EXAMINATIONS COUNCIL OF ESWATINI
Junior Certificate Examination

CANDIDATE NAME								
CENTRE NUMBER					CANDIDATE NUMBER			

Science **414/02**

Paper 2 **October/November 2020**

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	
Section B	
10	
Total	

This documents consists of **14** printed pages and **2** blank pages.

SECTION A

1 Fig. 1.1 shows a circuit diagram.

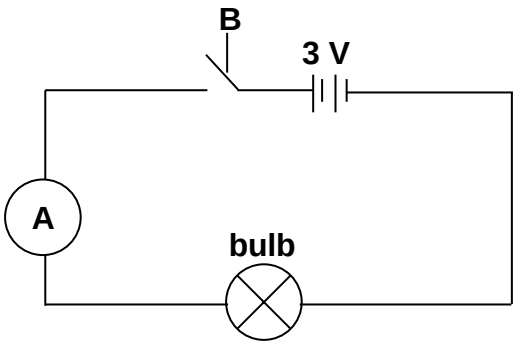

Fig. 1.1

(a) **(i)** Name the component of the circuit labelled **B** in Fig. 1.1.

……..……... [1]

(ii) State the function of the part labelled **A** in Fig.1.1.

……..……... [1]

(b) Draw, on Fig. 1.1, a voltmeter to measure the potential difference across the bulb. [2]

(c) The connecting wires are conductors of electricity.

Explain what is meant by a *conductor of electricity*.

……..……...……..

……..……..……

……..… [2]

[Total: 6]

2 A tool shed is made of galvanised iron sheets and has painted window frames to prevent rusting.

(a) State the physical property of iron that makes it suitable for making iron sheets.

……. [1]

(b) **(i)** Describe the process of rusting.

……

……

……

……. [3]

(ii) State a reason why rusting is an example of a chemical change.

……

……. [1]

(c) **(i)** Iron extracted from its ore in a blast furnace is impure.

Describe how the properties of the iron from a furnace are improved.

……

……

……. [2]

(ii) Write a word equation for the extraction of iron.

……. [2]

[Total: 9]

3 Fig .3.1 shows a female reproductive system.

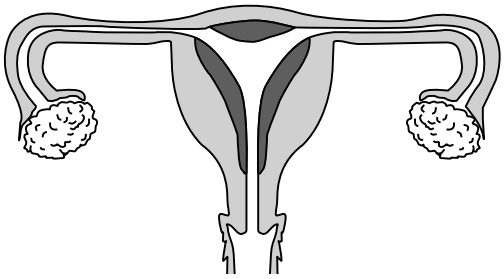

Fig. 3.1

(a) Identify using the letters **C, D** and **E** and label lines on Fig.3.1 where the following take place:

C: fertilisation

D: development of an embryo

E: production of eggs [3]

(b) State the name of the sex cells which carry genetic information that is passed from parents to their offsprings.

……[1]

(c) Describe what is meant by the following terms:

(i) menstruation……..……..…….……..

……..……..…

(ii) ovulation…….……..……..…….……..…..

……..……..…… [2]

(d) Describe how HIV infection leads to the development of AIDS.

……...

……..……..…….

……..……..…… [2]

[Total: 8]

4 Fig. 4.1 shows a girl standing in front of a large vertical plane mirror.

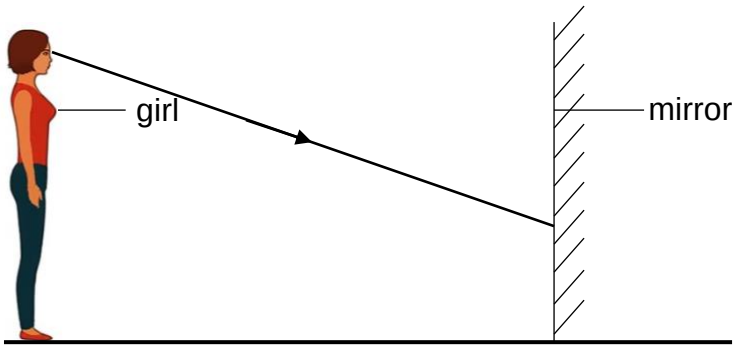

Fig. 4.1

(a) Mark with a cross labelled **F**, on Fig. 4.1, the position of the image of the girl's nose tip. [1]

(b) The incident ray from the eye is shown in Fig. 4.1.
Draw, on Fig. 4.1, a reflected ray. [3]

(c) State **one** difference between the image formed in Fig. 4.1 and a real image.

……..…….……..…

……..…….……..…. [1]

[Total: 5]

5 A school provides rice, fried chicken, oranges and spinach for lunch to pupils.

(a) Name the source of proteins from this meal.

..... [1]

(b) State the importance of spinach and oranges in the body.

spinach……..…

oranges……..….. [2]

(c) Rice is an example of a carbohydrate. It is made up of small basic units.

(i) Name the smallest basic unit making up the rice.

..... [1]

(ii) Describe a test that you would carry out to show that the rice contains starch.

.....

..... [2]

(iii) Describe how the rice is digested in the mouth.

.....

.....

……..…….. [2]

(d) Complete the missing information in the table below by writing the name of the food and end product of digestion.

name of food	end product
	amino acid
fats	

[2]

[Total: 10]

6 Fig. 6.1 shows apparatus used to prepare carbon dioxide by reacting calcium carbonate with dilute hydrochloric acid.

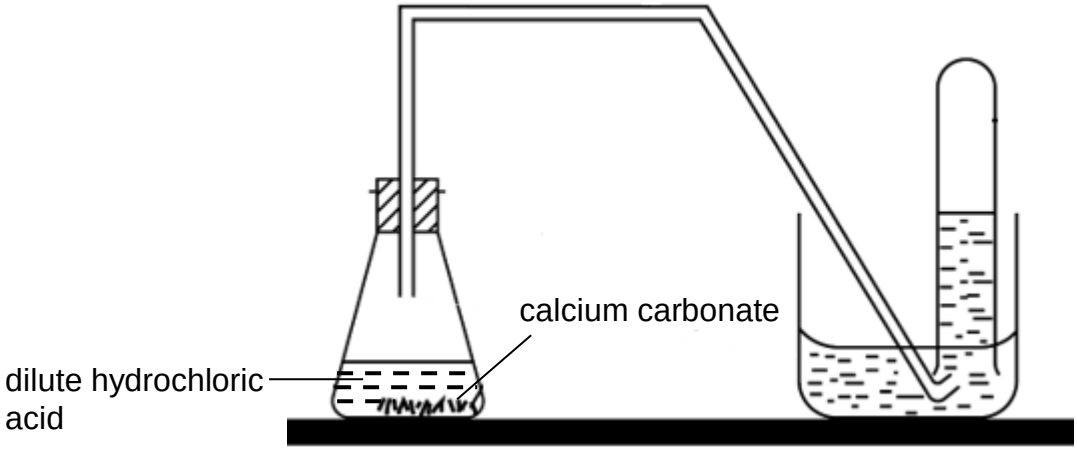

Fig. 6.1

(a) Name the method used to collect the gas in Fig. 6.1.

……..……..…… [1]

(b) Carbon dioxide is both a colourless and odourless gas.
State any other physical property of carbon dioxide.

……..…[1]

(c) Describe a test to show that the gas collected is carbon dioxide.

test……...……

result…….. [2]

(d) Carbon dioxide is an example of a compound.

Explain why carbon dioxide is a compound.

……..……..…..

…….…… [2]

(e) State why carbon dioxide is used in fire extinguishers.

……..……..…. [1]

[Total: 7]

7 Light waves are transverse while sound waves are longitudinal.

(a) State the difference between transverse and longitudinal waves.

……

……

……

…… [3]

(b) Fig. 7.1 shows rope waves produced in 5 seconds.

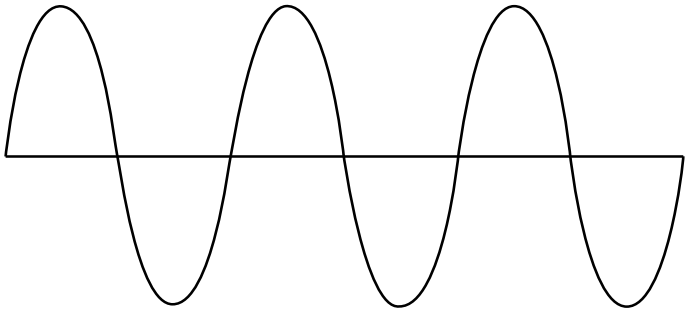

Fig. 7.1

(i) Measure and record the wavelength of the waves in Fig. 7.1.

…… [1]

(ii) Determine the frequency of the waves in Fig. 7.1.

……Hz [1]

[Total: 5]

8 **(a)** Describe the movement of particles in solid potassium permanganate.

……..……..……

……..…… [2]

(b) Fig. 8.1 shows potassium permanganate placed into a beaker of cold water through a straw.

The set-up is left for one minute and the purple colour is observed around the straw.

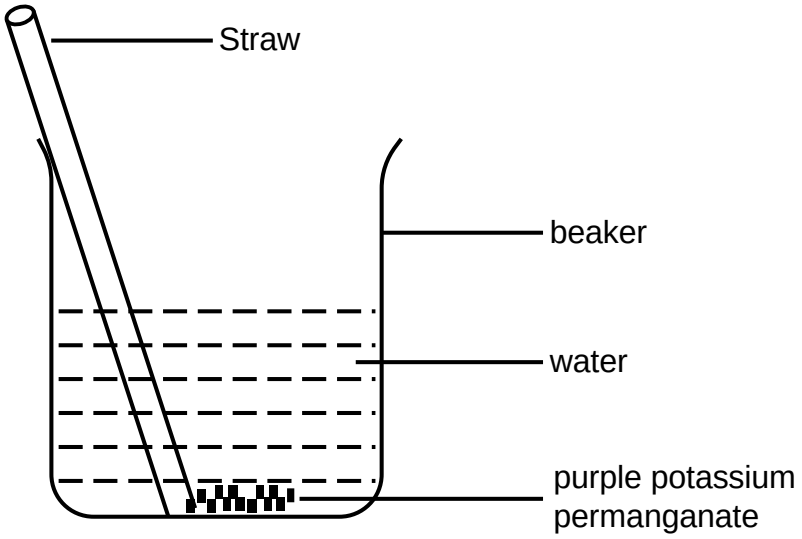

Fig. 8.1

State and explain what would be observed in Fig. 8.1 if the set-up is left for one hour.

observation:……..……..……

explanation:……..……..……

……..…

……..…… [3]

[Total: 5]

9 Energy is the ability to do work.

(a) State the main form of energy given out by a burning candle.

……. [1]

(b) Fig. 9.1 shows a hydro-electric power station.

The water is allowed to fall from point **G** to point **H**.

The total energy at point **G** is equal to the total energy at point **H**.

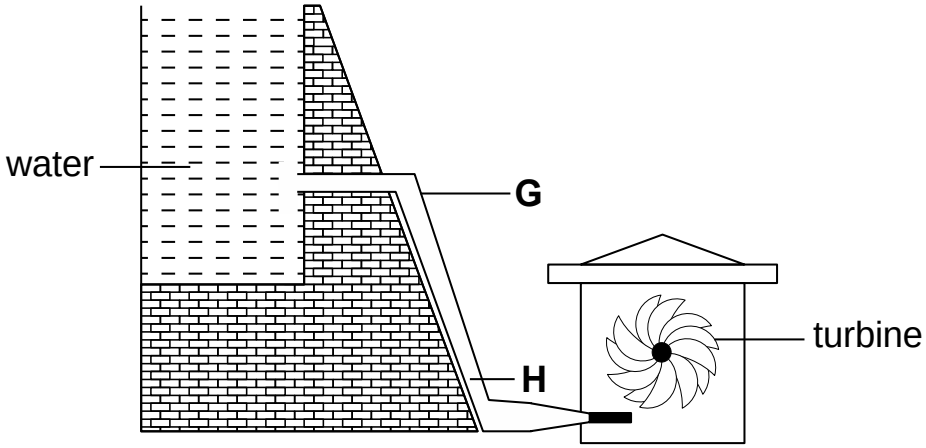

Fig. 9.1

(i) State the main energy conversions that take place as the water moves from point **G** to point **H**.

…… [2]

(ii) Explain why the energy of the water at point **G** is equal to the energy of the water at point **H**.

……

……

…… [2]

[Total: 5]

SECTION B

10 Fig. 10.1 shows apparatus used in the laboratory.

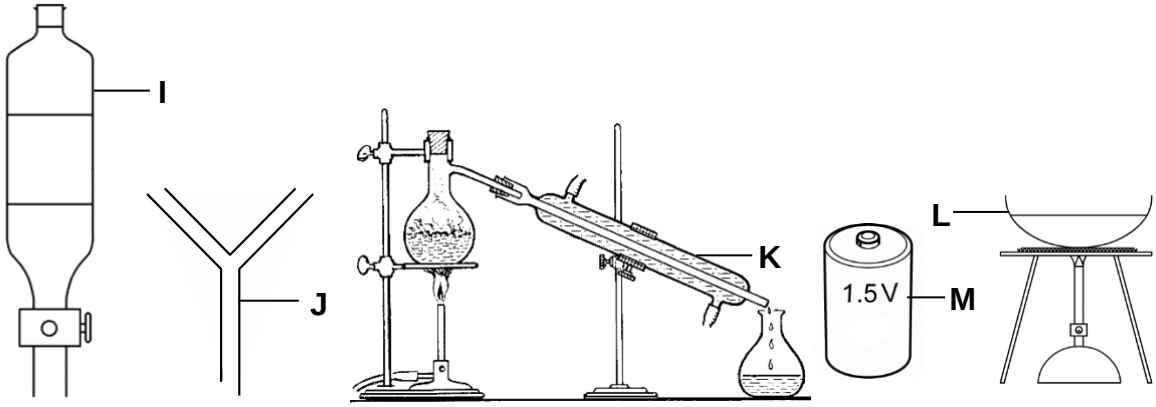

Fig. 10.1

(a) Name the apparatus labelled **K** and **L** in Fig. 10.1.

K……..……..……..... [1]

L……..... [1]

(b) State the functions of apparatus **J** and **M** in Fig. 10.1.

J……..…. [1]

M..……..... [1]

(c) Describe the type of substances that can be separated using apparatus **I**.

……..……..…..[1]

(d) Fig.10.2 shows an irregularly shaped card freely suspended on a pin clamped on a retort stand in order to find its centre of mass.

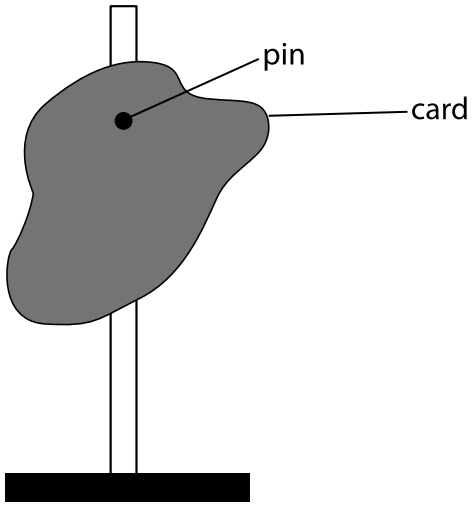

Fig. 10.2

Describe how the centre of mass of the card in Fig. 10.2 can be determined.

……

……

……

……

…… [4]

(e) Fig. 10.3 shows a car.

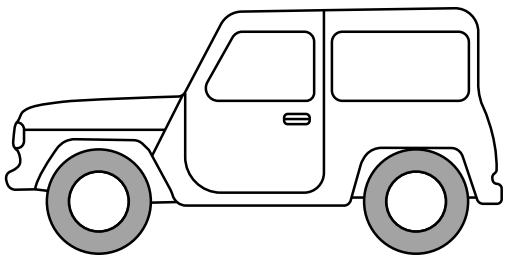

Fig. 10.3

Describe and explain how the design of the car in Fig. 10.3 can be improved to make it more stable.

……

……

…… [2]

(f) Pupils in a science class want to know if the colour of a flower affects the number of insects that visit it.

Describe an experiment they would carry out to investigate the effect of flower colour on the number of insects that visit it.

.....

.....

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……

……

……

…… [5]

(g) Fig. 10.4 shows apparatus for a reaction between dilute hydrochloric acid and magnesium.

The thermometers show initial and final temperatures.

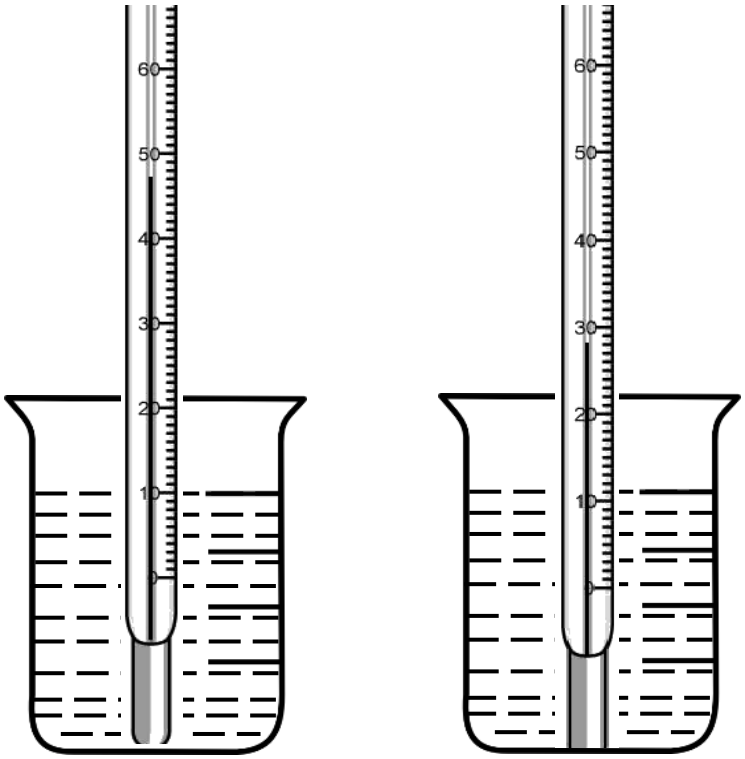

Fig. 10.4

(i) Complete Table 10.1 by recording the initial temperature, final temperature and change in temperature shown in Fig.10.4.

Table 10.1

initial temperature/ °C	final temperature/ °C	change in temperature/ °C

[2]

(ii) State **two** ways by which the temperature can be accurately measured.

1……..…….

2…….…… ……. [2]

[Total:20]

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