Name:	Class	Index No.

Jurong West Secondary School

Mid-Year Examinations 2018

75

LOWER SECONDARY SCIENCE

Secondary One Express

08 May 2018
0800 – 0930
1 h 30 min

Candidates answer on the Question Paper.

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams, graphs, tables or rough working.
Do not use staples, paper clips, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A
There are **twenty** questions. Answer **all** questions.
For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the **one** you consider correct and record your choice in the boxes provided on Page 2.
Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this question paper.

Section B and C
Answer **all** questions in the spaces provided. The number of marks is given in brackets [ ] at the end of each question or part question.

A copy of the Periodic table is provided on page **20**.

After checking of answer script		
Checked by Student	**Signature**	**Date**

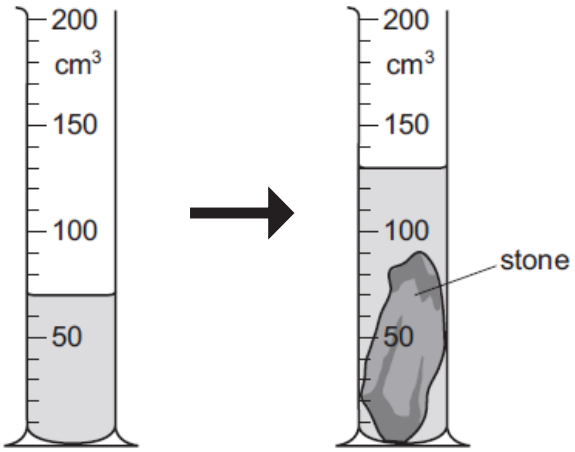
For Examiner's Use	
Section A	
Section B	
Section C	
Total	

Section A: Multiple Choice (20 marks)

Answer **all** questions. For each question there are four possible answers **A**, **B**, **C** and **D**. Choose the one you consider correct and record your choice in the boxes below.

A1	A2	A3	A4	A5
A6	**A7**	**A8**	**A9**	**A10**
A11	**A12**	**A13**	**A14**	**A15**
A16	**A17**	**A18**	**A19**	**A20**

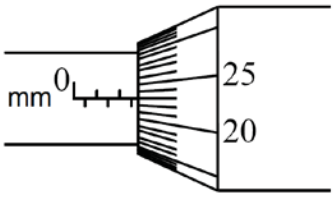
A1 The diagram shows some water in a measuring cylinder, and the same measuring cylinder with a stone completely immersed in the water.



What is the volume of the stone?

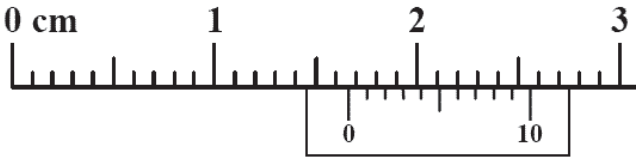
A 50 cm^3 **B** 60 cm^3 **C** 70 cm^3 **D** 130 cm^3

A2 What is the reading shown on the micrometer screw gauge?



A 0.23 mm **B** 2.523 mm **C** 2.73 mm **D** 5.23 mm

A3 What is the reading shown on the Vernier callipers?



A 1.46 cm **B** 1.66 cm **C** 2.12 cm **D** 2.26 cm

A4 A scientist reported a new discovery. A few scientists did not agree with the results of the new discovery. What is the best thing the rest of the scientists can do?

A Have other scientists repeat the scientist's experiments.
B Ignore the scientists who disagree with the discovery.
C Reject the discovery that was reported.
D Take a vote to decide who is correct.

*Read the description of the experiment in the box below to answer questions **A5** and **A6**.*

- 120 pea seeds were put in petri dishes covered with moist paper towels.
- Each petri dish was wrapped inside a black plastic bag.
- The seeds in their petri dishes were then divided into 3 groups.
- 1 group of 40 pea seeds were placed in an incubator set to 20°C.
- Another group of 40 seeds were placed in an incubator set to 30°C.
- The last group of seeds were placed in an incubator set to 40°C.

A5 In this experiment, what was the independent variable?

A Amount of light
B Amount of moisture
C Temperature of the incubator
D The number of pea seeds

A6 Which of the following was the likely aim of this experiment?

A To determine if pea seeds can germinate without light.
B To determine if petri dishes are suitable for germinating pea seeds.
C To determine if temperature of the incubator can be adjusted.
D To determine if temperature affects the germination of pea seeds.

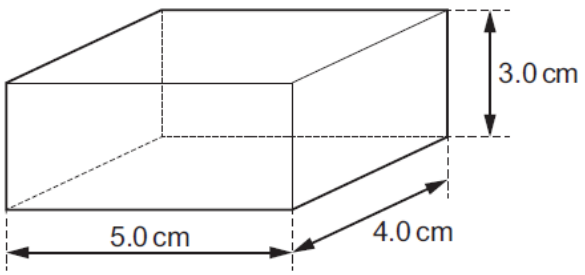
A7 The mass and volume of three liquids are measured.

liquid	mass / g	volume / cm^3
corn syrup	10.8	10
salad oil	23.0	25
vinegar	30.3	30

What is the difference in density between the least dense and densest liquids listed in the table?

A 0.07 g/cm^3 **B** 0.09 g/cm^3 **C** 0.16 g/cm^3 **D** 1.08 g/cm^3

A8 The diagram shows a rectangular block.



The density of the block is 2.5 g/cm^3. What is the mass of the block?

A 18 g **B** 24 g **C** 50 g **D** 150 g

A9 When a car stops suddenly, a passenger inside the car tends to keep moving because of his _____.

A inertia **B** mass **C** volume **D** weight

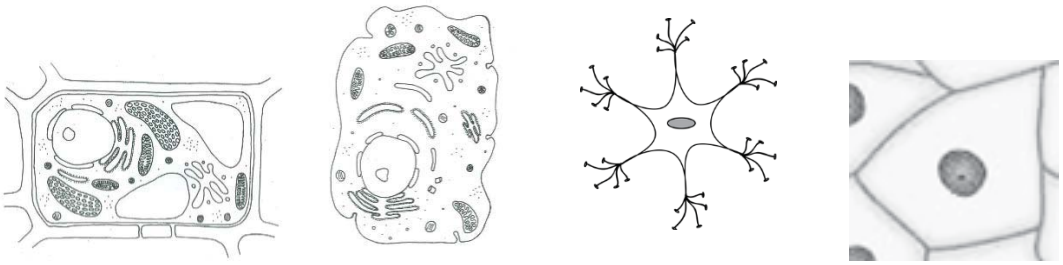
A10 Sam conducts an experiment to see if a marble floats or sinks in some liquids. His results are shown in the table.

liquid	marble
P	sinks
Q	floats
R	floats
S	sinks

Based on this data, what is the best conclusion?

A The marble is denser than all the four liquids.
B Liquid **P** has the same density as liquid **S**.
C Liquid **P** is denser than liquid **Q**.
D Liquid **R** is denser than liquid **S**.

A11 Which of the following are examples of animal cells?



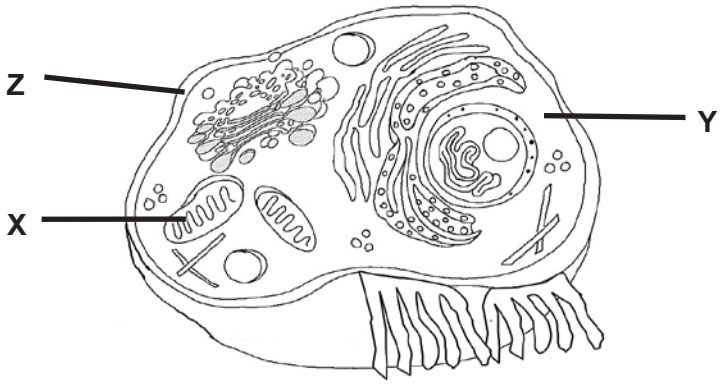
1 **2** **3** **4**

A **1** and **2**
B **1** and **4**
C **2**, **3** and **4**
D **1**, **2**, **3** and **4**

A12 Which of the following is **not** true?

A An organ is made up of one type of cell working together.
B Tissues are made up of similar cells with the same function working together.
C An organ system is made up of many organs working together.
D An organ is a group of different tissues working together.

*For questions **A13** and **A14**, refer to the animal cell below.*



A13 What is the function of **X** and **Y**?

	Function of X	Function of Y
A	storage of dissolved substances	carry out aerobic respiration
B	storage of dissolved substances	place for chemical reactions
C	carry out aerobic respiration	provide energy for the cell
D	carry out aerobic respiration	place for chemical reactions

A14 What is **Z**?

A nucleus
B cytoplasm
C cell wall
D cell membrane

A15 A light microscope was used to observe a cell under a total magnification of 400×. The magnification of the ocular lens used is 10×.

What is the magnification of the objective lens used?

A 4× **B** 40× **C** 400× **D** 4000×

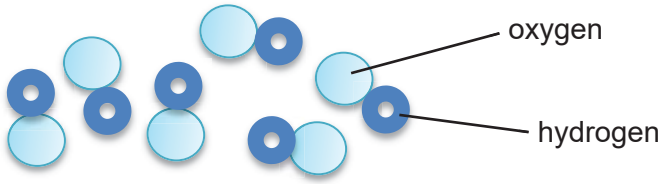
A16 When air is heated, it expands because

A the air molecules are getting bigger.
B the number of air molecules increases.
C the air molecules are moving faster and further apart.
D the air molecules move at the same speed but further apart.

A17 Which of the following is **not** true?

A Compounds are made up of two or more elements.
B Matter can be made up of atoms and molecules.
C Non-metallic elements are found on the left side of the Periodic Table.
D The Periodic Table consists of only elements.

A18 Substance **T** is made up of elements hydrogen and oxygen and the particles of **T** are arranged as shown below.



Which of the following is **not** true?

A **T** comprises molecules only.
B **T** does not have a fixed melting point.
C **T** has properties different from those of hydrogen and oxygen.
D **T** is made up of hydrogen and oxygen combined in a specific ratio.

*For questions **A19** and **A20**, refer to the table below showing the melting and boiling points of four substances **A** to **D**.*

Substance	Melting point / °C	Boiling point / °C
A	44	890
B	98	180
C	–39	357
D	–112	–18

A19 Which substance exists as a liquid over the smallest range of temperature?

A20 Which of the substance(s) is/are a solid at room temperature of 25°C?

A **A** only
B **C** only
C **A** and **B**
D **C** and **D**

Section B: Structured Questions (35 marks)
Answer all the questions in the spaces provided.

B1 **(a)** Write the names of the apparatus represented by the following diagrams. [2]

diagram	name of apparatus
	
	
	

(b) State what the following GHS symbols mean. [2]

GHS symbol	meaning
	
	

B2 Fig. 2 shows a part of an animal cell.

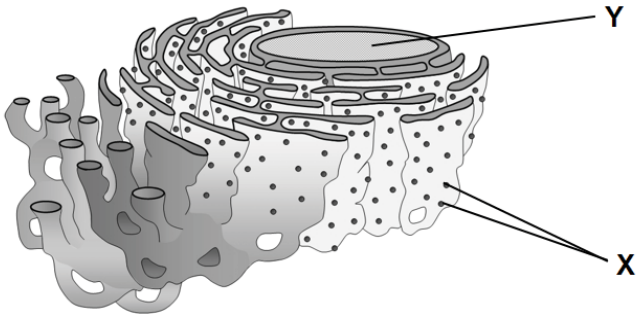


Fig. 2

(a) The function of structure **X** is to synthesize proteins. State the name of **X**.

……[1]

(b) For **X** to synthesize proteins quickly, it needs instructions that can only be obtained from DNA which is found in structure **Y**.

(i) State the name of structure **Y** and describe its main function.

……

……

……[2]

(ii) If structure **Y** is damaged, suggest what might happen to the cell.

……

……[1]

B3 Fig. 3 shows the cell wall and nucleus of a plant cell.

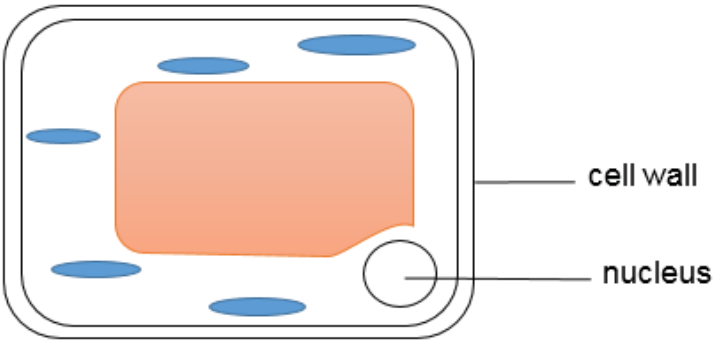


Fig. 3

(a) Draw an arrow to show and label the cell structure

(i) which stores dissolved substances,

(ii) which contains chlorophyll. [1]

(b) A cell structure is not labelled in Fig. 3. This structure is partially permeable. Describe the function of this cell structure.

.....

.....[1]

(c) Using ideas of cell structures, explain why an elephant requires a skeleton but a rain tree does not.

.....

.....

.....

.....[2]

(d) A student states, “All plant cells contain chlorophyll.”

State, giving a reason, whether you agree with this statement.

.....

.....

.....[2]

B4 **(a)** Describe the arrangement of the particles in a solid substance.

……

……

……[2]

(b) The substance is heated until it melts and then boils to form a gas.

(i) Explain why heat has to be supplied in order to melt the substance.

……

……

……[2]

(ii) Describe the **changes** in the arrangement of the particles when the substance is in the gaseous state.

……

……

……[2]

B5 Fig. 5 shows water droplets forming on the side of a cup that was taken out from the refrigerator.

Fig. 5

(a) Using ideas involving heat gain or loss, explain how the water droplets are formed.

……

……

……[2]

(b) Describe the change in the forces of attraction between the water particles during the formation of the water droplets.

……

……

……[2]

B6 A mixture is prepared using the steps shown below.

1) Mix 10 g of sand and 10 g of fine sugar with 50 cm^3 of water.
2) Stir the mixture.
3) Filter the mixture using the appropriate apparatus.

(a) State what is the filtrate in step 3.

……[1]

(b) If the fine sugar in step 1 is replaced with sugar cubes, state and explain how this will affect the rate of dissolving the sugar.

……

……

……[2]

(c) Two students, Donald and Daisy, are discussing how to speed up the rate of dissolving sugar in this experiment.

Donald suggested using 200 cm^3 of water.

Daisy suggested using 100 cm^3 of hot water.

For each suggestion, state and explain if it will lead to a faster rate of sugar dissolving.

……

……

……

……[2]

B7 The table in Fig. 7 shows diagrams of the particles of some elements and compounds. Some parts of the table have been filled up.

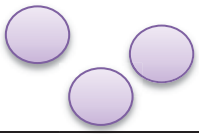
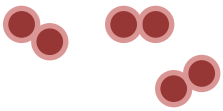
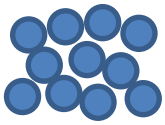
Substance	Diagram	Atom or Molecule?	Element or Compound?
A			Element
B			
C			
D		Atom	

Fig. 7

(a) Explain what is meant by a *compound*.

.....

.....[1]

(b) Complete the table in Fig. 7 by filling in all the blanks. [2]

(c) State whether substance D is a solid, liquid or gas. .....[1]

(d) Substance B, which is brown, was added to substance C, which is blue. As a result, a white solid is formed with some heat given out.

State and explain whether a compound or a mixture has been formed.

.....

.....

.....[2]

Section C: Longer Structured Questions (20 marks)

Answer all the questions in the spaces provided.

C1 (a) The melting points of some Group 1 metals are shown in Fig. 1.1.

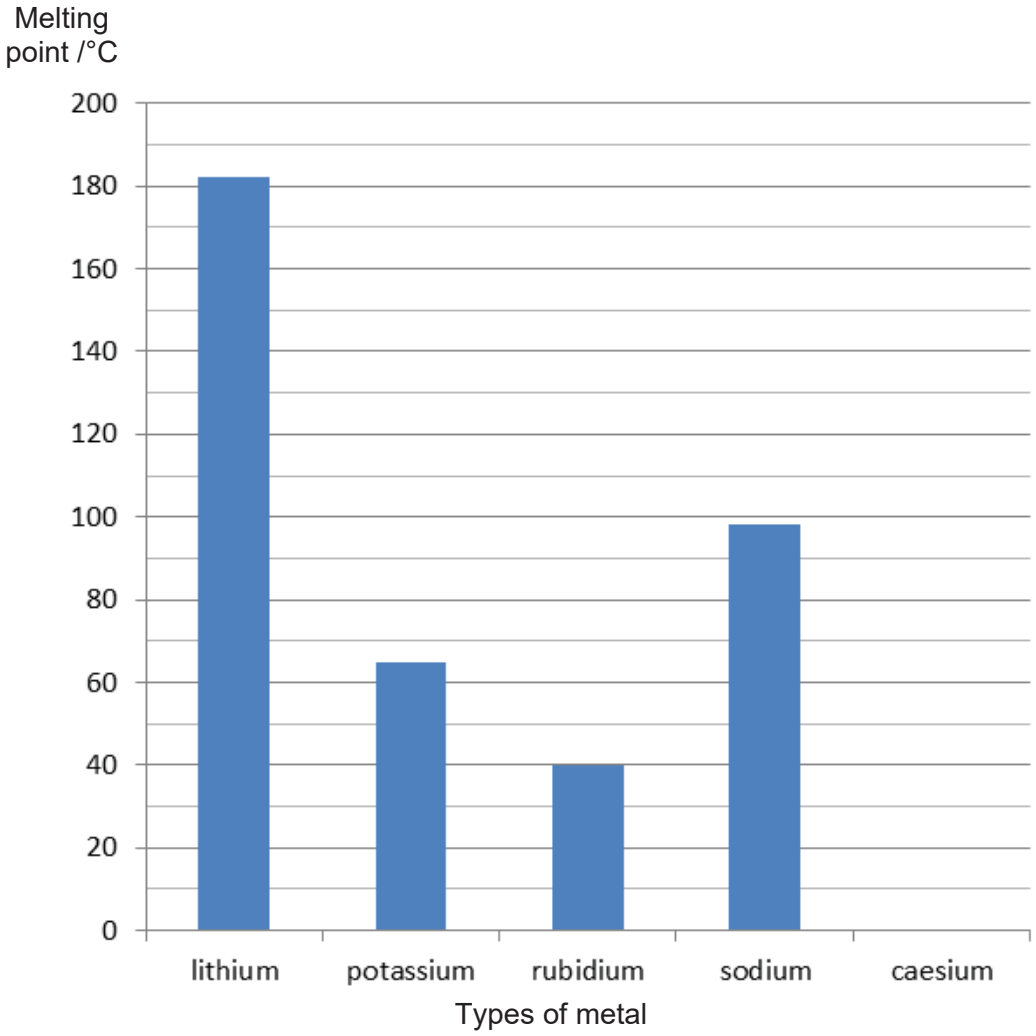


Fig. 1.1

(i) Caesium has a melting point of 30°C. On Fig. 1.1, draw a bar to show this information. [1]

(ii) A computer chip requires metals in the solid state to function. If the maximum temperature the chip operates at is 80°C, which metal(s) listed above is/are suitable for use in the computer chip?

.....[1]

(iii) Look up the positions of the metals in the Periodic Table and state the relationship between melting point and the position of the metal.

.....

.....

.....[2]

(b) When a mass is attached to a spring, the spring stretches. Leela conducts an experiment where she hangs different masses on the same spring and then measures the length the spring is stretched for each mass.

Fig 1.2 shows how the experiment is set up.

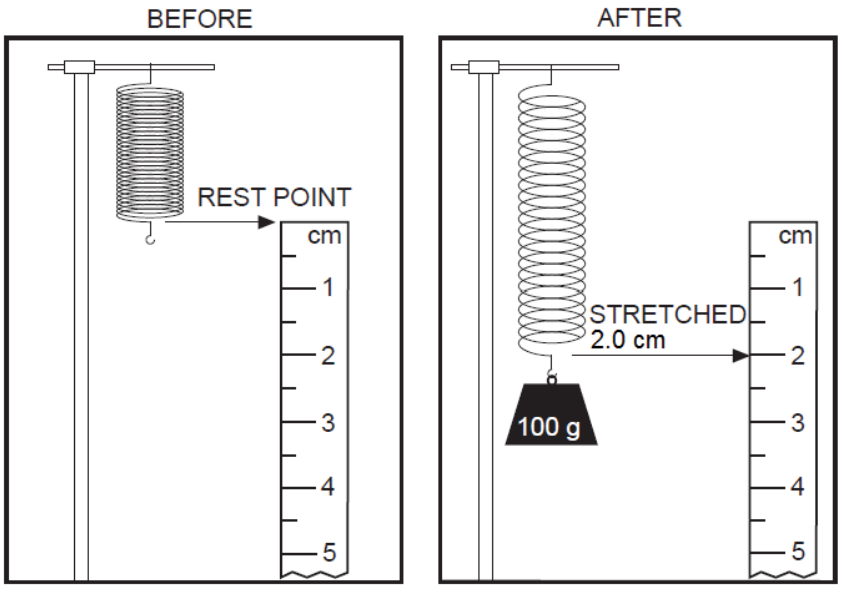


Fig. 1.2

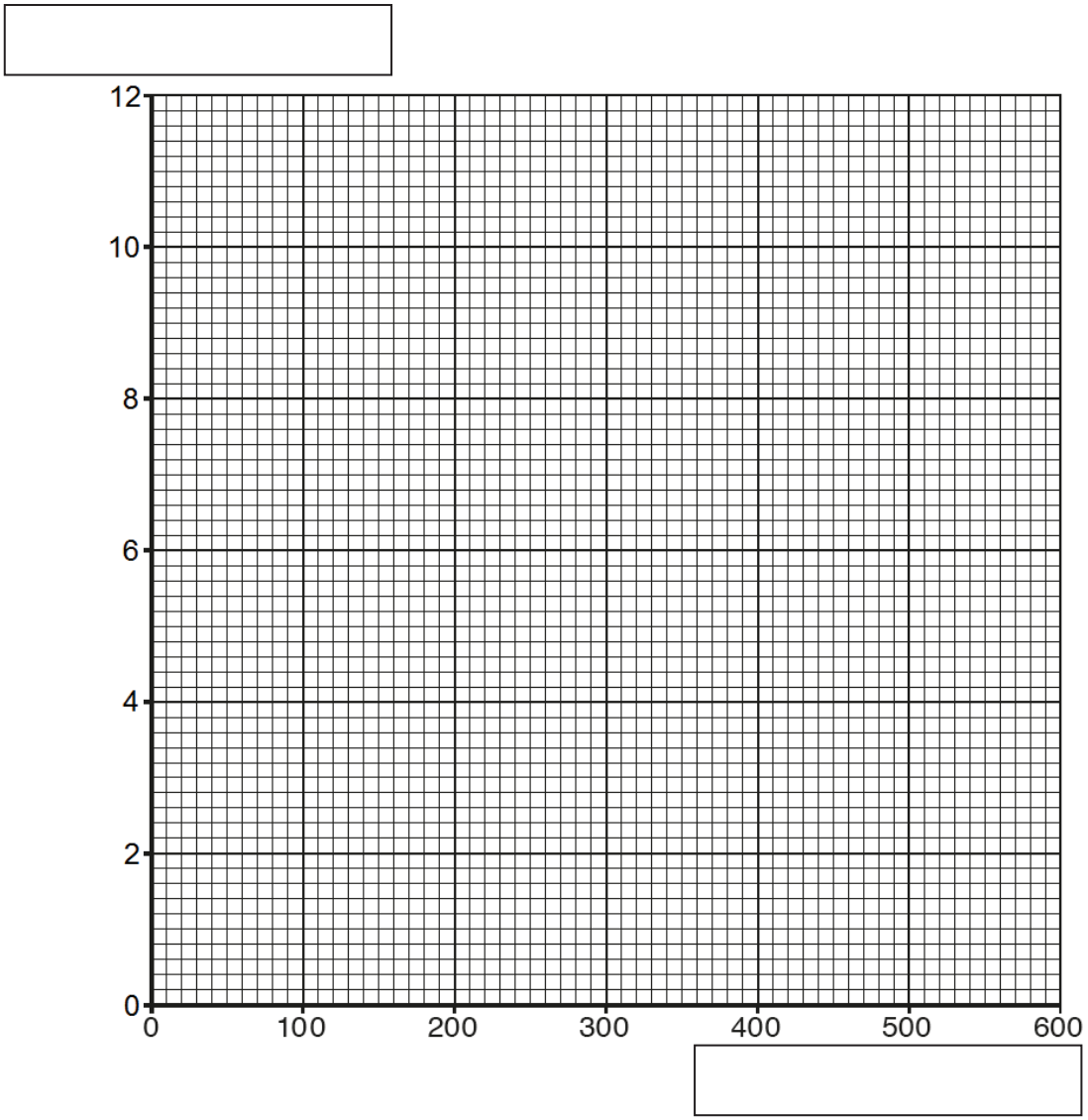
Table 1.3 shows the results of Leela's experiment.

attached mass / g	stretched length / cm
100	2.0
200	4.2
300	6.4
400	8.5
450	9.6
500	10.6

Table 1.3

[Question continues on the next page

(i) Plot a graph of stretched length of the spring against the attached mass. Write the axis labels in the boxes provided and draw the best-fit line for your graph.



[3]

(ii) State the relationship between the mass attached and the length the spring is stretched.

……

……[1]

(iii) Use your graph to determine the mass attached to the spring which will stretch the spring by 5.0 cm.

attached mass = ……g [1]

(iv) Suggest what Leela can do to read the length of the spring more accurately.

……

……[1]

C2 **(a)** Define *inertia*.

.....

.....[1]

(b) A space shuttle carrying a big satellite is moving through space. To stop its motion, the shuttle fires its retro rockets for 30 seconds.

If the space shuttle is empty, state and explain whether the shuttle needs to fire its retro rockets for a longer, shorter or same amount of time to stop its motion.

.....

.....

.....[2]

(c) Fig. 2.1 shows an experiment conducted to find the densities of a stone and a wooden block. The different stages of the experiment are shown.

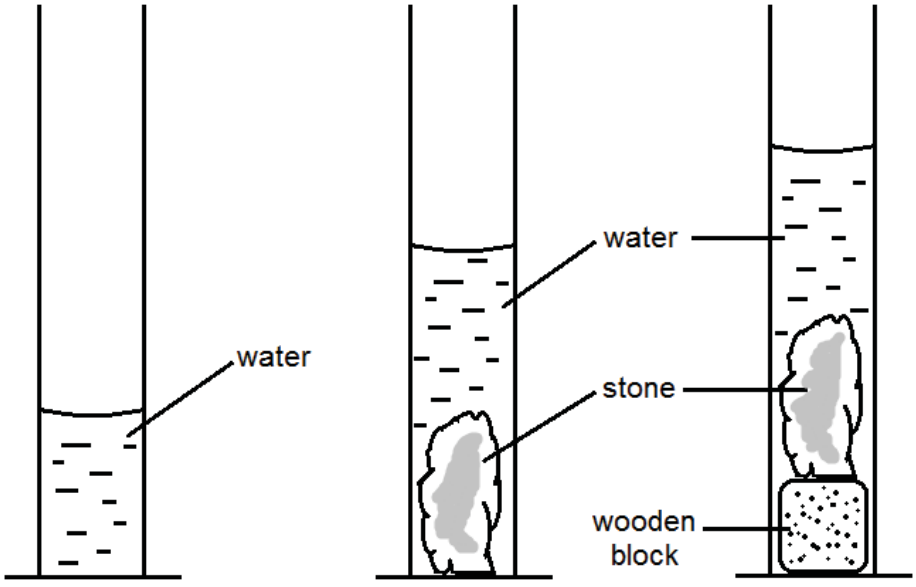


Fig. 2.1

At each stage, the total mass of the set-up and the volume of the water level are measured. Table 2.2 shows the data collected for each of the three stages.

	Stage 1	Stage 2	Stage 3
Mass	63.6 g	142.8 g	164.3 g
Volume of water level	40 cm^3	76 cm^3	103 cm^3

Table 2.2

[Question continues on the next page

From the data given,

(i) find the density of the stone,

density of stone = ……g/cm^3 [3]

(ii) find the density of the wooden block.

density of wooden block = ……g/cm^3 [2]

(iii) explain why the stone is needed to find the density of the wooden block. The density of water is 1.00 g/cm^3.

……

……

……

……[2]

The Periodic Table of Elements

Group																	
I	II											III	IV	V	VI	VII	0
							1 H hydrogen 1										2 He helium 4
3 Li lithium 7	4 Be beryllium 9											5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24											13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium -	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131
55 Cs caesium 133	56 Ba barium 137	57 – 71 lanthanoids	72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium –	85 At astatine –	86 Rn radon –
87 Fr francium –	88 Ra radium –	89 – 103 actinoids	104 Rf Rutherfordium –	105 Db dubnium –	106 Sg seaborgium –	107 Bh bohrium –	108 Hs hassium –	109 Mt meitnerium –	110 Ds darmstadtium –	111 Rg roentgenium –	112 Cn copernicium –		114 Fl flerovium –		116 Lv livermorium –		

Key

proton (atomic) number
atomic symbol
name
relative atomic mass

lanthanoids	57 La lanthanum 139	58 Ce cerium 140	59 Pr praseodymium 141	60 Nd neodymium 144	61 Pm promethium –	62 Sm samarium 150	63 Eu europium 152	64 Gd gadolinium 157	65 Tb terbium 159	66 Dy dysprosium 163	67 Ho holmium 165	68 Er erbium 167	69 Tm thulium 169	70 Yb ytterbium 173	71 Lu lutetium 175
actinoids	89 Ac actinium –	90 Th thorium 232	91 Pa protactinium 231	92 U uranium 238	93 Np neptunium –	94 Pu plutonium –	95 Am americium –	96 Cm curium –	97 Bk berkelium –	98 Cf californium –	99 Es einsteinium –	100 Fm fermium –	101 Md mendelevium –	102 No nobelium –	103 Lr lawrencium –

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).