When a piece of sodium metal is dropped into water, a violent reaction occurs.

Describe **one** observation made during this reaction.

……

……[1]

(d) The reaction of sodium and water is a chemical change.

Describe, using this reaction, why the reaction of sodium and water is a chemical change.

……

……

…… [2]

(e) **(i)** Describe a positive test for hydrogen gas.

test ……

……

result ……

[2]

(ii) State **one** use of hydrogen gas.

…… [1]

[Total: 8]

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[Turn over

For Examiner's Use

10 A student covering books pulls an end of a sticky tape down. This causes both the roll and the end of the tape to be electrically charged by friction.

Fig. 10.1 shows a roll of sticky tape with its end pulled down.

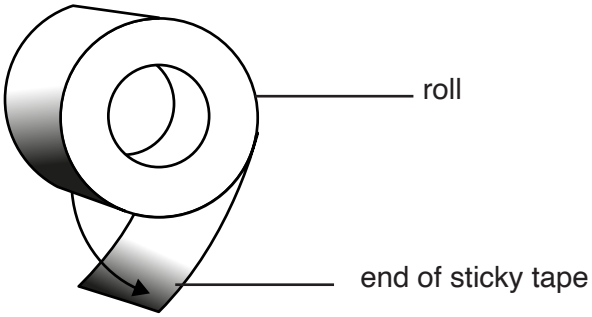

Fig. 10.1

This causes both the roll and the end of the tape to be electrically charged by friction.

(a) Describe how the roll and the end of the tape become electrically charged by friction.

……...

...……

……..……

……..……

…… [3]

(b) The student lets go of the end of the tape and the charges cause it to move towards the roll as shown in Fig. 10.2.

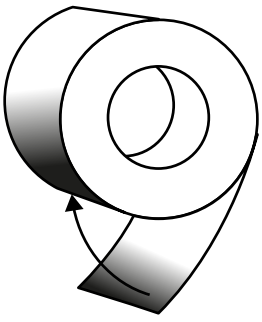

Fig. 10.2

Explain why the end of the tape moves back towards the roll.

……...

……..……

……..…… [2]

[Total: 5]

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SECTION B

11 A student carries out an experiment to investigate some properties of acids and bases.

The student is provided with two unknown solutions, solution **A** and solution **B**.

Solution **A** is an acid and solution **B** is a soluble base.

(a) Describe how the student can use a litmus paper to identify solution **A** as an acid.

……

…… [2]

(b) The student places 5 cm^3 of solution A into a test tube. Then adds the same volume of the solution **B**.

(i) Describe one observation the student makes as solution **B** is added.

……

…… [1]

(ii) State the name of the reaction that occurs between solution **A** and solution **B.**

…… [1]

(c) Suggest **one** change the student can make on the experiment to ncrease the speed of the reaction.

……

…… [1]

(d) Describe how the student can determine the pH of the soluble base.

……

……

……

…… [2]

[Total: 7]

For Examiner's Use

12 A student investigates the movement of water in and out of a raisin.

The student:

- measures and records the mass of the raisin.
- puts the raisin in a beaker containing distilled water as shown in Fig. 12.1.

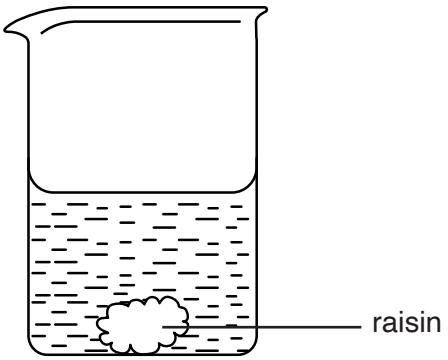

Fig. 12.1

The student:

- leaves the raisin in the beaker for one hour.
- measures the mass of the raisin again.

Fig. 12.2 shows the appearance of the raisin after one hour.

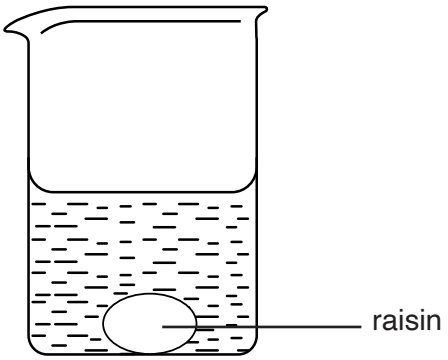

Fig. 12.2

(a) (i) Describe and explain the appearance of the raisin after one hour.

description ……

explanation ……

……

……

[2]

(ii) Describe one precaution the student makes on the raisin before measuring its mass.

……

…… [1]

(iii) Name the instrument the student uses to measure the mass of the raisin.

…… [1]

(b) The student then places the raisin in a sugar solution for another hour.

The size of the raisin remains unchanged.

Fig. 12.3 shows the raisin at the end of this hour.

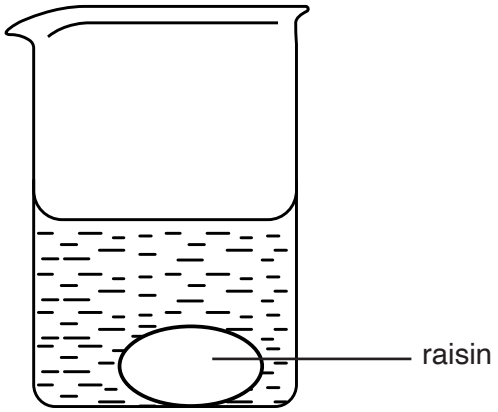

Fig. 12.3

State and explain why there was no change in mass.

……

……

……

…… [2]

[Total: 6]

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13 A teacher carries out two experiments.

In experiment 1, the teacher investigates the laws of reflection using a plane mirror and a light ray.

Fig. 13.1 shows the ray of light directed to the mirror so that it strikes the mirror at an angle

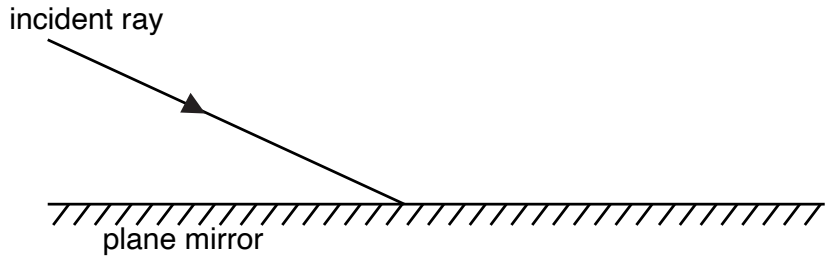

Fig. 13.1

(a) Complete Fig. 13.1 to show the reflected light ray after striking the plane mirror. [2]

(b) Measure and record the angle of incidence and angle of reflection.

angle of incidence …….

angle of reflection ……..

[2]

(c) The teacher then places the plane mirror on a wall and looks at the image.

State **one** characteristic of the image.

…..……

……..... [1]

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(d) She then investigates the action of a diverging lens on a beam of light.

Fig. 13.2 shows the diverging lens and the incident beam of light.

Complete Fig. 13.2 to show the direction of the beam of light after passing through the lens.

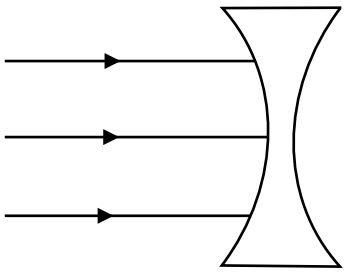

Fig. 13.2

[2]

[Total: 7]

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