2012
Secondary One Express

Science

1	First Toa Payoh Secondary School	SA1
2	Fuhua Secondary School	SA1
3	Kuo Chuan Presbyterian Sec dary School	SA1
4	Pasir Ris Crest Sec nd y School	SA1
5	Queenstown Seco dary School	SA1
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FIRST TOA PAYOH SECONDARY SCHOOL
MID-YEAR EXAMINATION 2012
Secondary One Express

Lower Sec Science   **2nd May 2012**

Paper 1   30 minutes

Additional Materials   Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

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

Write your name, register number and class on the Answer Sheet in the spaces provided.

There are **twenty** questions on this paper. 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 **soft pencil** on the separate Answer Sheet.

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 booklet.

This question paper consists of 7 printed pages.

[Turn over

Multiple Choice Questions (20 Marks)

Answer all questions on the Multiple Choice Answer Sheet provided.

1   Pouring unused chemicals back into their containers is discouraged because this may _____.

   A   cause an explosion

   B   dilute the chemicals

   C   contaminate the chemicals

   D   increase the concentration of the chemicals

2   A tube of cream has a hazard symbol as shown in the figure below:

   What precaution must a person take when using this cream?

   A   Do not consume the cream.

   B   Do not pour the cream into a sink.

   C   Wear gloves when applying cream.

   D   Place the cream far away from a flame.

3   Thomas Edison was a famous inventor who invented the light bulb. Before he successfully invented the light bulb, he experienced hundreds of failures. Which of the following qualities did he demonstrate?.

   A   curiosity

   B   responsibility

   C   perseverance

   D   open-mindedness

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Figure A shows the reading of a copper rod when clamped between the jaws of a vernier caliper. Figure B shows the reading when the copper rod was removed and the jaws fully closed.

Answer questions 4 and 5.

| Figure A | Figure B |
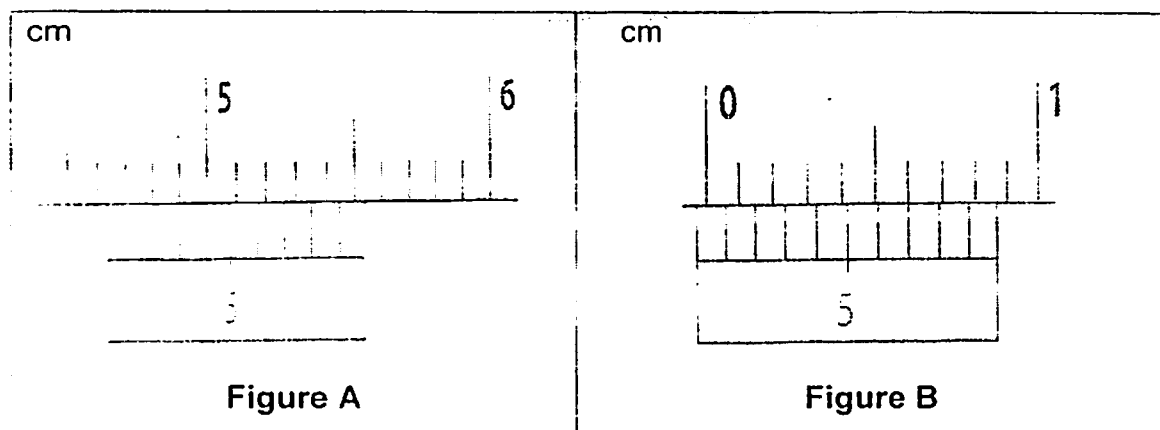
4   What is the reading shown when a copper rod is clamped between the jaws?

A   4.13 cm   B   4.63 cm

C   4.64 cm   D   5.33 cm

5   What is the actual diameter of the copper rod?

A   4.20 cm   B   4.60 cm

C   4.66 cm   D   4.70 cm

6   A cube of side 2 cm is placed in a measuring cylinder containing water as shown in the diagram below.
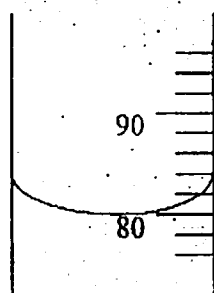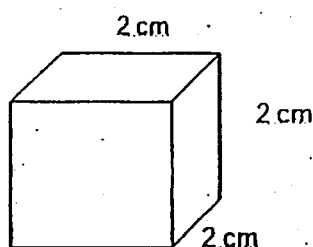
What is the final water level in the measuring cylinder?

A   82 cm^3 B   86 cm^3

C   88 cm^3 D   92 cm^3

4

7   Observe the diagram given below carefully.
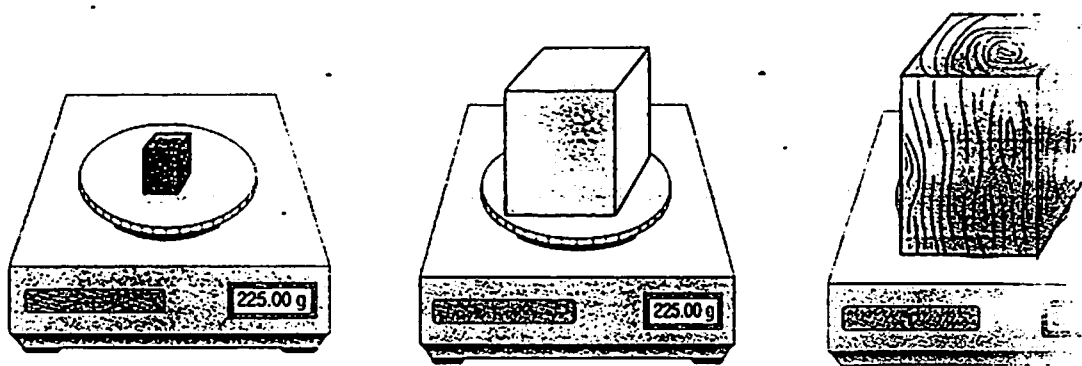

Which statement is true?

A   The blocks have equal masses and equal densities.

B   The blocks have equal masses and unequal densities.

C   The blocks have unequal masses and equal densities

D   The blocks have unequal masses and unequal densities

8   The following table shows the results of an experiment in which an uni╵ X, is placed in four different liquids.

liquid	density of liquid in kg/m³	Observat╵ solid X
mercury	13 600	floaɩ₅
water	1 000	flo╵ ₅
turpentine	700	sinᵏ╵
..ethane	.570	sinᵏ

What is the density of the solid X?·

A   exactly 700 kg/m³

B   exactly 1,000 kg/m³

C   between 700 kg/m³ and 1,000 kg/m³
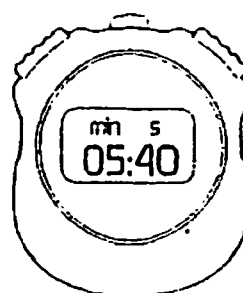
D   between 1 000 kg/m³ and 13 600 kg/m³

9   Which of the following statements is **true** about mass?

A   The S.I. unit for mass is grams.

B   The mass of an object can be referred to as its weight.

C   The mass of an object cannot be changed by changing its shape.

D   The mass of an object may change when it is removed from earth.

10   A student investigates to show how the temperature of a beaker of water changes with time as it is heated. The diagrams show the readings on his stop watch as the water reaches different temperatures.
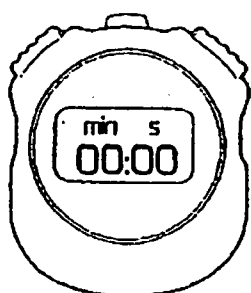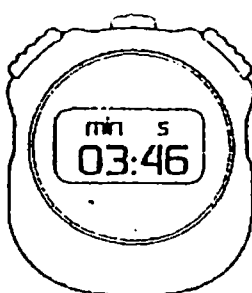
time at 20°C   time at 80°C   time at 100°C

What is the time taken for the temperature to rise from 80^0C to 100^0C?

A   1 min 54 s   B   2 min 06 s

C   3 min 46 s   D   5 min 40 s

11   Which of the following statements does **not** represent 'rate'?

A   The leg gets cramped whenever it is exercised.

B   The heart beats seventy-two times per minute.

C   The stomach digests 20 grams of proteins a day.

D   The lungs breathe in and out twenty-two times per minute.

12   Which of the following materials is **wrongly** classified?

	material	classification
A	comb	ceramic
B	blanket	fibre
C	key	metal
D	food container	plastic

13 Mitch brought home four objects which are made of different materials P, Q, R and S. Use the information below to arrange the material in order of hardness, starting with the hardest material.

- P is left with mark when Q is rubbed with it.
- R is scratched by all the other three materials.
- When rubbed with S, all three materials are left with a mark.

A   P, Q, R, S

B   S, R, P, Q

C   R, P, Q, S

D   S, Q, P, R

14 Imagine that you are an engineer in an aircraft factory. You have to develop a new material for aircraft bodies. What important physical properties should your new material have?

A   heavy and hard

B   low density and elastic

C   low density and strong

D   shiny and good conductor of electricity

15 Which of the following is **not** an effect of force?

A   Force can stop a moving body.

B   Force can move a stationary body.

C   Force can make a body move faster.

D   Force can increase the mass of a body.

16 A car is moving at a constant speed along a road and travels onto a large patch of oil. The driver applies the brakes to stop the car. Compared to braking on a dry road, what may happen?

A   The car takes a shorter time to slow down as there is less friction between the tyres and the road.

B   The car takes a shorter time to slow down as there is more friction between the tyres and the road.

C   The car takes a longer time to slow down as there is less friction between the tyres and the road.

D   The car takes a longer time to slow down as there is more friction between the tyres and the road.

17 A woman of mass 80 kg, balances evenly on two stilts, each having an area of 80 cm² as shown below.

What pressure does she exert on the ground?

A   5 000 Pa

B   10 000 Pa

C   50 000 Pa

D   100 000 Pa

18. Which of the following shows that high pressure is useful?

A   Using a sharp knife for cutting.

B   Wearing boots to walk along a snow path.

C   Carrying grocery in a plastic bag with narrow handles

D   Wearing high heels shoes to complete a walkathon

19. Which of the following scenarios shows no work done?

A   A boy climbing up the hill.

B   A woman pushing a trolley along a slope.

C   A boy is pulling a bucket of water from the well.

D   A lady carries her handbag and walks 30 m along the corridor.

20. The moment of a force about a point does not depend on _____.

A   the magnitude of the force

B   the time during which the force acts

C   the location of the line of action of the force

D   the perpendicular distance which the force acts

- **End of Paper** -   Need a home tutor? Visit smiletutor.sg

00034

Class	Candidate Name	Register Number

FIRST TOA PAYOH SECONDARY SCHOOL
MID-YEAR EXAMINATION 2012
Secondary One Express

Lower Sec Science $\qquad$ **2nd May 2012**

Paper 2 $\qquad$ **1 hour 15 minutes**

Candidates to answer on the Question Paper

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, register number and class on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams or graphs.

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

Section A (30 marks)

Answer **all** questions in the spaces provided.

Section B (30 marks)

Answer **all three** questions in the spaces provided. If working is needed for any question, it must be shown below that question.

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

For Examiner's Use	
Section A	
Section B	
B1	
B2	
B3	
Total	60

1

This question paper consists of 14 printed pages.

[Turn over

Section A (30 marks)

Answer all questions.
Write your answers in the spaces provided.

A1   (a)   The diagram below shows a substance being heated.
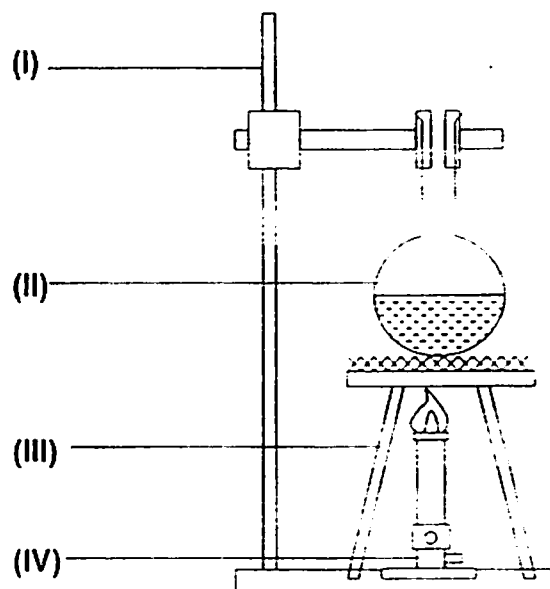
Label the apparatuses used in the diagram above.   [2]

(I)   _____

(II)   _____

(III)   _____

(IV)   _____

(b)   What type of flame should be used for the experiment above?   [2]
Explain your choice.

_____

_____

(c) How would you obtain the type of flame in **(b)**? [1]

_____

(d) The following two hazard symbols are found pasted on the containers of [3] some chemicals in the science laboratory.
State the type of hazard for each symbol and name one chemical stored in each container.

hazard symbol	type of hazard	name of chemical

A2 Name a suitable instrument that can be used to measure the following [4] physical quantities.

	physical quantities	instrument used
(a)	depth of a test tube	
(b)	mass of an apple	
(c)	body temperature of a child	
(d)	circumference of a baby's head	

4

A3 Two pictures of the Benjamin Shares Bridge are shown below.
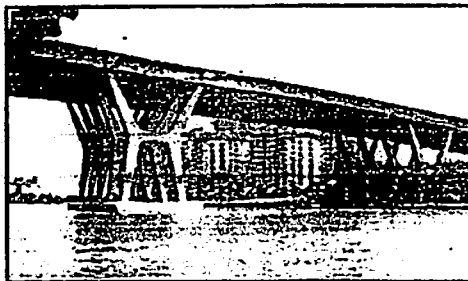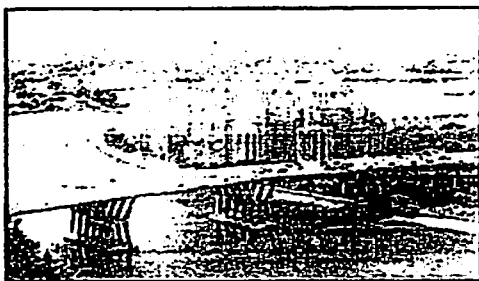
"Opened in 1982, the Benjamin Sheares Bridge is the longest bridge in Singapore, spanning 1.8 km, and the tallest, at 20 m. It built over reclaimed land, the bridge is made of pre-stressed concrete and links East Coast Parkway on the east coast to Marina Bay on the west coast.

http://en.wikipedia.org/wiki/Benjamin_Sheares_Bridge

(a) Explain what is meant by the **strength** of a substance. [1]

....

....

(b) Write down a reason why engineers consider the strength of the materials as an important factor when constructing Benjamin Sheares Bridge.

....

....

....

(c) Pre-stressed concrete was used in the construction of the Benjamin Sheares Bridge. Give a reason why you think that engineers did not consider wood to be an appropriate material.

....

....

(d) Suggest a material which is implanted into the concrete to make it even stronger.

....

A4   Susan cuts out the shape of a heart from a piece of paper. The outline of a heart is shown in the grid below.
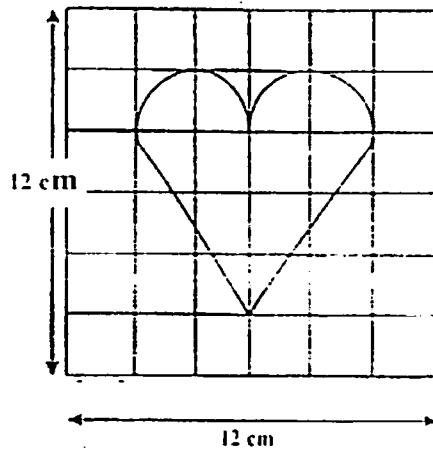
(a)   Find the area of the heart. Show your working clearly   [2]

(b)   Suggest one way in which she can obtain a more accurate value of the   [1]
area of the heart.

....

....

A5   The diagram shows an experiment used to determine the volume of a
     cork.
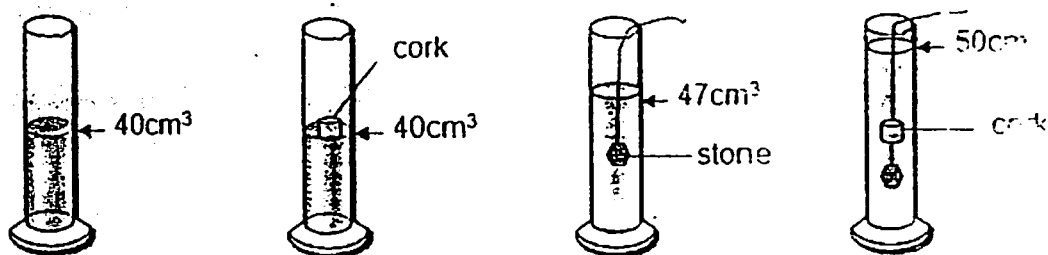
(a)   What is the purpose of the stone in this experiment?

....

....

(b)   What is the volume of the stone?

(c)   What is the volume of the cork?

(d)   Given that the mass of the cork is 0.54 g, calculate its density

(e)   What conclusion can you draw about the density of the cork as
      compared to that of water?

....

....

A6 **(a)** Large cranes on building sites have a counterweight made of concrete, which balances the load during lifting.
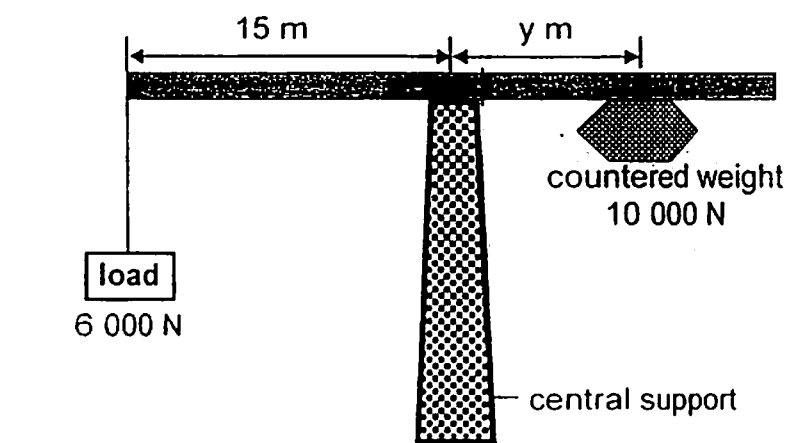
(i) Calculate how far the counterweight needs to be placed from the [2] central support when a load of 6 000 N is being lifted.

(ii) Calculate the work done by the crane to lift the load through 80 m. [1]

(b) Frictional force, magnetic force and gravitational force are present ⋯ a Maglev train, shown below, is travelling.
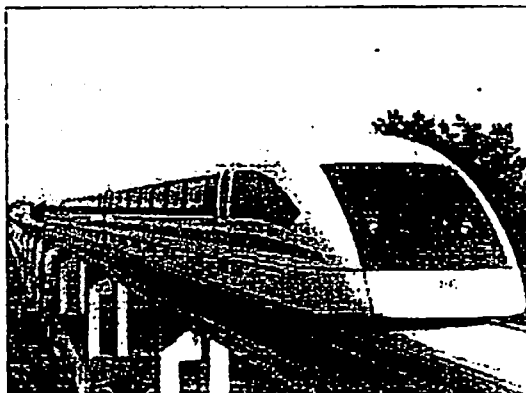
(i) Which type of force is used to **lift** a Maglev train of its track it is moving?

_____

(ii) Which type of force has to be **overcome** for Mac⋯ ⋯ ⋯ lifted off its track?

_____

Section B (30 marks)
Answer all questions.
Write your answers in the spaces provided.

B1 **(a)** Eugene hypothesized that the temperature of water will increase when a certain chemical X was added to a fixed amount of water. He conducted an experiment to test his hypothesis. The original temperature of the water was 20 °C.

No.	amount of chemical X added in (g)	temperature of water one minute after adding chemical X in (°C)
1	0	20
2	5	24
3	10	27
4	15	30
5	20	32
6	25	32

(i) Identify the independent and dependent variable for the above experiment. [2]

_____

_____

_____

(ii) Name two variables that Eugene must keep constant during the experiment. [2]

_____

_____

(iii) Name the equipment that Eugene will need to make the necessary measurement in **(a)**. [1]

_____

(iv) Suggest how Eugene can improve on the reliability of the ... from the experiment.

_____

_____

(v) Do the results of the experiment support his hypothesis? Explain

_____

_____

_____

_____

(iv) Why did he stop the experiment after adding 25 g of chemi...

_____

_____

(b) State two safety precautions you should take when boiling a test ...
water in the laboratory.

_____

_____

_____

_____

B2 **(a)** Mrs Lee drives her car at a speed of 80 km/h for a distance of 160 km. [3]
For every one litre of petrol consumed, the car travelled a distance of
8 km at this same speed. Calculate
(i) the time taken for her to complete the journey and
(ii) the rate of petrol consumption in litres per hour.

(b) Three friends subscribed to three different mobile phone service
providers, Starship, M01 and Singtall. Their mobile phone charges are
shown in the table below. [2]

mobile phone service provider	time used by mobile phone	amount charged
Starship	4 hours	$21.60
M01	15 minutes	$1.80
Singtall	1 hour 30 minutes	$7.20

Which service provider offers the lowest rate per hour? Show all your

workings.

(c) Study the table below and answer the questions that follow.

material	transparency	strength	melting p.
A	transparent	moderate	hig'
B	transparent	moderate	low
C	opaque	high	high

(i) Which material, **A**, **B** or **C**, is most suitable for making th containers used for heating in the science laboratories? E

material: ....

explanation:

....

....

....

(ii) Suggest possible identities of materials **B** and **C**.

B: ....

C: ....

B3 **(a)** Sophia carries a school bag of weight 50 N over her shoulder to school every day.

(i) Calculate the pressure exerted on her shoulder if the area of the [2]
shoulder straps of her school bag that is in contact with her
shoulder is 0.002 m². Show your working clearly.

(ii) Her shoulder hurts when she carries her bag on her shoulder.
What can she do to reduce the pain on her shoulder? [2]
Explain your answer.
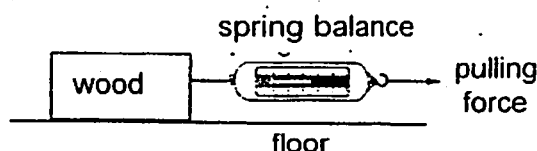
(b) The diagram below shows a piece of wood being pulled by a force on a
floor. The force needed to move the wood is measured by a spring
balance.

spring balance

wood ——⊏▱▱▱⊐᷍—→ pulling force

floor

(i) State the force which opposes the movement of the wood. [1]

(ii) In the diagram above, draw an arrow to show the direction of the force stated in **b(i)**. [1]

(iii) How would the reading on the spring balance be affected if the roughness of the floor surface increases? [2]
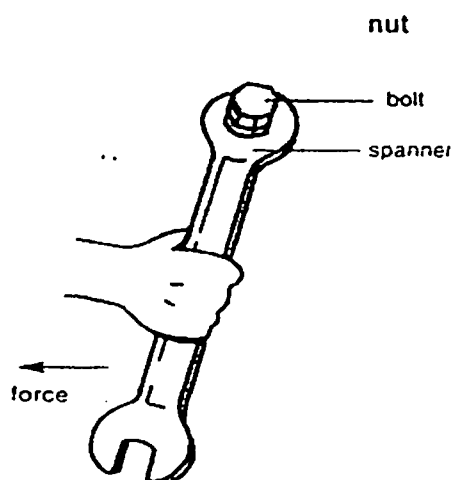(Assume that the wood is being pulled at the same speed.)
Explain your answer.

....

....

....

(c) A plumber is trying to loosen a nut to the clockwise direction with a spanner as shown below, but he is unsuccessfully.

nut

bolt

spanner

force

Suggest two ways by which the plumber could increase the turning effect of the spanner on the nut. [2]

....

....

....

-End of Paper-

FIRST TOA PAYOH SECONDARY SCHOOL
MID-YEAR EXAMINATION 2012
SECONDARY ONE EXPRESS
Lower Sec Science Marking Scheme

Paper 1 (20 marks)   Answer all questions in the spaces provided.

1	C	6	C	11	A	16	C
2	A	7	B	12	A	17	C
3	C	8	C	13	D	18	A
4	B	9	C	14	C	19	D
5	C	10	A	15	D	20	B

Paper 2
Section A: 30%

A1	(a)	I	retort stand
		II	round bottom flask
		III	tripod stand
		IV	Bunsen burner
	(b)	He should have used a non-luminous flame for heating, It does not produce soot. It is hotter.	
	(c)	He should open the air-hole of the Bunsen burner to obtain a non luminous flame for heating.	
	(d)		

hazard symbol	type of hazard	name of chemical
	flammable	petrol / alcohol / kerosene
	corrosive	any acid / any alkali

A2	(a)	vernier calipers
	(b)	electronic balance / beam balance
	(c)	clinical thermometer
	(d)	measuring tape

A3	(a)	Ability to support a heavy load without breaking or tearing. or Ability to withstand applied force without deformation.
	(b)	The bridge needs to withstand large forces due to the volume of cars travelling on it daily.
	(c)	Wood breaks when it experience large forces
	(d)	steel

A4	(a)	No of squares = 10	½
		Area of 1 unit square = 2 cm x 2 cm = 4 cm²	½
		Area of heart = 10 x 4 cm² = 40 cm²	1
	(b)	use grid with smaller squares	1
A5	(a)	To make the cork to sink in water	1
	(b)	7 cm³	1
	(c)	3 cm³	1
	(d)	Density = $\frac{mass}{volume}$	½
		$= \frac{0.54}{3}$	½
		= 0.18 g/cm²	½ , ½
	(e)	Density of cork is lower than that of water.	1

A6	(a)	(i)	clockwise moment = anticlockwise moment	½
			10 000 x Y = 6 000 x 15	½
			Y = 9 m	1
		(ii)	Work done = force x distance	
			= 6 000 x 80	½
			= 480 000 J	½
	(b)	(i)	magnetic force	1
		(ii)	gravitational force	1
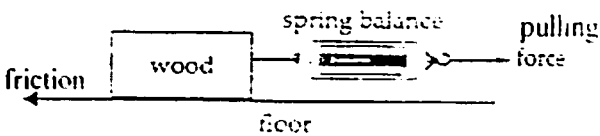
Section B
Answer All three questions

B1	(a)	(i)	Independent variable: Amount of chemical X
			Dependent variable: Temperature of water one min after addin . chemical
		(ii)	• Initial temperature of water, • amount of water, Accept any possible answers
		(iii)	Laboratory thermometer
		(iv)	Repeat experiment to find average temperature of watei .
		(v)	Yes, The temperature of water increases when the amount of chemical X added was increased.
		(iv)	As the temperature become constant when 20 g or more of chemical was added.
	(b)		Wear safety goggles. Do not point the mouth of test tube to any one.
B2	(a)		No of hours taken for journey = $\frac{160}{80}$ = 2hr Amount of petrol used = $\frac{160}{8}$ = 20 litres Rate of petrol consumption in litres per hour = $\frac{20}{2}$ = 10 litres pei
	(b)		Cost of Starship plan = $\frac{21.6}{4hr}$ = $5.4 Cost of M01 plan = $\frac{1.8}{0.25 hr}$ = $7.2 Cost of Singtall plan = $\frac{7.20}{1.5hr}$ = $4.8 Singtall provides the best deal
	(c)	(i)	Material: A
			Explanation: The contents of the container can be seen during heating due to its transparency. The container can withstand high temperature during heali due to its high melting point.
		(ii)	B — Plastic C — metal

B3	(a)	(i)	$P = \frac{F}{A}$	½,
			$= \frac{50}{0.002}$	½.
			$= 25,000\ Nm^{-2}$	1
		(ii)	Increase the area of the shoulder strap in contact with her shoulder.	1
			The same force is spread out over a larger area resulting in lower pressure	1
	(b)	(i)	Frictional force	1
		(ii)		1
		(iii)	The reading increases.	1
			The frictional force is greater when the floor is rougher. Therefore, greater force is needed to overcome greater frictional force.	1
	(c)	•	Use the longer spanner and move the hand farther away from the nut.	1
		•	Apply the greater force.	1

-End of Paper-

Candidate Name: _____

Class	Index No.

FUHUA SECONDARY SCHOOL

Secondary One Express

Mid-Year Examination 2012

E

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Science

Additional Materials:

OMR, Periodic Table (on page 19 of this paper), Writing paper & Electronic calculator

DATE	11th May 2012 (Friday)
TIME	0750 - 0950
DURATION	2 hours

INSTRUCTIONS TO CANDIDATES

Answer all questions. Write in dark blue or black pen. You may use a soft pencil for any diagrams

Section A: Multiple Choice Questions [30 marks]

There are 30 questions in this section. For each question, there are four possible answers, A, B, C and D. Choose the one you consider correct and **SHADE** your answer in the OMR sheet provided.

Section B: Structured Questions [40 marks]

Write your answers in the spaces provided on the question paper.

Section C: Free Response Questions [30 marks]

Write your answers on the writing paper provided. Answer each question on a fresh page of paper.

The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is **100**.
The use of an electronic calculator is expected, where appropriate.
Give non-exact numerical answers correct to 3 significant figures.

PARENT'S SIGNATURE	FOR EXAMINER'S USE		Highest Mark:	Lowest Mark:
		/ 100		

Setter: Miss Zeng Liming Dawn   *Vetter:* Mr Wan Yan Ying

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This question paper consists of 19 printed pages including this page.

Section A: Multiple Choice Questions [30 marks]

There are **thirty** questions in this section. Answer **all** questions.

For each question there are four possible answers A, B, C, D.

Answer **ALL** the questions and shade your answers in the OMR sheet provided.

A1 The following diagram shows the actions taken by a student who is doing a heating experiment.

Which of the following precautions did the student fail to take during the experiment?

(i)   The student should be wearing his goggles
(ii) The student should not be filling the beaker to the brim
(iii) The student should not be adding chemicals during heating
(iv) The student should be using a non-luminous flame for heating

A (i) and (iv) only
B (ii) and (iii) only
C (i), (ii) and (iii) only
D (i), (ii) and (iv) only

A2 Which of the following safety precautions should be taken when heating some liquid in a test tube?

(i)   The test tube should be placed on a wire gauze.
(ii) The test tube should be pointed away from any laboratory user.
(iii) The test tube should be slanted at an angle of approximately 45°.
(iv) A rubber stopper should be used to cover the mouth of the test tube.

A (i) and (iv) only
B (ii) and (iii) only
C (i), (ii) and (iii) only
D (ii), (iii) and (iv) only

A3 A student observed ice melting at room temperature. She concluded that the melting point of ice is lower than room temperature. Which process skill did she make use of in reaching the conclusion?

A   inferring   B   verifying

C   predicting   D   guessing

A4 A student made some comments about the nature and handling of the chemical in the bottle shown below.

Which of the following statements is **incorrect**?

A   The bottle is likely to contain an acid.

B   The bottle is likely to be made of glass.

C   The bottle of chemical should be kept away from naked flame.

D   The bottle of chemical can be placed in the fume cupboard during experiments.

A5 Which of the following apparatus is **not** recommended for use to heat substances in the laboratory?
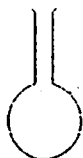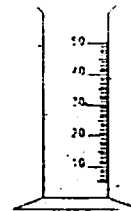
A6 Mary accidentally spilt some dilute hydrochloric acid onto her hands. What should she do immediately?

A   She should avoid breathing in the vapour.

B   She should wash her hands with plenty of tap water.

C   She should wipe the acid off and apply some antiseptic cream.

D   She should pour some alkali onto her hand to neutralise the acid.

A7 Which of the following statements about Science and Technology is incorrect '

A All scientific inventions are used only for the benefit of mankind.
B Technology is the development as a result of scientific advances.
C Scientific discoveries may sometimes cause more moral problems.
D Improvements in technology can help to make life more convenient.

A8 A vernier calipers with a zero error of +0.06 cm is used to measure the diameter spherical marble. The measurement obtained is shown in the diagram below.
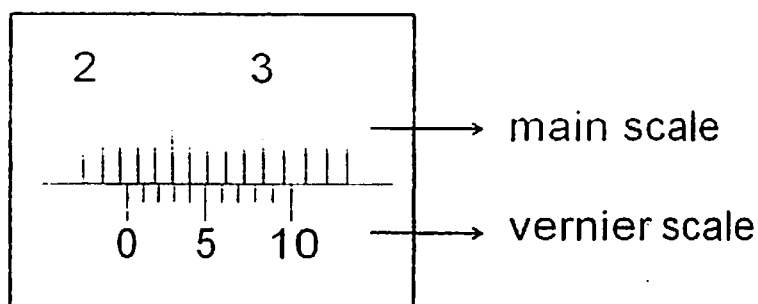
What is the diameter of the marble?

A 2.60 cm   B 2.18 cm
C 2.24 cm   D 2.30 cm

Answer questions **A9** and **A10** using the following information.
Students A, B, C and D are taking temperature readings using a thermomete
diagram below. shows the eye positions of the four students.
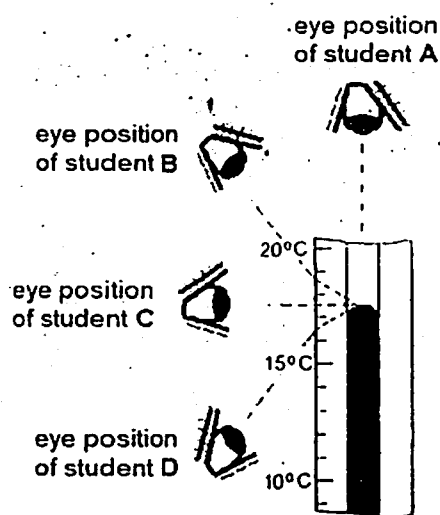
A9 Which student has positioned his eye **correctly**?

A Student A   B Student B
C Student C   D Student D

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4

A10 What is the **correct** temperature reading?

A	16.0°C	B	16.5°C
C	17.5°C	D	18.5°C

A11 Which of the following is **not** an SI unit for a physical quantity?

A	Ampere	B	Second
C	Kilogram	D	Degree Celsius

A12 The densities of four substances are given as follows

1.00 g/cm^3 1.50 g/cm^3 2.30 g/cm^3 0.56 g/cm^3

The four substances are placed in a beaker as shown below.
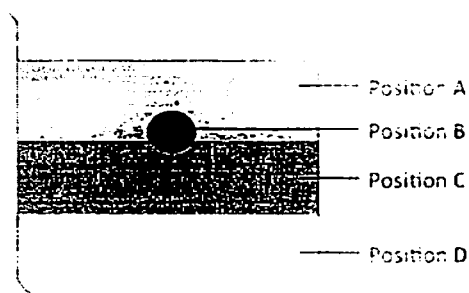
Which of the following represents the position occupied by the substance of density 1.00 g/cm^3?

A	Position A	B	Position B
C	Position C	D	Position D

A13 The diagrams below show the difference in liquid level before and after two solid balls are submerged in a measuring cylinder.
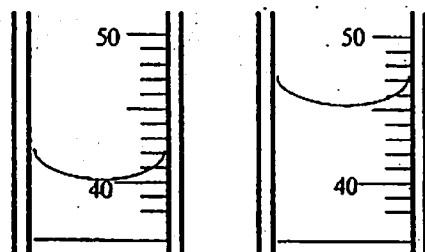
What is the volume of **one ball**?

A	2.5 cm^3	B	5.0 cm^3
C	10.0 cm^3	D	22.5 cm^3

A14 Which of the following is not a physical quantity of a substance?

    A Measuring how well a substance can conduct heat.
    B Measuring how well a substance can conduct electricity.
    C Measuring how well a substance can decompose upon heating.
    D Measuring how well a substance can allow light to pass through.

A15 A car travels at an average speed of 30 km/h. How long will it take for the car to travel 35 km?

    A 1.17 minutes   **B** 0.857 minutes
    C 70.0 minutes   **D** 51.4 minutes

A16 A student went to donate blood at the Singapore blood bank. A total of 450 cm^3 of blood was collected in 30 min. What is the rate of blood flow during the collection?

    A 15.0 cm^3/s **B** 7.50 cm^3/s
    C 0.250 cm^3/s **D** 0.667 cm^3/s

A17 The dimensions of a container are as shown in the diagram below. What is the volume of the container?
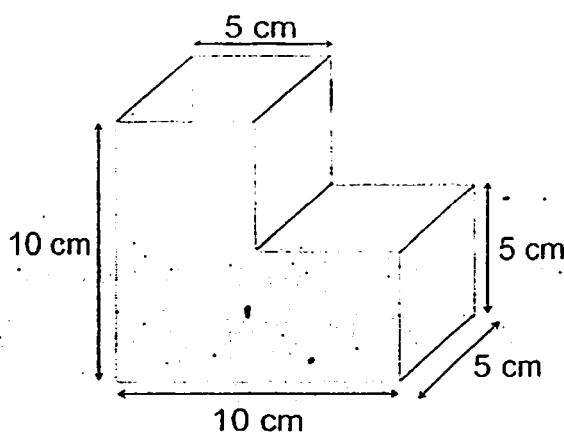
    A 500 cm^3 **B** 475 cm^3
    C 375 cm^3 **D** 125 cm^3

A18 Bakelite is sometimes used to produce casings of telephones to prevent the user from being burnt due to the telephone becoming excessively hot during usage. Which of the following materials is Bakelite likely to be?

    A metal   **B** ceramic
    C fibre   **D** plastic

A19 The scale of hardness for different materials is shown in the table below. A harder object has a higher hardness value.

material	powder	fingernail	steel	quartz	diamond
hardness value	1	3	5	7	10

Which of the following statements is **true**?

A   Steel is unable to scratch quartz.
B   Powder is able to scratch diamond
C   Quartz is able to scratch only one object
D   Fingernail is able to scratch quartz but not steel

A20 Which of the following statements **correctly** explains why food preserved in vinegar (ethanoic acid) is usually stored in glass containers but not metal containers?

A   Glass is transparent.
B   Metals are easily corroded
C   Glass is more brittle than metals.
D   Metals are good thermal conductors.

A21 Which of the following substances **incorrectly** describes an element?

A   An element cannot be split into simpler substances.
B   An element can be represented in the Periodic Table.
C   An element is the simplest form of matter found naturally.
D   An element is made up of many different simpler substances.

A22 Which of the following is made up of elements combined in a fixed proportion by mass?

A   air   B   steel
C   sugar solution ·   D   water

A23 The chemical formula for the compound calcium carbonate is $CaCO_3$. Which of the following **correctly** describes the elements found in calcium carbonate?

A   calcium and carbon dioxide
B   calcium, copper and oxygen
C   calcium, carbon and oxygen
D   calcium, sodium, oxygen and carbon

A24 Vitamins A, E and K are soluble in fats in our body. What are the fats acting as?

A	Fats act as a solute.	B	Fats act as a solvent.
C	Fats act as a solution.	D	Fats act as a suspension.

A25 The graph below shows the solubility of solute X in solvent Y and Z.
In which sets of solvent and temperature given below is the highest solubility of Y observed?
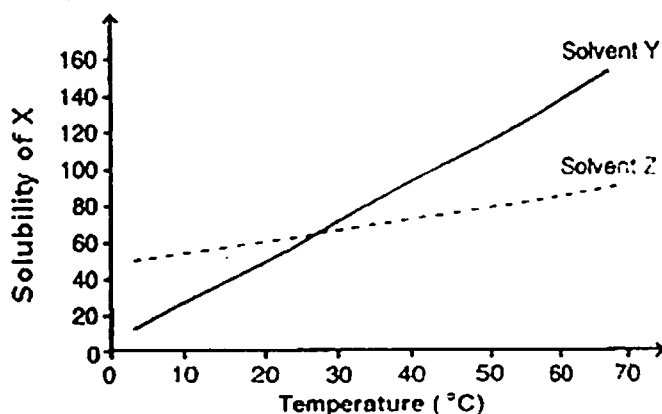
	Solvent	Temperature
A	Y	25 °C
B	Y	50 °C
C	Z	25 °C
D	Z	65 °C

A26 Raja observed that iodine dissolves better in alcohol than in water. Which of the following statements is correct about his observation?

A   It shows that alcohol is the only solvent that can dissolve iodine.

B   It shows that the type of solvent affects the solubility of a substance.

C   It shows that the mixture is stirred when dissolving iodine in alcohol but ...

D   It shows that powdered iodine was used when dissolving iodine in alc... in water.

A27 Which of the following statement(s) correctly describe(s) a suspension?

(i)   A suspension has a uniform colour.

(ii)   A suspension is non-homogeneous.

(iii)   A suspension can be separated by filtration.

(iv)   A suspension must contain solutes suspended in solvent.

A	(i) and (iii) only	B	(ii) and (iii) only
C	(i), (ii) and (iv) only	D	(ii), (iii) and (iv) only

8

A28 Which of the following is an example of neutralisation?

A Adding sugar to coffee.
B Adding lemon juice to water.
C Adding common table salt to meat.
D Taking antacid tablets (containing magnesium oxide) for gastric pain.

A29 Which of the following substances reacts with dilute hydrochloric acid to produce water and salt only?

A zinc metal
B zinc hydroxide
C zinc chloride
D zinc carbonate

A30 The table below shows the pH of 4 solutions.

Solution	W	X	Y	Z
pH	3	4	7	8

Which of the following will likely mix together to give a neutral pH?

A W and Z
B X and Y
C W and X
D Z and Y

Section B: Structured Questions [40 marks]
Answer all the questions in this section in the spaces provided.

B1 An investigation to determine which brand of detergent powder (Brand A or Brand B) has a higher rate of solubility in water is being carried out. Identify the following parts to the investigation.

(a) (i) Hypothesis of the investigation [1]

....

....

(ii) An independent variable

....

(iii) A dependent variable [1]

....

(b) Jonathan conducted an experiment involving two tests to compare the rates of solubility between Brand A and Brand B. She used 5.0 g of each detergent powder for each test. The experimental set-ups for the two tests are as shown.
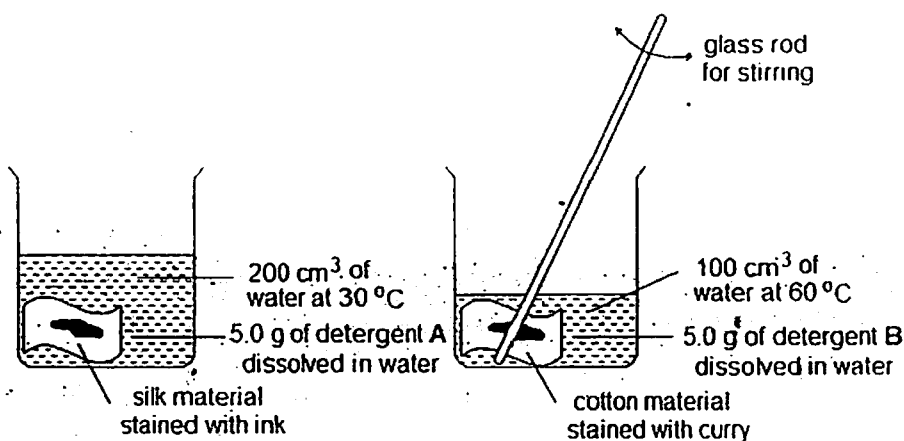
Identify three variables of the experiment that made the comparisons between tests unfair.

....

....

....

B2 The diagram shows the length of an object measured using a ruler
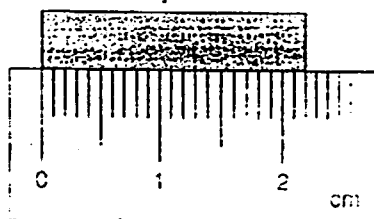
The measurement was recorded by four students P. Q. R and S. The table below shows the recorded measurements by these students.

Student	Length of object
P	2.2 cm
Q	2.1 cm
R	2.2 cm
S	2.20 cm

(a) State one possible error made by student Q when taking the reading of the length using a ruler. [1]

....

....

(b) Explain why the record of measurement by student S is incorrect. [1]

....

(c) Suggest an instrument that can be used to obtain a more precise measurement of the length of this object. [1]

....

B3 Elements can be classified under metals and non-metals.

(a) **(i)** Given an element, how can you use the Periodic Table to identify whether the element is a metal or non-metal? [1]

....

....

(ii)   State two differences between the properties of metals and non-m=·

....

....

(b)   Using the Periodic Table, write down the **chemical symbol** of a metal that

(i)   is liquid at room temperature.

....

(ii)   most likely be used to make electrical wires.

....

(iii)   is used to make aircraft bodies.

....

(c)   Brass is an alloy of copper and zinc.

(i)   What is an 'alloy'?

....

(ii)   State another example of an alloy.

....

B4   You are given the following apparatus listed in the box below.

beaker	tripod stand	wire gauze	Bunsen burner

(a)   Draw a labelled diagram in the box to show how the apparatus are set up to heat a test tube of liquid in the water bath.   [2]

(b)   Identify the type of flame that should be used to heat the water bath.   [1]

....

(c)   State how the Bunsen burner can be adjusted to obtain the type of flame stated in **(b)**. [1]

....

(d)   Explain why the flame obtained in **(b)** is used for heating.   [2]

....

....

00068

B5　The following illustration shows a life jacket that is commonly worn by athletes who take part in water sports.

(a) What can you conclude about the densities of sea water and the life jacket? [1]

....

(b) Suggest a suitable material which can be used to make life jackets. State two reasons to justify the choice of material. [3]

....

....

....

....

....

(c) A buoy is a device that is found in the sea to help athletes navigate their way when sailing on the sea.
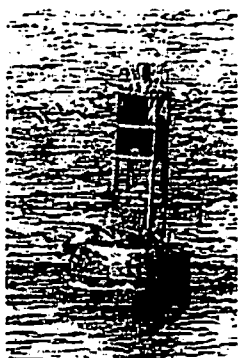
Unlike the life jacket, the buoy shown above is made up of a metal. A reddish brown substance is found at the bottom of the buoy after a certain period of time.

(i) Identify the process that had occurred to cause the formation of the reddish brown substance. [1]

....

(ii) Suggest a metal that is used to make the buoy.

....

(iii) Suggest how the process identified in c (i) can be prevented. [1]

....

B6 **(a)** Explain the difference between solubility and the rate of dissolving a solute [2]

....

....

....

....

(b) "A concentrated sugar solution is the same as a saturated sugar solution."
Do you agree with this statement? Explain your answer. [2]

....

....

....

(c) State two factors that affect solubility. [2]

....

....

B7 Acids and alkalis have different chemical and physical properties.

(a) **(i)** "Toothpaste is acidic in nature." Is this statement true or false? Explain your answer
by citing physical properties of either acids or alkalis. [2]

....

....

(ii)   State one other difference between the physical properties of acid and alkali   [1]

....

(b)   Give one example of an industrial application of an alkali.   [1]

....

Section C: Free Response Questions [30 marks]

Answer all the questions in this section.
Answer each question on a fresh page of writing paper provided.

C1   (a)   (i)   (1) electronic mass balance   (2) measuring cylinder
                     (3) string   (4) water

Using only the apparatus and materials listed above, describe briefly with the help of diagrams. how you would go about finding the density of a small solid bob.   [4]

(ii)   Another student suggested using vernier calipers to measure the diam   the small solid bob and calculate the volume of the bob using a formula instead of measuring the volume experimentally.
Which method is more accurate? Explain your answer.   [2]

(b)   The figure below shows a solid plastic cylinder with a diameter of 14 cm. It   of 1.4 g/cm^3. (Take $\pi = 22/7$)

14 cm   10 cm
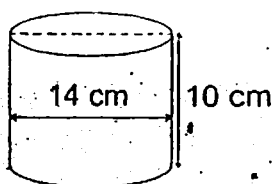
(i)   Calculate the mass of the plastic cylinder.   [2]

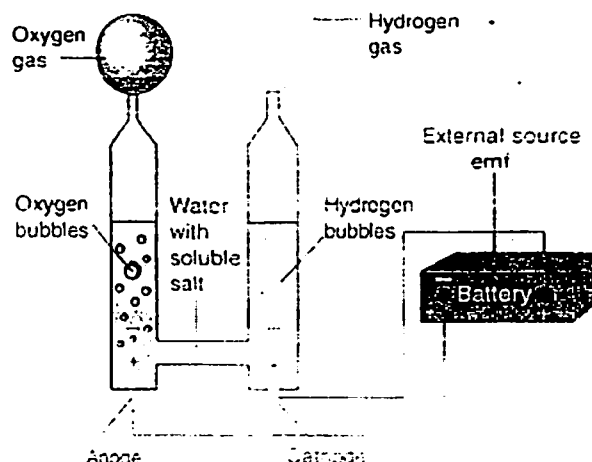(ii)   A heart-shaped tube block with a shaded surface area of 20 cm^2 and is cut off from it.

Shaded surface area of 20 cm²

14 cm

Cut off heart-shaped tube

10 cm
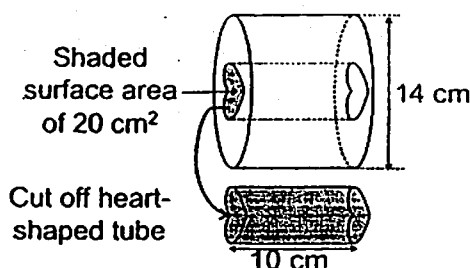
What would be the density of the remaining piece of plastic?
Explain your answer.

16

C2 An experimental set-up used to decompose water H_2O is shown in the diagram below.

(a) Name the process that is used to decompose water as shown above.

(b) (i) Write the chemical formula of the two gases that are produced during the decomposition of water. [2]

(ii) Predict the ratio of the volume of the two gases collected. Explain your answer [2]

(iii) Describe briefly how you would test for the two gases produced from the decomposition of water. State the expected observations for each test. [4]

(c) What physical property of the water sample can be measured to determine the purity of the water sample? [1]

C3 A delivery tanker supposedly carrying hydrochloric acid, crashes in a village and spills the acid onto a road.

(a) Name the ion that is found in all acids. [1]

(b) Suggest a suitable indicator that can be used to identify the exact pH of the acid. [1]

(c) A villager suggests that the acid spilled on the road should be treated with a large amount of **excess** sodium hydroxide.

(i) Do you agree with the villager's suggestion? Explain your answer. [2]

(ii) Write the chemical equation for the reaction that will occur between dilute hydrochloric acid and sodium hydroxide. [1]

(iii) Suggest another chemical that can be added to the acid. [1]

00072

(d) Some broken egg shells found by the side of the road reacted with the acid. Bubbling of gas was observed during the reaction.

    (i) Based on the chemical property of acids, what substance is the egg shell likely to be made up of? [1]

    (ii) Identify the gas likely to be produced when the egg shell reacts with the acid. [1]

    (iii) Describe the test that can be used to confirm the identity of the gas produced in **(d) (ii)**. [2]

End of Paper

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Science Mid-Year Examinations
Suggested Answer Key

Section A [30 marks]

1	2	3	4	5	6	7	8	9	10
D	B	A	C	D	B	A	B	C	C

11	12	13	14	15	16	17	18	19	20
D	B	A	C	C	C	C	D	A	B

21	22	23	24	25	26	27	28	29	30
D	D	C	B	B	B	B	D	B	A

Section B [40 marks]

B1 **(a)** **(i)** Brand A has a higher rate of solubility in water. [1] OR
Brand B has a higher rate of solubility in water. [1]

(ii) Brand of detergent. [1]
(iii) Time taken for detergent powder to dissolve. OR
Rate of dissolving (weak ANS) [1]

(b) Any 3 of the following variables: [3]
1) Different volume of solvent
2) Different temperature of solvent
3) Different material stained
4) Different stain on the material
5) Stirring for detergent A but not for detergent B

B2 **(a)** Incorrect positioning of the eye / parallax error when reading length using ruler. [1]

(b) The precision of the ruler is only up to 1 decimal place while the reading is recorded to 2 decimal places. / The precision of a metre rule is only up to 0.1cm, hence it is not possible to record up to 2.20 cm [1]

(c) Vernier calipers / Micrometer screw gauge [1] – Serious Spelling Error

B3 **(a)** **(i)** Check whether the element lies to the right or left of the zig zag line in the Periodic Table. If the element lies to the right, it is a non-metal. If the element lies to the left, it is a metal. [1]

(ii) Any two of the comparisons: [2]

Metals	Non-metals
High density	Low density
High melting point, boiling point	Low melting point, boiling point
Good electrical conductor	Bad electrical conductor
Good heat conductor	Bad heat conductor
Ductile	Non-ductile
Malleable	Brittle

1

Shiny	Dull
Corrode	Does not corrode (Weak ANS)

(b) Or other relevant examples:
(i) Hg
(ii) Cu.
(iii) Al

(c) **(i)** An alloy is a mixture of metal and **other elements**.

(ii) Brass is likely to have higher malleability / harder / softer (⋯
on concentrations) as compared to pure copper and z⋯

B4 **(a)** Student need not draw test tube with liquid

beaker [1/2] + Water [1/2]

tripod stand with [1/2]
.wire gauze

Bunsen burner [1/2]
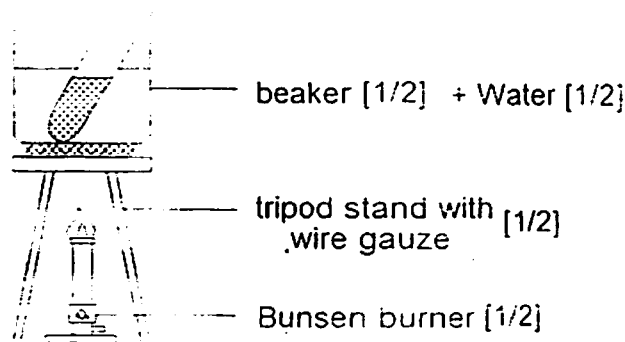
(b) non-luminous flame
(c) **Open the air hole** fully
(d) The flame does not produce soot (minimal). steady flame. hotter ⋯
heating time

B5 **(a)** The life jacket has a lower density than the sea water. [1]
(b) Plastic / Rubber / Styrofoam [1]
Reasons: Any 2 relevant reasons [2]
1) Low density
2) Does not corrode easily
3) Flexible
4) Light-weight
5) Water-proof

(c) **(i)** rusting
(ii) iron
(iii) painting, galvanising (zinc protective coat), use of stainless
steel/plastic (weak ANS)

B6 **(a)** Solubility is the **maximum amount of solute** [1] which can dissolve ⋯
of solvent at a fixed temperature. Rate of dissolving is the time taker
fast [1] the solutes dissolve.

(b) Disagree. [1] A concentrated sugar solution has lesser sugar disso⋯
compared to a saturated sugar solution. [1]

2

(c) . Any two: [1 mark each]
type of solvent / type of solute / temperature

B7 (a) (i) False. [1] Toothpaste is bitter to taste / soapy / neutralises mouth acids, hence toothpaste is likely to be an alkali. [1]

B7 (a) (ii) Any one of the following [1]: (other then the ANS in (a) (i))

Alkalis	Acids
soapy	Not soapy
bitter	sour
Turns red litmus paper blue	Turns blue litmus paper red

(b) Any one of the following [1]:

Alkalis	Uses
Sodium hydroxide	Making soaps and detergents
Potassium hydroxide	Ingredient in pain removers, dyeing of cloth
Calcium hydroxide	Reducing acidic nature of soil in agriculture
Ammonia solution	Making fertilizers, bleach

Section C [30 marks]
C1 (a) (i) 1. Use a balance to measure the mass of the solid. [1]
2. Calculate the volume of the solid by subtracting the initial reading of the water in the measuring cylinder [1/2] from the reading of the final water level. [1/2]
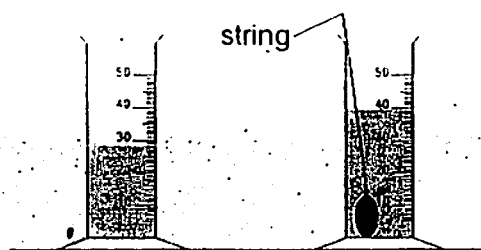
[1] - correct diagram
3. Calculate the density of the solid: density = mass ÷ volume [1].

(ii) Volume of small bob calculated using formula is more accurate than the volume measured [1] as measurements are subjected to experimental errors like parallax errors. [1]

(b) (i) Volume of cylinder = pi * (7^2) * 10 = 1 539.3804 ≈ 1540 cm^3 (3sf) [1]

Mass of cylinder
= density x volume
= 1.4 g/cm^3 x 1539.3804 cm^3 = 2155.13256 g ≈ 2160 g (3sf) [1]
Note: premature rounding or answers not to 3 significant figure minus 1 mark.

3

00076

(ii) Mass of the cut out tube = (20 x 10) x 1.4 = 280 g [1/2]
Mass of remaining piece of plastic = 2155.13256 – 280 ≈1 875 ?
Volume of remaining piece of plastic
= 1 539.3804 – 200 = 1339.3804 cm^3 ≈ 1340 cm^3 [1/2]
Density of remaining piece of plastic
= 1 875.13256 g/1339.3804 cm^3 = 1.4 g/cm^3 [1/2]
→ Density remains unchanged.

C2 (a) Electrolysis [1]

(b) (i) H_2 [1], O_2 [1]

(ii) Oxygen : Hydrogen = 1:2 [1]
Water has a chemical formula of H_2O. When water is decompose
of the elements obtained will have a volume ratio according to
formula [1]

(iii) Test for oxygen:
Insert a glowing splint into the mouth of the test tube containing th
the glowing splint rekindled/ burst into flames. gas produced is ov

Test for hydrogen:
Insert a lighted splint into the mouth of the test tube contairing in
the burning splint extinguised with a 'pop' sound, gas produced
[1]

(c) Boiling point of water (100°C), freezing point of water (0°C) [1]

Weak answers: melting point of water. density

C3 (a) Hydrogen ions [1]

(b) Universal indicator [1]

(c) (i) Disagree. [1] Acid able to neutralize by NaOH but too much NaOH
corrosive/ slippery which is dangerous on the road. [1]

(ii) HCl + NaOH → NaCl + H_2O [1]

(iii) Any possible bases / carbonates: Calcium oxide / Calcium carbone
Calcium hydroxide [1]

(d) (i) Carbonates [1]

(ii) Carbon dioxide. [1]

(iii) Bubble the gas collected into limewater. [1] if a white precipitate is
carbon dioxide gas is present. [1]

No marks: limewater turn chalky/ milky.

4

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Secondary 1 Express

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LOWER SECONDARY SCIENCE

10 May 2012

2 hours

Additional Materials: Multiple Choice Answer Sheet.

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in

This paper consists of 3 sections.

Section A consists of 30 multiple-choice questions.
Answer **all** questions.
For each question, choose the most appropriate answer and shade the letter corresponding to the answer
in soft 2B pencil on the separate OTAS Answer Sheet.

Section B consists of 7 structured questions.
Answer **all** the questions in dark blue or black pen in the space provided on the Question Paper.

Section C consists of 4 free response questions.
Answer **any three** questions in dark blue or black pen in the space provided on the Question Paper.

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

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

....
Parent's signature/ Date

This document consists of **22** printed pages

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Section A [30 marks]

1   The scientific method usually involves the following steps:

1. Identifying a problem
2. Y
3. Conducting an experiment
4. Z
5. Drawing conclusions

Which row best describes steps Y and Z?

	Y	Z
A	collecting experimental data	planning an experiment
B	making a hypothesis	collecting experimental data
C	planning an experiment	writing a report
D	writing a report	making a hypothesis

2   Which of the following statements describe a **non-luminous** flame?

I   It is yellow in colour.
II   It is most suitable for heating.
III   It produces a little or no soot.
IV   It is obtained when the air-hole is closed

A   I and II
B   I and IV
C   II and III
D   II and IV

3   The laboratory technician wants to label a glass container containing a
chlorofoam to warn users that it can produce fumes which cause irritat
eyes, nose and throat. Which of the following symbols is the most suitabl

A   B   C   D
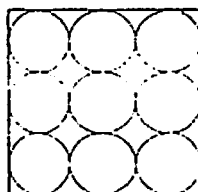
4   A student recorded a few measurements as follows.
     Which reading is most likely measured using a mètre rule?

     A   0.312 cm
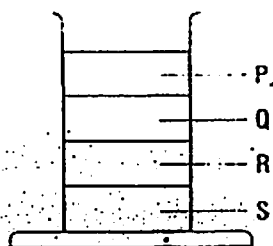   B   12.16 cm
     C   24 cm
     D   36.0 cm

5   The diagram shows a square containing nine identical circles in it

     If the radius of a circle is 2 cm. what is the area of the square?

     A   4 cm^2
     B   36 cm^2
     C   144 cm^2
     D   400 cm^2

6   The diagram shows four substances. P to S. placed in a measuring cylinder. Which
     substance has the greatest mass if the volume of each substance is the same?

     A   P
     B   Q
     C   R
     D   S

7   Mrs Loo parks her car at a shopping centre. For every five minutes of parking, the parking fee is $0.20. If she parks her car for 1.2 h. what is the approximate amount of fee she has to pay?

   A $1.20
   B $2.40
   C $2.90
   D $3.50

8   The time taken for 20 complete oscillations of a pendulum is 14.6 s

   What is the period of the pendulum?

   A   0.73 s
   B   1.46 s
   C   2.92 s
   D   14.6 s

9   In winter, the pond surface becomes frozen and the ice remains on top of the unfrozen water below. We can infer that

   A   water expands on freezing.
   B   water contracts on freezing.
   C   water becomes denser on freezing.
   D   the mass of water decreases on freezing.

10 Robert placed a measuring cylinder under a leaking tap as shown in the diagram. 40 cm³ of water was collected in 5 seconds. The rate of water flow is
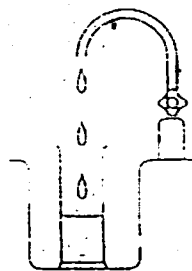
   A   2 cm³/s.
   B   8 cm³/s.
   C   40 cm³/s.
   D   200 cm³/s.

For questions **11** and **12**, please refer to the two diagrams of a pair of vernier calipers below.

The first diagram shows the vernier calipers when the jaws are closed. The second diagam shows the reading on the calipers which measured the thickness of a book.
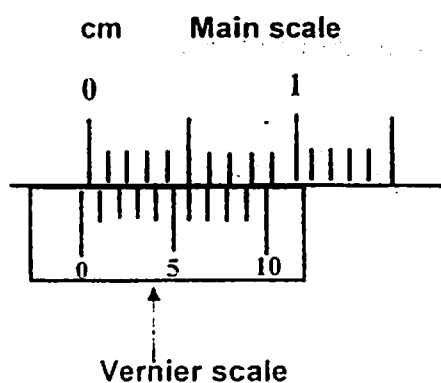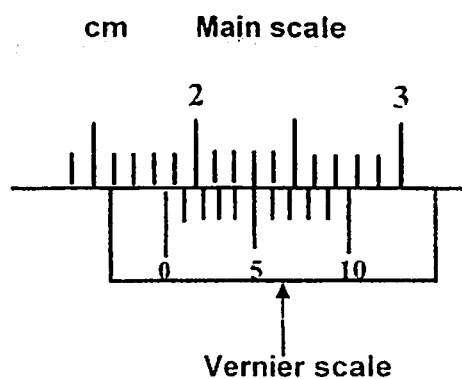

Diagram 1

Diagram 2

11 What is the zero error of the vernier calipers?

A   - 0.06 cm
B   - 0.04 cm
C   + 0.04 cm
D   + 0.06 cm

12 What is the actual thickness of the book?

A   1.79 cm
B   1.85 cm
C   1.89 cm
D   1.91 cm

13 Which of the following statements about speed is false?

A   A bus travelling at 90 km/h will cover 45 km in half an hour.
B   The SI unit for speed is m/s.
C   Average speed refers to the speed of a moving object at a particular instant of time.
D   Two people travelling the same distance in the same time, but going in opposite directions will have the same speed.

14 Which of the following statements about energy is true?

A   Energy can be converted from one form to another.
B   Energy cannot be stored or transmitted.
C   Energy is always wasted and destroyed.
D   The total energy in a system is not constant.
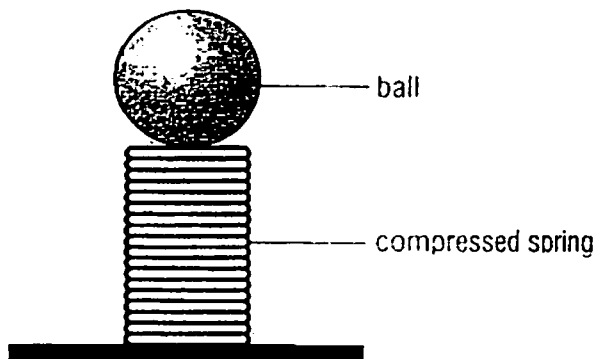
15 The diagram below shows an object moving on a track. At which po object have the minimum gravitational potential energy?
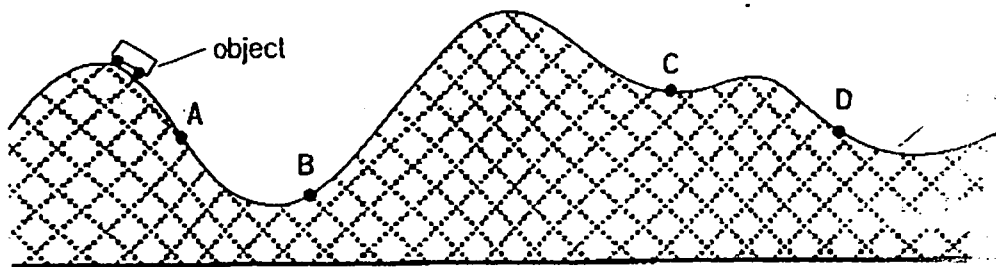
16 The diagram shows a spring being compressed by a ball

Which type of energy is being stored in the spring?

A   Heat energy
B   Kinetic energy
C   Elastic potential energy
D   Gravitational potential energy

17 Which energy change take place during the production of hydroelectric pow

A   Electrical energy → kinetic energy → potential energy
B   Potential energy → kinetic energy → electrical energy
C   Kinetic energy → electrical energy → potential energy
D   Kinetic energy → potential energy → electrical energy

18 Which of the following statements is correct?

A   Liquids expand less than solids but more than gases.
B   Liquids expand more than solids but less than gases.
C   Solids expand less than liquids but more than gases.
D   Solids expand more than liquids but less than gases.

19 An object X has a melting point of 120 °C and a boiling point of 410 °C. At which of the following conditions does object X have the lowest density?

A 0 °C
B 121 °C
C 350 °C
D 411 °C

20 What is/are the possible way(s) that a cup of hot water placed on a table can lose heat?

A By conduction only.
B By convection only.
C By radiation only.
D By conduction, convection and radiation.

21 Which of the following appliances makes use of convection currents?

A A stove
B A television
C A computer
D An air conditioner

22 The diagram shows a Thermos flask.
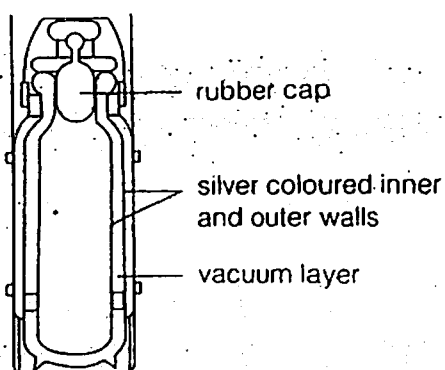
Which of the following statements is correct?

A The rubber cap reduces heat loss by radiation.
B The silver coloured walls reduce heat loss by radiation.
C The vacuum reduces heat loss by radiation.
D All the parts reduce heat loss by radiation.

N

23 A young lady has four pairs of shoes. Which pair will exert the least pressure on the ground when she wears them?

A

B

C

D

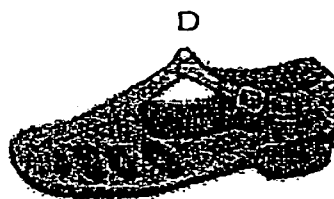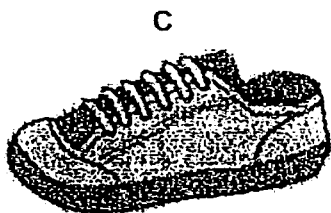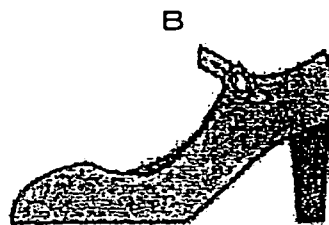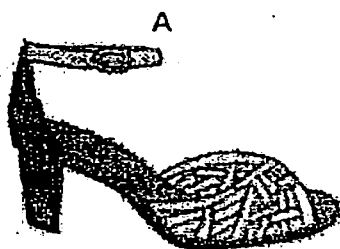24 A spring has a length of 10 cm when not extended. When a weight of 150 N is hung at its end, the spring has a length of 25 cm. What is the weight needed to extend the spring by 1 cm?

A 1 N
B 10 N
C 15 N
D 25 N

25 Which statement correctly describes the mass of the object?

A The heaviness of the object.
B The force due to gravity on the object.
C The amount of substance in the object.
D The amount of space taken up by the object.

26 All of the following statements about pressure are true except

A pressure is inversely proportional to area of contact.
B pressure is proportional to force.
C pressure increases with increasing mass.
D pressure increases with increasing area of contact.

27 A substance evaporates very quickly when left in the open. Which of the following would be its boiling point?

A 0 °C
B 28 °C
C 100 °C
D 110 °C

28 The following diagram shows the arrangement of particles in a substance.
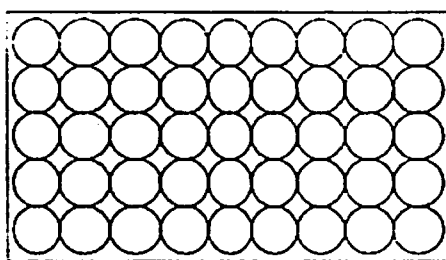
Which of the following statements is true about the particles in the above substance?

A The particles are able to slide over each other in random directions.
B The particles are held by weak forces of attraction.
C The particles can move around freely at great speeds
D The particles vibrate about their fixed positions

29 Which sentence best describes the arrangement of particles in water?

A They are close together in an orderly arrangement.
B They are close together in a disorderly arrangement.
C They are far apart in an orderly arrangement.
D They are far apart in a disorderly arrangement.

30 Which of the following statements explains why gases have no fixed shape?

A The gas particles are far apart from each other.
B The gas particles are held by strong forces of attraction.
C The gas particles are free to move around in all directions.
D The gas particles are in a random arrangement.

NAME: _____ (   ) ·   DATE: _____

CLASS: _____

Section B [40 marks]

1   **Figure 1.1** shows an experiment whereby a substance is heated.
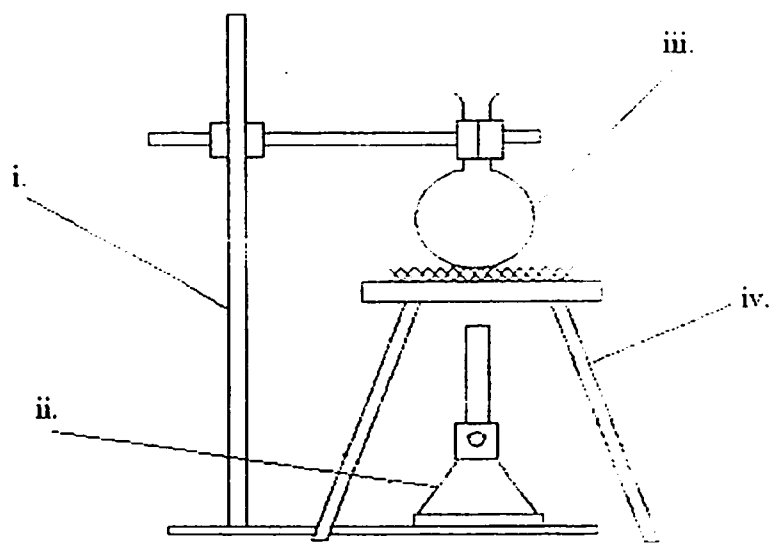
Figure 1.1

(a)   Label the apparatus used in **Figure 1.1**.   [4]

(i) ....

(ii) ....

(iii) ....

(iv) ....

(b)   After the experiment, the bottom of (iii) was found to be covered with a lot of soot. Explain what could have happened.   [1]

....

....

(c)   What could be done to prevent so much soot from accumulating at the bottom of the apparatus?   [1]

....

....

(d) Sketch a sectional diagram of a gas jar and state its function.

(i) [1]
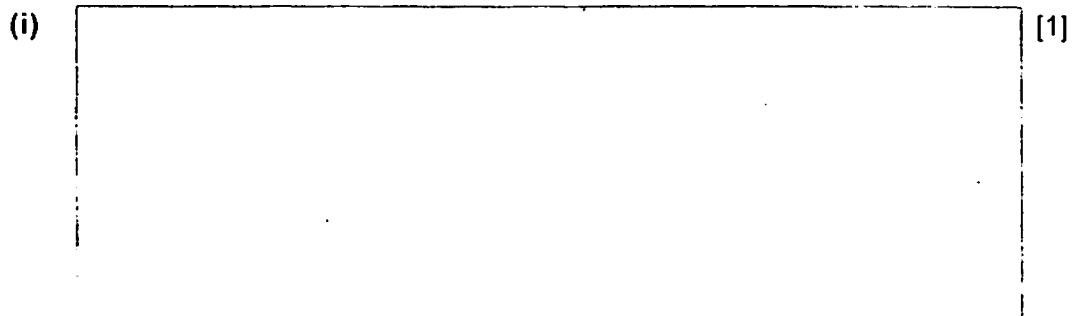
(ii) Function: .... [1]

[8 marks]

2   Three cars, X, Y and Z, started on a journey from Woodlands in Singapore to Kuala Lumpur in Malaysia at the same time using the same route.

(a)   Car X travelled at an average speed of 85 km/h and reached Kuala Lumpur in 5 hours 30 minutes. Find the distance between Singapore and Kuala Lumpur.

Distance between Singapore and Kuala Lumpur =.................... [2]

(b)   Car Y used up approximately 45 litres of petrol during the journey. Find the petrol consumption of car Y.

Petrol consumption of car Y = ... [2]

(c) If the petrol consumption of car Z is 15 km/l and 1 litre of petrol costs $1.90. find the cost of petrol for the car to go from Singapore to Kuala Lumpur.

Cost of petrol = ... [3]

[marks]

3 **Figure 3.1** shows a solar panel. part of a solar water-heating system found on many Singapore roofs.
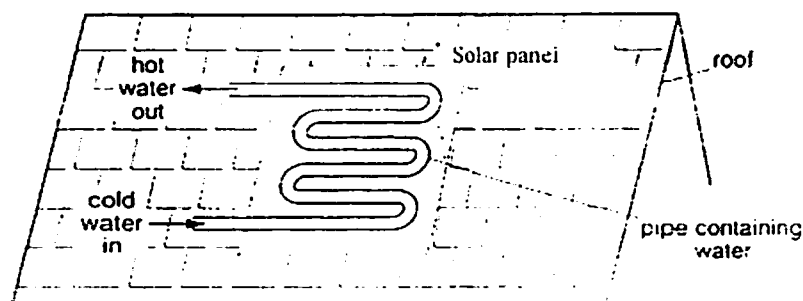
Figure 3.1

(a) State the methods by which heat gets from:

(i) the sun to the outside of the pipe. [1]

....

(ii) from the outside of the pipe to the water in the pipe [1]

....

(b) If you are designing the system, state your choice of its colour and give a reason for your choice. [1]

....

....

[3 mar

4   Complete **Figure 4.1** and **Figure 4.2** with the correct types of energy.

(a)   **(i)**   Use of the motor in the ceiling fan is   [1]

```
 _____              _____
|                  |          |   kinetic        |
| _____   |  ──────> |   energy         |
|   energy         |          |_____|
|_____|
```

Figure 4.1

(ii)   Striking a match is   [2]

```
                                    _____
                                    |  heat     |
 _____                   |_____|
|                  |                      +
| _____   |  ──────>    _____
|   energy         |            |                  |
|_____|            |  ..............  |
                                |     energy       |
                                |_____|
```
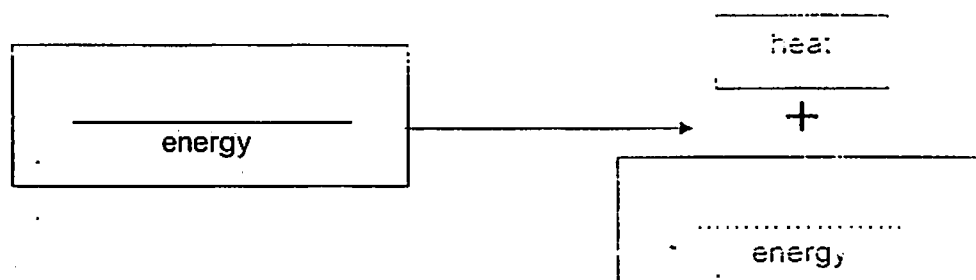
Figure 4.2

(b)   Fill in the blanks with the appropriate types of energy.   [2]

(i)   When a child plays with a battery driven toy truck,

.... energy stored in the battery

is changed into .... energy as the truck moves.

(ii)   When a ball is dropped from the top of a tall building, its

.... energy is changed into

.... energy as it falls.

[5 marks]

5   (a)   A glass with thick sides cracks when boiling water was poured into it.

        (i)   Suggest a reason that caused the cracking.

        ....

        (ii)   Suggest a solution to this problem.

        ....

    (b)   Suggest a suitable solution to prevent water pipes left in the sun from bursting.

        ....

6   Figure 6.1 shows a beaker of water containing a small amount of blue dye c.
     When the container is heated, the blue dye crystals dissolve in the water an
     pattern in it.

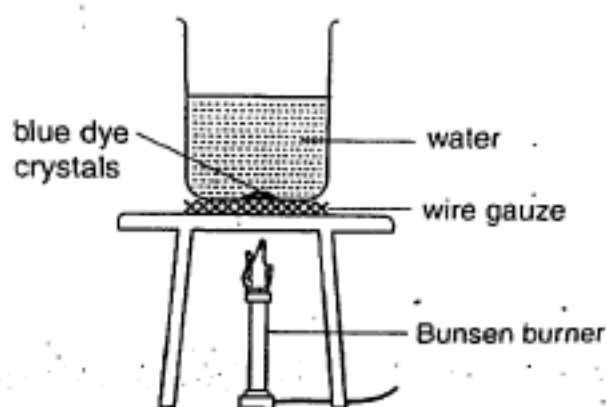Figure 6.1

    (a)   Explain why wire gauze is used in this experiment.

        ....

    (b)   Name the mechanism of heat transfer from

        (i)   wire gauze to glass of beaker   ....

        (ii)   within water in the beaker   ....

(c) (i) Draw on **Figure 6.1** the pattern you would expect to observe in the [1] water created by the blue dye.

(ii) Explain why you would expect this pattern in (c)(i). [3]

....

....

[7 marks]

7 (a) A car has a mass of 1500 kg. The total area of contact between each tyre and the road surface is 5 cm².

(i) What is the weight of the car?

Weight of car = ... [1]

(ii) What is the total area of contact between the tyres and the road surface? Leave your answer in SI unit.

Total area of contact = ... [1]

(iii) Determine the average pressure exerted by all the tyres on the road surface. Leave your answer in Pa.

Average pressure = ... [2]

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16

(b) The weight of a man on Earth is 600 N. Suppose the gravitational fie.
10 N/kg on the Earth but 1.7 N/kg on the Moon.

(i) Calculate the mass of the man on Earth.

Mass of man on Earth =

(ii) Calculate his mass on the Moon.

Mass of man on the Moon =

(iii) What is his weight on the Moon?

Weight of man on the Moon =

Section C [30 marks]
*Answer any **three** questions in this section in the space provided.*

8   An unknown block P of mass 98 g has a dimension of 7.0 cm long, 6.4 cm wide and 0.65 cm high.

(a)   Define density.   [1]

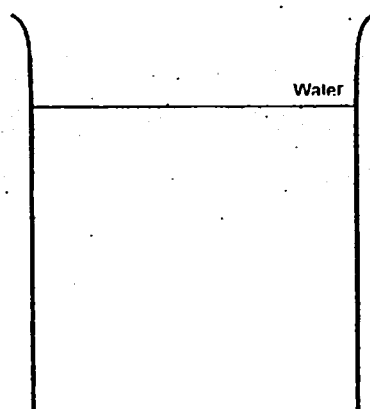   ....

    ....

(b)   Calculate the volume of block P and hence determine the density of block P in g/cm³.

    Volume = ...

    Density = ...   [4]

(c)   On **Figure 8.1**, indicate how block P will look like when it is placed in the container of water. (Hint: Density of water = 1 g/ cm³)   [1]

Water

Figure 8.1   Need a home tutor? Visit smiletutor.sg

(d) State and explain whether the density of block P will change experiment is performed on the moon.

....

....

(e) Block P is then cut into half. State and explain what happens to its density

....

....

9   **Figure 9.1** shows how a bimetallic strip made of brass and stee s .se iron.
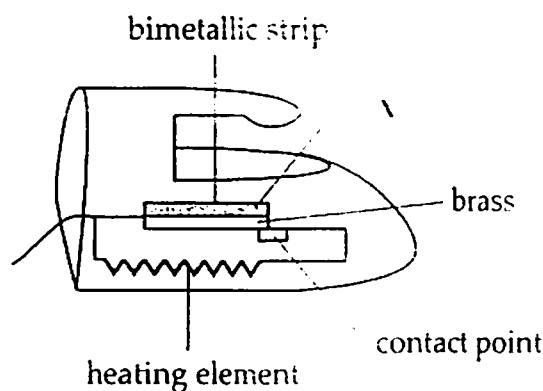
Figure 9.1

(a) **(i)** What is a bimetallic strip?

....

(b) **(II)** Staggetefunttitionatetamfostat.

....

(III) Explainbowtherbimetallic appianpessaesinthebinetallicentrip can tullrlbe function in (b)(i).

....

....

....

....

(c) State the main method of heat transfer in an electric iron. [1]

....

[10 marks]

10 Figure 10.1 shows the different parts of a bicycle.

saddle

handle bar grips

bearings

pedals
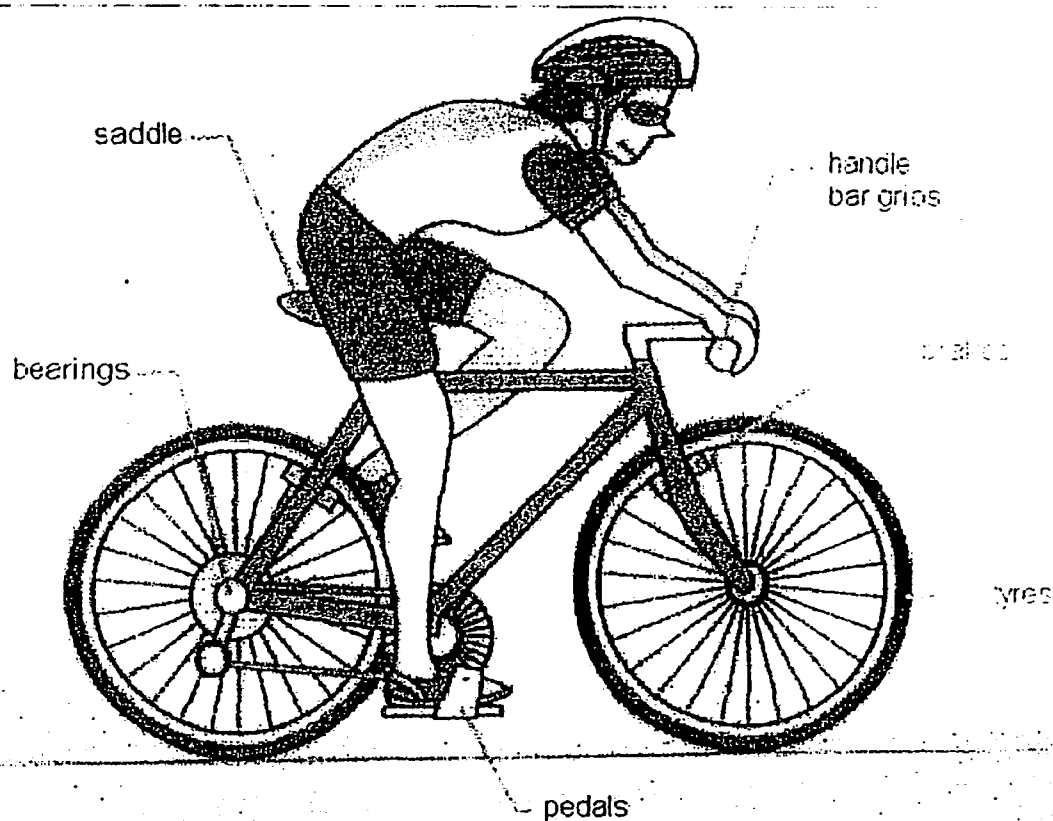
Figure 10.1

(a) How does friction make cycling possible? [1]

....

....

(b) **(i)** Name two examples where friction is useful. [2]

....

....

(ii) Name two examples where friction can be a nuisance. [2]

....

....

(iii)   Suggest how you would reduce friction in the examples [2]
        identified in (b).

....

....

(c)   Give two effects of how friction can be a nuisance to the cyclist.   [2]

....

....

(e)   How does the cycling posture that the cyclist takes in **Figure 10.1** help him   [1]
      cycle faster and longer during a competition?

....

....

[10 marks]

11   **Figure 11.1** shows a heating graph of water.
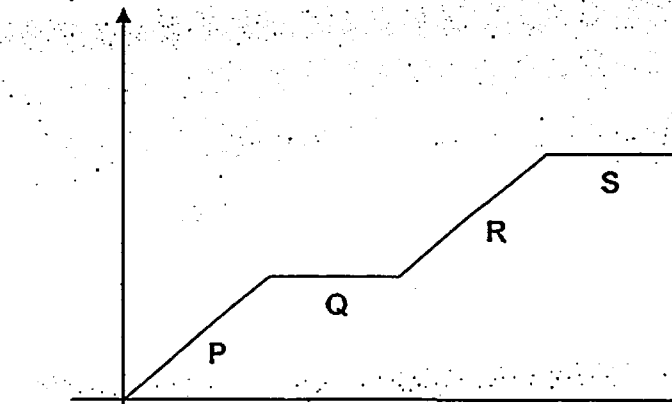
Figure 11.1

(a) (i) Which regions (P to S) represent the melting point and boiling point   [2]
of water?

-   Melting point ....

Boiling point ....

(ii) State the physical state(s) of water at regions Q and S   [2]

Q ....

S ....

(iii) Sketch, in Table 11.1, how the particles of water are arranged at   [2]
regions P and R respectively.

Arrangement of particles at region P	Arrangement of particles at region R

Table 11.1

22

(iv) Water has a boiling point of 100 °C. Describe what happens to particles in water when it is heated from a temperature of 80 °C to 105 °C.

....

....

....

(b) Use the particulate model of matter to explain why gases are easily compressed but not liquids.

....

....

END OF PAPER

KUO CHUAN PRESBYTERIAN SECONDARY SCHOOL
Sec 1 Express
Lower Secondary Science
Mid Year Exam/ 2012

Marking Scheme

Important Note:

1. Mark only answers clearly written in black or blue ink.

Section A – Multiple Choice Questions [30 marks]

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
B	C	C	D	C	D	C	A	A	B

Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
B	C	C	A	B	C	B	B	D	D

Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
D	B	C	B	C	D	B	D	B	C

Section B [40 marks]

1	ai)	Retort Stand	1
	ii)	Bunsen burner	1
	iii)	Round-bottomed flask	1
	iv)	Tripod stand	1
	(b)	Luminous flame was used to heat the chemical/air-hole was closed. (Best answer: Incomplete combustion/burning took place.)	1
	(c)	Use a non-luminous flame instead/open the air-hole	1
	(di)	[R: closed top] Function: To collect gas	1
	dii)		1

Total 18

2	(a)	Distance = speed x time [-½ if the formula is not given] = 85 x 5.5 [1] = 467.5 km [1]	2

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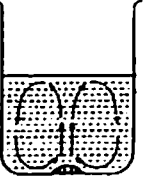
	(b)	Petrol consumption = distance ÷ volume of petrol = 467.5 ÷ 45 [1] = 10.4 km/l [1] [ECF: wrong answer in (a), award 1 mark for working]	2
	(c)	Cost = amount of petrol used x cost per litre = (467.5 ÷ 15) [1] x 1.90 [1] = $ 59.20 [1; 0 if answer not in 2 d.p] [ECF: wrong answer in (a), award 1 mark for working]	3
		Total	7

3	(a)	(i) radiation	1
		(ii) conduction [R: convection]	
	(b)	Black coloured pipes – good absorber of heat [Reject brown / "dark colour"]	1
		Total	3

4	(a)	(i) electrical	1
		(ii) chemical potential [1]; light [1]	2
	(b)	(i) chemical potential; kinetic	1
		(ii) gravitational potential; kinetic [both must be correct]	1
		Total	5

5	(a)	(i) Uneven expansion between inner and outer wall. [R: expands more; A: expands faster]	1
		(ii) Make glassware using glass which expands very little when heated OR pyrex	1
	(b).	Make expansion bends in the pipes.	1
		Total	3

6	(a)	To conduct heat quickly from the flame of the Bunsen burner to heat up water in the beaker. / To allow even heating.	1
	(b)	(i) Conduction	1
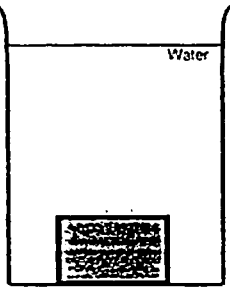
		(ii) Convection	1
	(c)	[1]	1
		(ii) When the region of water is being <u>heated</u>, it becomes <u>less dense</u> and <u>rises</u> to the top. Water in the <u>cooler</u> region, being <u>denser</u>, <u>sinks</u> down. This creates convection currents that can be observed by the colour of the blue dye crystals.	1 1 1
		Total	**7**

7	**(a)**	(i) Weight of the car = 1500 x 10 = <u>15 000 N</u>	1
		(ii) Total area = 4 x 5 cm^2 [answer not in SI unit no marks] = <u>0.002 m^2</u>	1

		(iii) Pressure = Force / Area [1]
		             = 15 000 / 0.002
		             = <u>7 500 000 Pa</u> [1]
		
		[ECF: if (i) and (ii) wrong answers, award 1m]
			2

	(b)	(i) Mass of the man on earth = 600 / 10 = <u>60 kg</u>	1
		(ii) Mass of man on the Moon = <u>60 kg</u>	1
		(iii) Weight of man on the Moon = 60 x 1.7 = <u>102 N</u>	1
		Total	**7**

Section C [30 marks]

Answer any three questions in this section in the space provided.

8	**(a)**	Density of a substance is defined as the amount of mass per unit volume. [R: Density is mass divided by volume]	1

	(b)	Volume = 7 cm ×6.4 cm ×0.65 cm [1]
		         = <u>29.12 cm^3</u> [1]
		Density = Mass / Volume [1]
		         = 98 g / 29.12 cm^3
		         = <u>3.37 g / cm^3</u> [1]
		
		[ECF: award 1m for working if volume was calculated wrongly]
			4

	(c)	Water
	(d)	No. Mass and volume of the object is not affected by gravitational f...
	(e)	No change in density. The amount of mass per unit volume in half a block remains the same.

Tot... 1(

9	a	(i) A bimetallic strip is made up of two different metals joined together
		(ii) X is steel/iron.
		(iii) Refrigerator, rice cooker, electric oven [any two]
	b	(i) A thermostat switches the circuit on or off when the desired temperature is reached to maintain a constant temperature. [A: regulates the temperature; R: controls the temperature]
		(ii) When the iron is hot the bimetallic strip bends upwards away from the contact [1]. The circuit is then open and the iron cools dow. When this happens, the bimetallic strip straightens/bends downward touch the contact again [1] and the circuit is closed [1] to repeat the c.
	c	Conduction.

10	a	Friction enables the tyres to grip onto the road without sliding ov. it so easily.
	b	(i) Handle bar grips, saddle, brakes, pedals [any two]
		(ii) Bearings, tyres
		(iii) Apply lubricant oil, use a thinner tyre
	c	It causes wear and tear in metal parts/tyres and replacement required. Energy is wasted in the form of heat.

	d	The posture reduces the surface area that has to overcome air resistance, allowing the cyclist to use energy to convert to more kinetic energy, hence less energy wasted. [A: reduces air resistance; R: air friction]	1
		Total	**10**

11	a	(i) Q S	1
		(ii) Q: solid + liquid [both must be correct] S: liquid + gas	
		(iii) P: particles are touching each other in regular arrangement of the same size. Q: particles are slightly apart, some touch and some do not. fewer particles than in P.	
		(iv) Upon heating, the water particles <u>gain kinetic energy</u> and move faster and further apart. As it reaches 100 °C. the particles <u>gain enough energy to break free from one another</u>, and they move in rapid, random motions.	
	b	Gas particles are <u>far apart</u> from one another, while liquid particles are closer together. Hence there are <u>spaces</u> between the gas particles for gases to be compressed but not in liquids.	2
		Total	**10**

Pasir Ris Crest Secondary School
Mid-Year Examination 2012
Secondary One Express

Science (Chemistry)

10 May 2012
1 hour

Additional Materials: Objective Test Answer Sheet (OTAS)

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, register number and class in the spaces at the top of this page

Section A (15 marks)
There are **fifteen** questions in this section.
Answer all the 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 **soft pencil** on the Objective Test
**Answer Sheet. Read the instructions on the
Objective Test Answer Sheet very carefully.**

Section B (15 marks)
Answer all the questions. Write your answers in the
spaces provided in the question paper.

Section C (20 marks)
Answer all the questions. Write your answers in the spaces provided.

Hand in the Objective Test Answer Sheet separately.
The number of marks is given in brackets [ ] at the end of each question or part question.

A copy of the Periodic Table is attached on page 13 for your reference.

For Examiner's Use	
Section A	/ 15
Section B	/ 15
Section C	/ 20
Total	/ 50
Parent's Signature	

This question paper consists of **13** printed pages including the cover page.

My Reflection ... "What was" ...... "Why?"...... "What next?"......

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SECTION A: MULTIPLE CHOICE QUESTIONS (15 MARKS)

- 1. Which of the following apparatus is used to measure volume of liquid mos.

    A   Beaker

    B   Boiling tube

    C   Burette

    D   Conical flask

2. Chemicals once removed from the bottles should not be pour back into the because _____.

    A   it is a difficult task

    B   it is against the law

    C   the removed chemicals may be contaminated

    D   all unused chemicals must be thrown away

3. Why should the Bunsen burner be left with a luminous flame if it is left una'':

    A   To save gas.

    B   A luminous flame is not so hot.

    C   A luminous flame does not flicker.

    D   A luminous flame can be seen clearly.

4. The diagram shows a flame from a Bunsen burner.
    Which part of the flame should be used to heat the bottom of the test tube to efficient and fast heating?
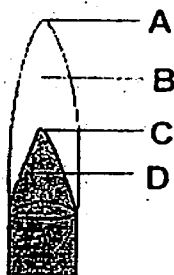
5. Which of the following can be separated using a separating funnel?

        (i)   sugar and water
        (ii)   oil and water
        (iii) flour and wafer

A   (i)   C   (i) and (iii)

B   (ii)   D   (ii) and (iii)

6. Salt crystals are often found on the shore of the Dead Sea because of

A   evaporation.   C   filtration.

B   distillation.   D   magnetic attraction.

7 Which of the following best shows that water is pure?

A   It is colourless.

B   It is odourless.

C   It is safe to drink.

D   It freezes at 0 °C.

8. To separate a mixture of sand and salt, the first step is to stir in some water.
What are the next two steps?

A   crystallisation, then evaporation

B   evaporation, then crystallisation

C   evaporation, then filtration

D   filtration, then evaporation

9. Fractional distillation is used to obtain pure nitrogen and pure oxygen from the air by first cooling it to -200 °C so that it changes into a liquid. This method works because nitrogen and oxygen have different _____.

A   boiling points

B   densities

C   freezing points

D   solubilities

10. Drinkable water can be obtained by _____.

    (i) distillation
    (ii) evaporation
    (iii) reverse osmosis

    A   (i) only   C   (i) and (ii)

    B   (iii) only   D   (i) and (iii)

11. Elements in the same row in the Periodic Table show a gradual change in physical property, from left to right across the table, from

    A   metallic to non-metallic.

    B   gaseous to liquid to solid.

    C   soluble in water to insoluble in water.

    D   poor to good conductor of heat.

12. During the melting process, what happens to the water molecules in the ice cube?

    A   They condense.

    B   They gain energy.

    C   They dissolve.

    D   They lose energy.

13. The diagram shows the changes in state of water.
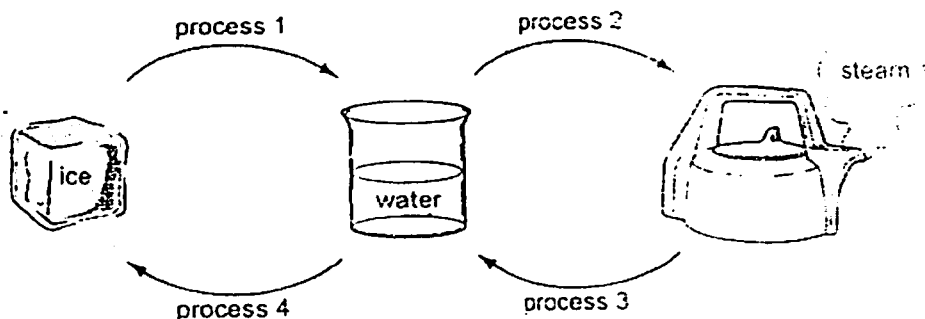
	process 1	process 2	process 3	process 4
A	condensation	freezing	melting	evaporation
B	melting	condensing	freezing	evaporation
C	melting	evaporation	condensation	freezing
D	evaporation	melting	condensation	freezing

14. Glucose is represented by the chemical formula $C_6H_{12}O_6$.
Which elements are present in glucose?

A   carbon, helium and water

B   carbon, hydrogen, and oxygen

C   calcium, hydrogen and oxygen

D   copper, hydrogen and oxygen

15. Which one of the following elements is a non-metal?

A   scandium   C   sodium

B   strontium   D   sulfur

SECTION B: STRUCTURED QUESTIONS (15 MARKS)

Write your answers on the spaces provided.

1. The following apparatus is set up to prepare and collect carbon monoxide ga:
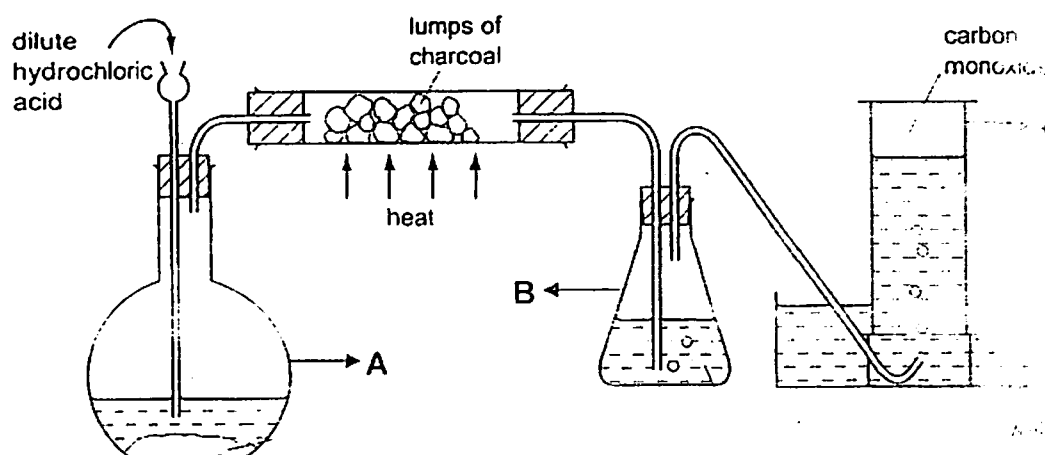
a) Name the apparatus labelled **A, B** and **C**.

A : _____

B : _____

C : _____

b) This experiment requires charcoal to be strongly heated. State the typ used and describe how the flame can be obtained.

c) On a bottle containing hydrochloric acid, a label shown below is found bottle.

What should a student do immediately if hydrochloric acid is split on ri-

2.
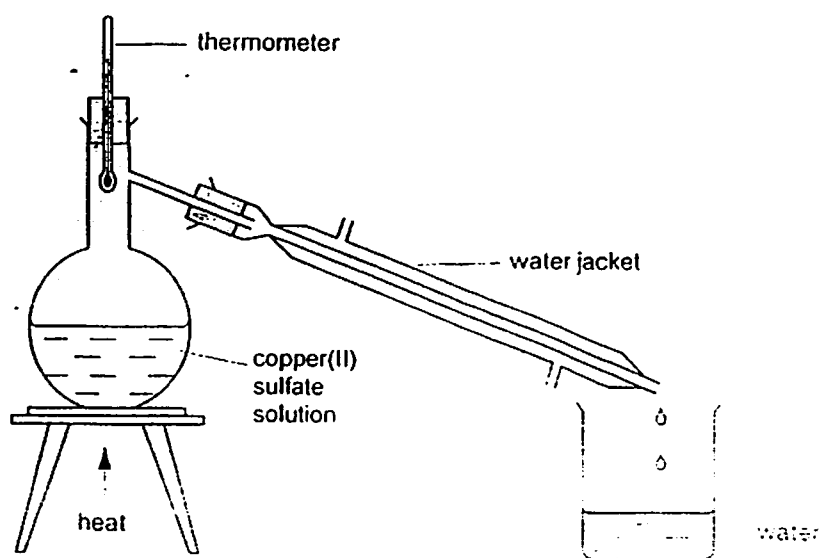
Copper(II) sulfate is a blue salt and soluble in water.
Study the diagram above and answer the questions below.

a) (i) Name the method of purification.

    (ii) Suggest the purpose of the water jacket   [2]

b) What would be the reading on the thermometer during the purification?   [1]

c) Draw a cross (X) on the diagram where the copper(II) sulfate salt would be left
    after purification is complete.   [1]

d) Another student accidentally spilled alcohol into a beaker of copper(II) sulfate
    solution. The above set-up is not suitable to remove alcohol from the mixture.

    (i)   Suggest a suitable separation method.

    (ii) Explain why the method you suggested is more suitable.   [2]

                                                        [Total: 6]

00112

3. The following table provides data some physical properties of four elements

element	appearance	melting point/°C	boiling point /°C	
W	silvery	-39	356	ther
X	brown	1084	2930	wi
Y	black	3500	4027	ne
Z	greenish-yellow	-101	-34	kill h

a) Name element W.

_____

b) Describe a physical property of element X that is observed from the ...

_____

_____

c) From the table, which elements exist as a solid at 25 °C?

_____

SECTION C (20 MARKS)

Answer ALL the questions. Write your answers in the space provided.

1   a)   Using the kinetic particle theory, suggest why

(i) a liquid takes the shape of its container but a solid does not.   [2]

(ii) a gas is easier to compress than a liquid.   [2]

b)   The diagram below shows the heating curve of water from 5 °C to 105 °C.

temperature/°C
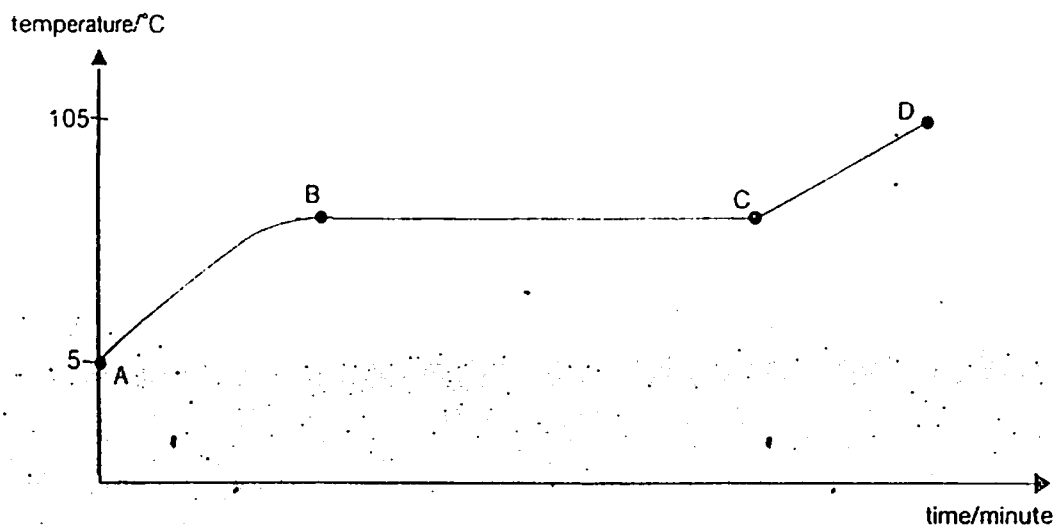
(i)   Complete the table below.   [2]

point	physical state(s) present
A to B	
B to C	
C to D	

b) (ii) Describe the motion and arrangement of the water particles at ·2 ℃

   motion:

   _____   _____   __   ___   _____

   _____   ___   __   _____   ____

   arrangement:

   _____   ___   __   ___   _____   _____   _____

   ___   _____   ___

c) Explain what is meant by 'iodine sublimes at 184°C'.

   ___   ____   _   __   _   ___   _

   __   __   ___

2   The diagram below show five substances P, Q, R, S and T.

| P | Q | R | S | T |
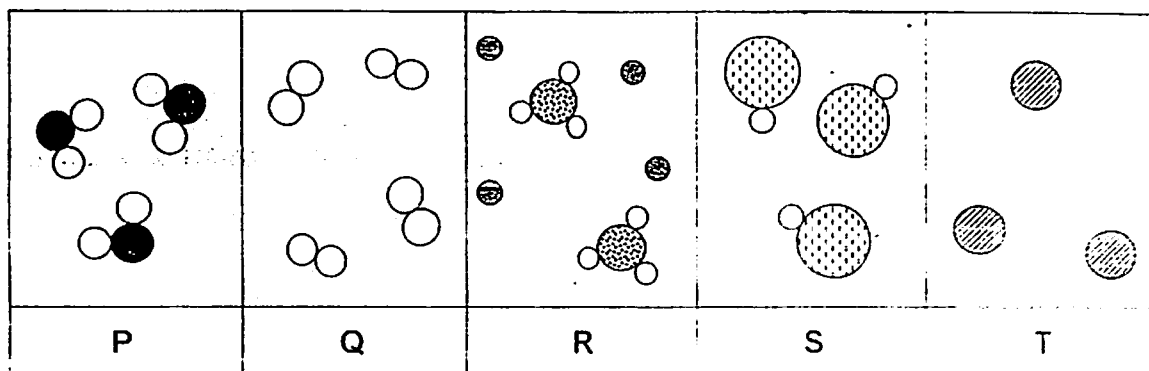
a) Describe the similarity between substance Q and T

_____

_____

b) Which of the diagrams represents molecules of compound? _____ [1]

c) Which one of the diagrams represents a mixture? _____ [1]

d) Which one of the diagrams represents molecules of water, H_2O? _____ [1]

e) Janelle was given two samples. Sample A contains salt solution which is prepared by mixing salt and water together. Sample B contains salt whose chemical formula is NaCl.

(i) Classify the two samples as element, compound or mixture. [1]

Sample A: _____

Sample B: _____

(ii) Compare two differences between the samples based on (i). [2]

_____

_____

_____

_____

_____

[Total: 7]

00116

3   The diagram below shows the results obtained when five inks, A to E, were separated into their components.
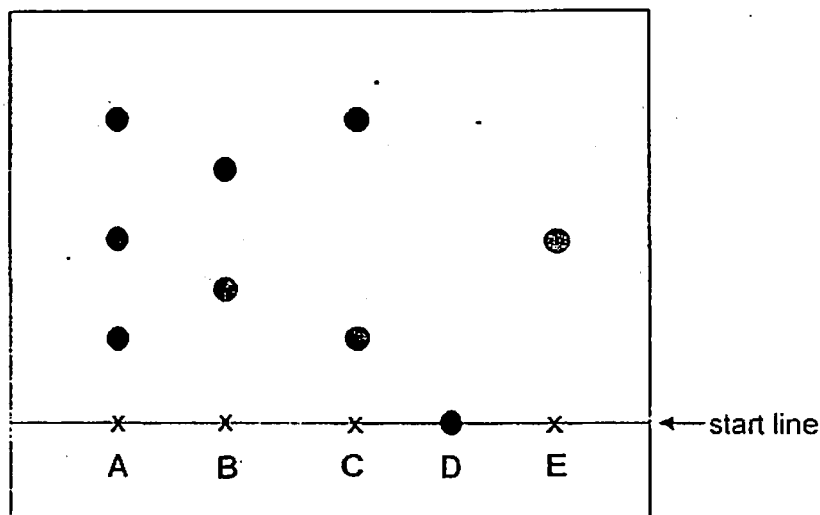
a) Name the separation method used to obtain the above results.   [1]

b) Which ink is a pure substance?   [1]

c) Which two inks can be combined to make ink A?   [1]

d) Explain why ink D remained on the start line.   [1]

[Total: 4]

— END OF PAPER —

The Periodic Table of the Elements

Group

I	II		III	IV	V	VI	VII	0

| | | | | | | | | 4
He
Helium
2 |

| 7
Li
Lithium
3 | 9
Be
Beryllium
4 | | 11
B
Boron
5 | 12
C
Carbon
6 | 14
N
Nitrogen
7 | 16
O
Oxygen
8 | 19
F
Fluorine
9 | 20
Ne
Neon
10 |

| 23
Na
Sodium
11 | 24
Mg
Magnesium
12 | | 27
Al
Aluminium
13 | 28
Si
Silicon
14 | 31
P
Phosphorus
15 | 32
S
Sulfur
16 | 35.5
Cl
Chlorine
17 | 40
Ar
Argon
18 |

| 39
K
Potassium
19 | 40
Ca
Calcium
20 | 45
Sc
Scandium
21 | 48
Ti
Titanium
22 | 51
V
Vanadium
23 | 52
Cr
Chromium
24 | 55
Mn
Manganese
25 | 56
Fe
Iron
26 | 59
Co
Cobalt
27 |

| 59
Ni
Nickel
28 | 64
Cu
Copper
29 | 65
Zn
Zinc
30 | 70
Ga
Gallium
31 | 73
Ge
Germanium
32 | 75
As
Arsenic
33 | 79
Se
Selenium
34 | 80
Br
Bromine
35 | 84
Kr
Krypton
36 |

| 85
Rb
Rubidium
37 | 88
Sr
Strontium
38 | 89
Y
Yttrium
39 | 91
Zr
Zirconium
40 | 93
Nb
Niobium
41 | 96
Mo
Molybdenum
42 | Tc
Technetium
43 | 101
Ru
Ruthenium
44 | 103
Rh
Rhodium
45 |

| 106
Pd
Palladium
46 | 108
Ag
Silver
47 | 112
Cd
Cadmium
48 | 115
In
Indium
49 | 119
Sn
Tin
50 | 122
Sb
Antimony
51 | 128
Te
Tellurium
52 | 127
I
Iodine
53 | 131
Xe
Xenon
54 |

| 133
Cs
Caesium
55 | 137
Ba
Barium
56 | 139
La
Lanthanum
57 | 178
Hf
Hafnium
72 | 181
Ta
Tantalum
73 | 184
W
Tungsten
74 | 186
Re
Rhenium
75 | 190
Os
Osmium
76 | 192
Ir
Iridium
77 |

| 195
Pt
Platinum
78 | 197
Au
Gold
79 | 201
Hg
Mercury
80 | 204
Tl
Thallium
81 | 207
Pb
Lead
82 | 209
Bi
Bismuth
83 | Po
Polonium
84 | At
Astatine
85 | Rn
Radon
86 |

| 226
Ra
Radium
88 | 227
Ac
Actinium
89 |

| 87
Fr
Francium
87 |

1
H
Hydrogen
1

*58-71 Lanthanoid series
†90-103 Actinoid series

| 140
Ce
Cerium
58 | 141
Pr
Praseodymium
59 | 144
Nd
Neodymium
60 | Pm
Promethium
61 | 150
Sm
Samarium
62 | 152
Eu
Europium
63 | 157
Gd
Gadolinium
64 | 159
Tb
Terbium
65 | 162
Dy
Dysprosium
66 | Ho
Holmium
67 | 167
Er
Erbium
68 | Tm
Thulium
69 | 169
Lm
Ytterbium
70 | 173
Yb
70 | 175
Lu
Lutetium
71 |

| 232
Th
Thorium
90 | 231
Pa
Protactinium
91 | 238
U
Uranium
92 | Np
Neptunium
93 | Pu
Plutonium
94 | Am
Americium
95 | Cm
Curium
96 | Bk
Berkelium
97 | Cf
Californium
98 | Es
Einsteinium
99 | Fm
Fermium
100 | Md
Mendelevium
101 | No
Nobelium
102 | Lr
Lawrencium
103 |

Key

$\begin{array}{c} a \\ X \\ b \end{array}$

a = relative atomic mass
X = atomic symbol
b = proton (atomic) number

The volume of one mole of any gas is 24 dm³ at room temperature and pressure (r.t.p.)

Mark Scheme
Mid Year Exam 2012
Sec 1 Science (Chemistry)

Paper 1 [15 marks]

1	C	11	A
2	C	12	B
3	D	13	C
4	C	14	B
5	B	15	D
6	A		
7	D		
8	D		
9	A		
10	D		

Paper 2 - Section B [15 marks]

No	Mark Scheme	Total marks
1	a) A – flat-bottomed flask (1) B – conical flask (1) C - jas jar (1)	3
	b) type of flame: non-luminous (1) open the air-hole to obtain a non-luminous flame (1)	2
	c) wash his hands with plenty of water (1)	1 total: 6
2	a) (i) distillation (1) (ii) to condense steam/water vapour into water (1)	2
	b) 100°C (1)	1
	c) show: X on the base of the round-bottom flask (1)	1
	d) (i) fractional distillation (1) (ii) alcohol and water has different boiling point (1)	2 total: 6
3.	a) mercury (1)	1
	b) conduct electricity / ductile (1)	1
	c) X and Y (1)	1 total: 3

Section C [20 marks]

No	Mark Scheme
1.	a) (i) the particles of a liquid can move around one another (1) the particles of a solid are held in fixed position (1) (ii) the particles of the gas are far apart from one another (1) the particles of liquid are close together (1) b) (i) any mistake – deduct 1 mark

b) (i)

Point	Physical state(s) present
A to B	liquid
B to C	Liquid and gas
C to D	gas

(ii) motion: the particles vibrate at fixed position (1)
arrangement: particles are close together and arranged in regular arrangement

c) it changes from solid to gas state (1)

No	Mark Scheme
2.	a) they are elements containing one type of atoms (1) b) P and S (1) c) R (1) d) P (1) e) (i) Sample A: mixture, Sample: compound (1) (ii) 1 mark each for correct comparison of mixture and compound • mixtures can be separated by physical means but compounds can be separated by chemical reactions. • mixtures does not have a fixed composition but compounds have a fixed composition. • Mixtures has same properties as their consistuents but compounds have different properties from its consistuents/elements. • Energy is not given out when mixtures are mixed but heat/light energy is given out when compounds are formed.
3.	a) Chromatography (1) b) E (1) c) C and E (1) d) it is insoluble in the solvent. (1)

PASIR RIS CREST SECONDARY SCHOOL
MARKER'S REPORT

Mid-Year Examination 2012

Subject: Sci(Chemistry)　　　　　Level: 1 (Express)　　　　　Paper No.:

Name of Marker: Mrs Mimi Ang & Miss Ong Xin Yi　　　　　Questions marked: All

Comments and observations made by the marker (for each question marked, please take note of the common mistakes made)

General Comments:
Very few gaps appeared in candidates responses.

Questions that were well answered included laboratory apparatus and purification methods.

Students did not perform well included kinetic particle theory and elements, compounds & mixtures.

Comments on specific questions:

SECTION A – Multiple Choice Questions 15 marks

The average score of 13.5 marks was obtained for the whole level. On the whole students did very well for this section.

However, question 9 posed a problem for most students. The distractor is option C and key is option A. Students may not be able to differentiate the difference between boiling point and freezing point as the question stated that the gas is being cooled.

SECTION B –15 marks

No	Description
1.	a) Most students were unable to identify the gas jar. Many named it gas cylinder, measuring cylinder, gas tube, beaker etc b) Most students were able to describe how to obtain a non-luminous flame. However, some students described that they can do it by opening the collar which was not given a credit. c) Most students were able to state that they have to wash hands with plenty of water/ thoroughly/ under running tap and informing the teacher immediately. However some students stated using water and soap to wash which was not given a credit.
2.	a) A significant number of students know that condensation will take place in the condenser however were not able to specifically mention water vapour/steam being cooled to form water. b) Well-answered.

		c) To earn a credit, students must draw the cross at the base of the dist⋯
		d) Not well-answered. Answers such as distillation, filtration, and cⅰⅴ⋯ -stated.
3.		a) Well- answered.
		b) Only a handful of students were able to deduce a physical pⅰ⋯ electrical conductivity or ductility. Most of them stated the physicaˡ of the element.
		c) Well-answered.

SECTION C – 15 marks

No	Description
1.	a) A significant number of students did not use kinetic particle to answⅰ While some of them who answered correctly gave too much inforⅿ⋯
	b) Part (i) proved to be difficult for many students as they were nⱺⁱ ⋯ physical state of water at the given temperature. Part (ii) is well-aⁱⁱ⋯
	c) Many students did not know the change in physical state involvⱼ⋯ they used terms such as evaporate or boil. Some of the studentⱼ change of gas to solid which was not given a credit.
2.	a) Well-answered. Some gave the definition of elements as consist oⁱ ⋯ which was given credit.
	b) Some students stated only one answer instead of two. They shouⁱ carefully.
	c) Well-answered.
	d) Well-answered.
	e) Students were able to classify given the scenario, however, most ⋯ the differences between a mixture and compound.
3.	Most of the students can answer (a) to (c) correctly. Many thought that ink the starting line is pure. ⋯

Signature: _____   Date: !⁔⋯

Note: To submit the completed report to the HOD who in turn will give copies of ⋯ subject teachers before the return of answer scripts

* Delete accordingly

| Class: Sec 1 / ..... | Register No ...... | Name: ....·................................./................... |

Pasir Ris Crest Secondary School
Mid Year Examination 2012
Secondary One Express

Science (Physics)   **10 May 2012**
                                                            1 hour

Additional Materials: Objective Test Answer Sheet (OTAS)

INSTRUCTIONS TO CANDIDATES

Do not open this booklet until you are told to do so.
Write your name, register number and class in the spaces at the top of this page.

Section A (15 marks)

There are **fifteen** questions in this section.
Answer all the 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 soft pencil** on the **Objective Test
Answer Sheet**. Read the instructions on the
Objective Test Answer Sheet very carefully.

For Examiner's Use	
Section A	/15
Section B	/15
Section C	/20
Total	/50
Parent's Signature	

Section B (15 marks)
Answer all the questions. Write your answers in the spaces provided in the question paper.

Section C (20 marks)
Answer all the questions. Write your answers in the spaces provided in the question paper.

Hand in the Objective Test Answer Sheet separately.
The number of marks is given in brackets [ ] at the end of each question or part-question.

This question paper consists of <u>11</u> printed pages including this cover page.

My Reflection ... "What was" ......"Why?".........."What next?"......

----------------------------

1

Section A - MCQ (15 marks)

Answer **ALL** questions. Record your answers in the Objective Tes: -
(OTAS)

1. A reagent bottle has the following sign on it.

    A   He should not touch the bottle.
    B   He should not heat the liquid directly over a flame.
    C   He should store it near a flame.
    D   He should wear goggles when handling the bottle of chem···

2. Which part of the vernier calipers is used to measure the depth of a bo·a·

    A   Internal jaws
    B   Extenral jaws
    C   Tail
    D   Vernier scale

3. The diagram showa a swing. It oscillates from X to Z and back to X ·
of the oscillation.
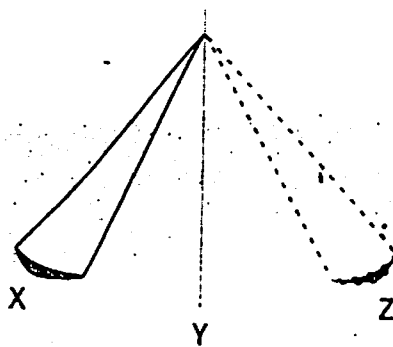
If the time taken for it to oscillate from Y to Z were 1.5 s, what would b· ·
for it to oscillate from X to Z then back to X? ·

    A 1.5 s
    B 3.0 s
    C 4.5 s
    D 6.0 s

4. What is the accuracy of metre rule in its measurement?

A 0.01 mm
B 0.01 cm
C 0.1 cm
D 1 cm

5. A rectangular box is 1.2 m long, 12 mm high and 20 cm wide. What is its volume?

A 28.08 cm³
B 28.80 cm³
C 288 cm³
D 2880 cm³

6. Which of the following has the smallest mass?

A 100 μg
B 1000 ng
C 1 mg
D 0.01 g

7. What is the volume of the liquid in the measuring cylinder?
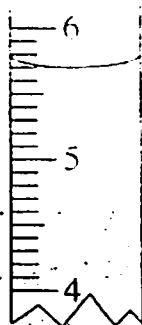
, A 5.6 cm³
B 5.7 cm³
C 5.8 cm³
D 5.9 cm³

8. A displacement can is filled to the level of overflow with 50 cm³ of water. 10 marbles of total volumes 60 cm³ are immersed in the water in the displacement can. What is the total volume of the water displaced?

A 6 cm³
B 50 cm³
C 60 cm³
D 110 cm³

9. In question 8, each of the 10 marbles are of the same size. What is the [...] such marbles?

    A 6 cm³
    B 24 cm³
    C 50 cm³
    D 60 cm³

10. Mike drove a car at 40 km/h. What is the speed in m/s?

    A 0.09 m/s
    B 0.67 m/s
    C 11.1 m/s
    D 667 m/s

11. 800 birds migrate from Auckland to Wellington in 3 hours. [...] birds migrating from Auckland to Wellington in one day fo: [...]

    A 267
    B 800
    C 2400
    D 6400

12. Which of the following is not an example of rate?

    A The flow of water decreases as the tap is slowly turned off.
    B From bus stop 1, the bus reaches the next bus stop in 10 min [...]
    C The heart beats faster as Peter walks faster.
    D The more books are stacked in the bookshelf side by side [...] occupied by the books.

13. A lorry is leaking petrol at a rate of 1 drop for every 10 s. From th[...] showing the drops of petrol on the road, calculate the average spe[...] Point Q to Point R.

Q ⊢——+——+——+——+——⊣ R
  15 m 15 m 15 m 20 m 25 m
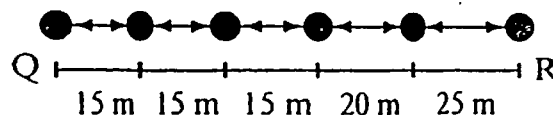
    A 1.8 m/s
    B 9 m/s

C   18 m/s
D   90 m/s

14. Which of the following statements is correct?

A   All solids are denser than liquids.
B   As petrol is less dense than mercury, it will float on mercury.
C   As the volume of a plastic box is bigger than that of a metal box, it also has a larger density than the metal box.
D   None of the above.

15. Which of the following statements is **wrong** about the effect of a force?

A   It changes the direction of a moving object.
B   It changes the position of an object.
C   It decreases the mass of an object.
D   It decreases the speed of a moving object.

Section B (15 Marks)

1. Jane takes the Northbound MRT to school every morning. She notices that, on most days, the MRT that goes in the opposite direction comes first.

a. Write down one hypothesis to explain Jane's observation.
    [1]

_____

_____

b. Suggest one method by which Jane can test her hypothesis.   [2]

_____

_____

_____

_____

2. Convert the following quantities that involve the use of prefixes to the base SI units.
   Give your answer in non-standard form. Show your working clearly.
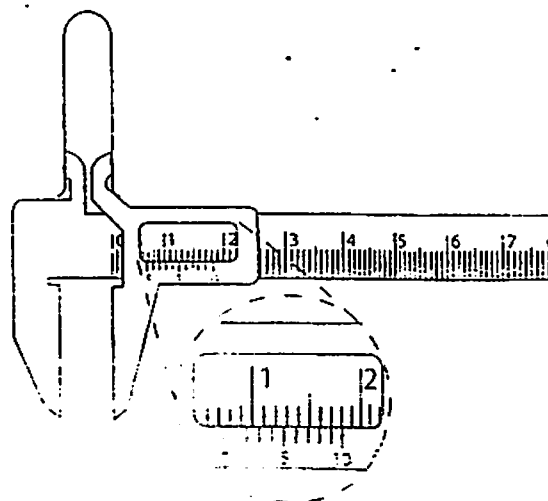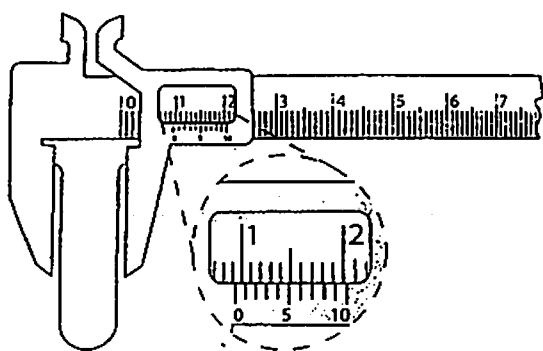
a. 5.3 Mm = _____

      [1]

b. 32 ds = _____

      [1]

c. 800 mg = _____

      [2]

d. 30 kA = _____

      [1]

3. During a science practical lesson, Thomas was asked to determine :.
   test tube. He used the outside jaws of a pair of vernier calipers to r .
   diameter of the test tube and the inside jaws of the vernier calipe-
   inner diameter of the test tube.
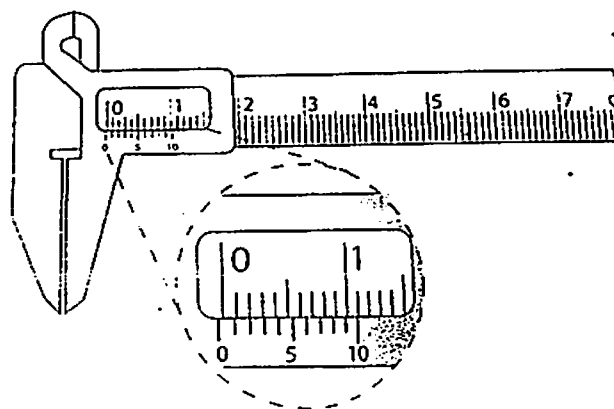
a. What are the readings that Thomas obtained?

Outer diameter: _____   Inner   diameter:

_____

b. From the readings above, determine the thickness of the glass wall of the test tube. [2]

Thickness of the test tube= _____

c. Thomas closed the jaws of the vernier calipers fully and realizes that there is a zero error.

Determine the zero error of the vernier calipers.

Zero error = _____ ___ ___

d. Do you think there is a need to recalculate the thickness of the test :
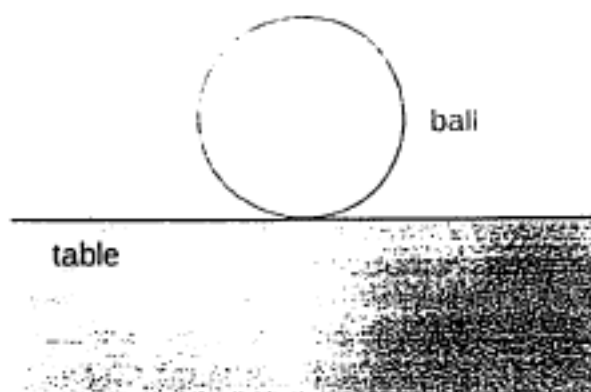answer.

_____

_____

_____

_____

_____

Section C (20 Marks)

1. a. A ball is lying on the table stationary as shown below.

   i. Draw on the diagram below, the two main forces that act on the stationary ball on the table and label the forces, **Force 1 and Force 2**.
      [2]

   ii. Write down the name of the two forces drawn in part a.   [2]

   Force 1 : _____

   Force 2 : _____

   b. Define density.   [1]

   _____

   _____

   c. A student delievered 5 cm³ of an unknown liquid into a flask weighing 20.50 g. The total mass of the flask and the unknow liquid is 24.50 g. Calculate the density of the unknown liquid.   [2]

Density of the unknown liquid : _____

d. A copper ingot has a mass of 3.56 kg and a density of 8.90 g/cm^3. If the copper is made into wire with a diameter of 2.60 mm, what is the length of copper wire, in metres, can be obtained from the copper ingot? Taking π = 3.14. (Volume of cylinder = $\pi r^2 h$)   [3]

Length of copper wire : _____

2. a. The following diagram shows water being leaked out from a water tank.

   i. Write down the expression for the rate of volume of water leaking from the water tank.
   [1]

_____

   ii. The amount of water flowing out of the tank is found out to be 800 cm³ in 25 seconds. Determine the rate of volume of water leaking from the water tank. [1]

   Rate of volume of water leaking : _____

   iii. Hence, determine the time taken for 120 000 cm³ of water to leak out completely from the tank. Leave your answer in minutes. [2]

Time taken : _____

b. The diagram below shows the route taken by Nelson.
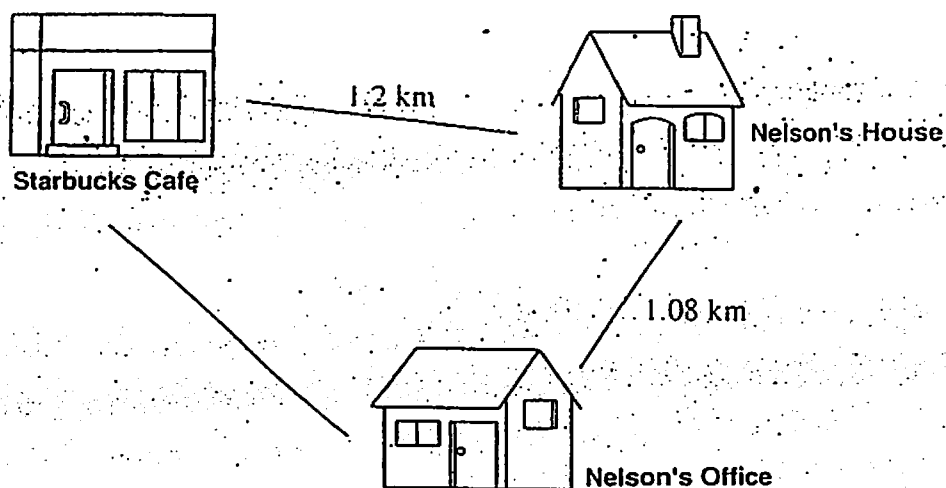
i. Nelson leave the Starbucks Cafe at 10.00 am and takes 30 mintues to reach his house, calculate his average speed in km/h.   [1]

Average speed : _____

ii. After reaching his house, he cycle to his office at twice his average speed in part a., calculate the time he reachs his office if he starts at 10.30 am. [2]

Time : _____

iii. 30 mintues after reaching his office, he travels back to the Starbucks Cafe. He travel at an average speed of 10 km/h and reaches the restaurant at 1.28 pm. Calculate the distance between his office and the Starbucks Cafe.
[3]

Distance : _____

Section A:

1. B

2. C

3. D

4. C

5. D

6. B

7. B

8. C

9. B

10. C

11. D

12. D

13. A

14. B

15. C

SECTION B

1   a: There are more eastbound trains than northbound train.

b. Jane can count the number of trains passing in both directions over a certain period of time, example for an hour. She will then be able to determine the number of both eastbound and northbound trains passing through the station.

2a. 5 300 000 m

b. 3.2 s

c. 0.0008 kg
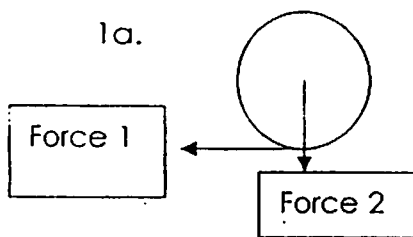
d. 30 000 A

3a. 0.97 cm   0.79 cm

b. (0.97 − 0.79) / 2 = 0.09 cm

c. zero error = − 0.08 cm

d. There is no need to repeat the calculations for the thickness of the test tube. This is because to obtain the thickness, the inner diameter is subtracted from the outer diameter. Ther error will be cancelled out when the difference is taken.

Section C

1a.

Force 1: friction   force 2: weight

b. it is defined as mass per unit volume.

c. mass = 24.5 − 20.5 = 4 g

density = 4/5 = 0.8 g/cm³

d. volume = 3,56 (1000) / 8.9 = 400 cm³

volume = πr²h

400 = π(0.26/2)²(h)

H = 7534 cm = 75.34 m

2a.(i) rate of volume leaking = volume of water / time taken

(ii) rate = 800 / 35 = 32 cm³/s

(iii) time taken = 120 000/ 32 = 3750 s = 62.5 min

b.(i) speed = 1.2 / (30/60) = 2.4 km/h

(ii) speed = 2.4 x 2 = 4.8 km/h

Time taken = 1.08 / 4.8 = 0.225 h = 13.5 min = 14 min

Total time = 10.30 + 0.14 = 10.44 am
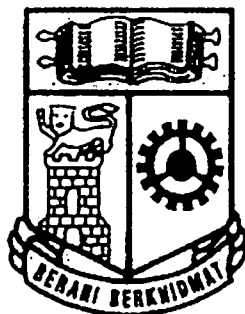
(iii) time leaving his office = 10.44 + 0.30 = 11.14 am

Time taken to travel = 13 28 − 11 14 = 2 hr 14 min

Distance = $10(2\frac{14}{60}) = 22.3$ km

Name: _____(   )   Class _____

Queenstown Secondary School

Mid-Year Examination 2012
Secondary One Express
General Science

04-05-2012   **Time: 10 00 – 11 45 hours**
Friday   **Duration: 1 h 45 mins**

Setter: Mdm Shamima Begum

Instructions to candidates:
DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.
Write your name, class and registration number on the answer sheet provided.

Section A (30 marks)
There are thirty questions in this section. Answer all questions.
For each question there are four possible answers, A, B, C and D. Choose the most
appropriate one and record your choice in **soft pencil** on the separate answer sheet – the .
OMS.

Section B (40 marks)
Answer all questions in this section. Write your answers in the space provided.

Section C (30 marks)
Answer all questions in this section. Write your answers in the writing paper provided.

Hand in the OMS separately from Section B and C.

Information for candidates
The number of marks is given in brackets [ ]
at the end of each question or part question
Marks will not be deducted for wrong answers
Calculators may be used.

Examiner's Use	
Section A	
Section B & C	
Total	

_____
This question paper consists of 18 printed pages including the cover page.

00142

Section A
[Total 30 marks]
There are **thirty** questions in this section. 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 **soft pencil** on the separate optical mark sheet provided.

1   Which situation shows good scientific attitude?

A   Sean has an unexpected experiment result. He was puzzled and decided to repeat the experiment.

B   Warren thinks that yellow light and blue light would mix to form red light, and he teaches his tuition class students about it.

C   Ervin has an unexpected experiment result. He changed his observation record to what he thinks should be the correct answer.

D   Keith wanted to invent something that would kill all snakes.

2   Which label should be on a bottle of concentrated acid?
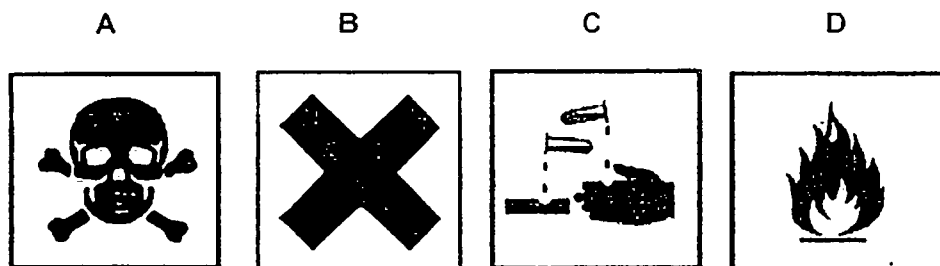
3   Which statement is **not** a good practice in the Science laboratory?

A   Pouring away unused chemicals into the sink instead of returning them back into their original bottles.

B   Reading instructions and understanding them before starting your experiment.

C   Making the Bunsen flame luminous in between heating.

D   Experimenting on your own by adding chemicals together.

4   Which of the following is the right way to draw an apparatus?

2
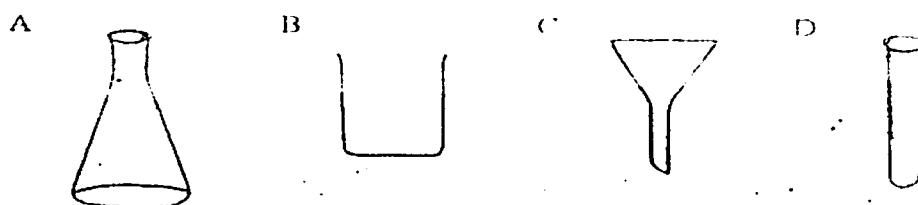
5   Which diagram shows the correct way of heating water in a beaker?
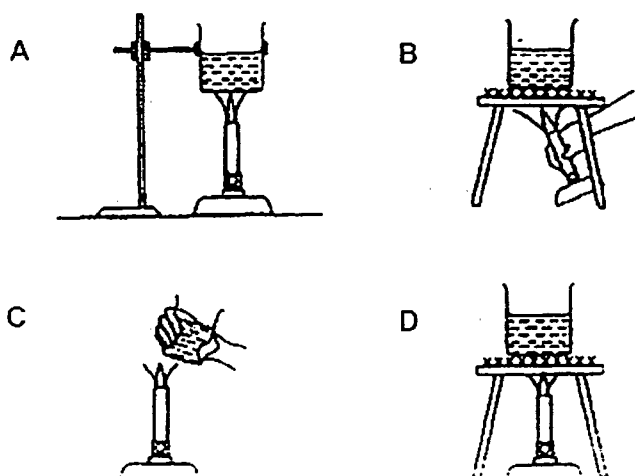
6   Which of the following part of the Bunsen burner controls the amount of air entering it?

   A   Collar
   B   Base
   C   Jet
   D   Barrel

7   Which of the following measurements of length is made using the wrong instrument?

   A   Internal diameter of a beaker using a metre rule.
   B   Height of a laboratory stool using a metre rule.
   C   Diameter of a marble using a vernier caliper.
   D   Circumference of a tree using a measuring tape.

8 · The surface of a river is covered with ice in winter. The ice remains on top because

   A   ice is a solid
   B   water is a liquid
   C   the density of ice is higher than that of water
   D   the density of ice is less than that of water

9   A lump of plasticine is moved from a small measuring cylinder to one :r :: -,
    diameter.
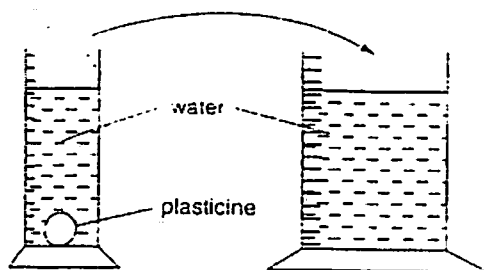
    The reading on the small measuring cylinder goes down by 20 cm³. By how ·
    reading on the large cylinder go up?

    A   10 cm³

    B   20 cm³

    C   40 cm³

    D   80 cm³

10 The diagram below shows the timing on a digital stopwatch What is the ····
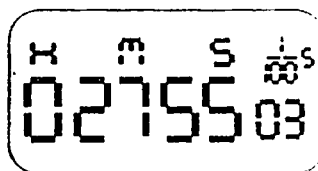
    A   27.5503 s ·

    B   275.503 s ·

    C   27 min 55.03 s

    D   2 h 7 min 55.03 s

11 June is able to type 24 words every 60 seconds on her computer. Rachel ·
    words every 30 seconds. Which statement is correct?

    A   June is able to type at twice Rachel's rate of typing.

    B   June is able to type at half Rachel's rate of typing.

    C   Both June and Rachel type at the same rate of 0.4 words per secon·

    D   Both June and Rachel type at the same rate of 2.5 words per second

12 Eugene cycled from his home to the grocery shop 5 km away. He started out at 2.10 pm and arrived at the shop at 2.34 pm. After buying some groceries, he left the shop at 3.10 pm and reached home at 3.22 pm. Which statement correctly describes his ride?

A   His speed when he was heading home was twice as fast as when he started out for the grocery shop.

B   His speed when he was heading for the grocery shop was twice as fast as when he was heading home.

C   He cycled at the same speed when he was heading for the grocery shop and when he was heading home.

D   His average speed for the whole ride was 5 km/h.

13 Arrange the following materials accordingly from the least dense to the most dense.

	material	density g/cm^3
1	Pinewood	0.50
2	Air	0.00129
3	Silver	10.5
4	Glycerine	1.3

A   1, 2, 3, 4

B   2, 1, 4, 3

C   2, 4, 1, 3

D   3, 4, 1, 2

14 Substance X exists as a liquid at 100 °C and as a solid at room temperature. It can be stretched and pulled into various shapes. Which of the following best describes the properties of substance X?

A   Substance X has a melting point below 100 °C and is elastic.

B   Substance X has a melting point above 100 °C and is soft.

C   Substance X is a good conductor of electricity and is elastic.

D   Substance X is not flexible and is not strong.

15 Which of the following explains why cooked food is usually packed in boxes made of styrofoam?

A   Styrofoam is flexible.

B   Styrofoam reacts with food.

C   Styrofoam has a low density.

D   Styrofoam is a poor conductor of heat.

16 Which group of substances contains an element. a mixture and a compo ...

A   air, pure water, sodium chloride

B   copper, air, copper(II) sulfate

C   pure water, sulfur, magnesium

D   sulfur, copper(II) sulfate, sodium chloride

17 The element hydrogen is a highly flammable gas. However. when two atoms
    are combined with oxygen, the product water (H_2O) does not burn. Which ...
    properties of compounds and its elements best explains this?

A   An element is a substance which cannot be broken into simpler sub ...

B   Elements in a compound can only be separated by chemical met ...

C   Compounds have different chemical properties from the elements ...

D   When a compound is formed. heat or light is given off or taken in

18 An element _____

A   usually has a low density

B   will not undergo a change in state when heated

C   cannot be broken down into simpler substances

D   cannot combine with other elements to form new substances

19 The diagram below shows an outline of the Periodic Table with elements P

Which of the following pairs of elements has the same chemical prope ...

A   R and T

B   R and S

C   P and Q

D · Q and T

20 When sugar is added to water and stirred. _____

   A   a compound is formed
   B   a mixture is formed
   C   two compounds are formed
   D   a compound and a mixture are formed

21 The most common element in the universe is _____.

   A   oxygen
   B   carbon
   C   silicon
   D   nitrogen

22 Which method should be used to separate insoluble solids from a liquid?
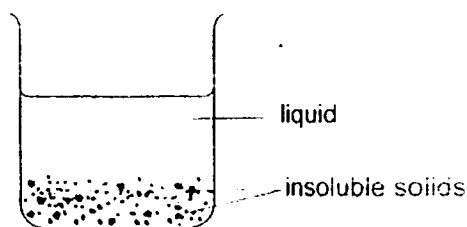
   A   Distillation
   B   Evaporation
   C   Filtration
   D   Magnetic attraction

23 Which is true about reverse osmosis?

   A   A membrane with very fine pores is used to act as a filter. Water molecules naturally
        move through the membrane from seawater by osmosis.
   B   A membrane with very fine pores is used to act as a filter. Salt and water molecules
        pass through this membrane, leaving other impurities behind.
   C   High pressure is required to force water molecules through a membrane with very fine
        pores. Salt and water molecules pass through this membrane, leaving other
        impurities behind.
   D   High-pressure is required to force water molecules through a membrane with very
        fine pores. Water molecules pass through this membrane, leaving salt and other
        impurities behind.

24 The diagram shows a chromatogram produced to find out which colouring : a certain fruit drink.

| fruit drink | colourings |
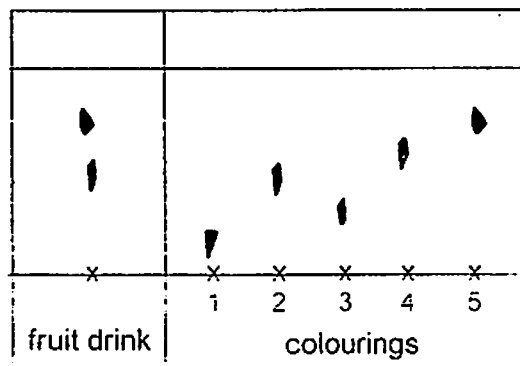
Which colourings are found in the fruit drink?

A 1 and 4

B 1 and 5

C 2 and 3

D 2 and 5

25 A vacuum cleaner removes dust from the floor by sucking up the dust and

A distilling it

B evaporating it

C filtering it

D removing it by magnetic attraction.

26 To show that sea water contains dissolved substances, we use the method

A filtration

B evaporation

C magnetic attraction

D paper chromatography

27 What is/are the process(es) involved in distillation?

    (i)   Melting
    (ii)   Boiling
    (iii) Condensation
    (iv) Sublimation

    A   (iv) only

    B   (i), (ii) and (iii) only

    C   (ii) and (iii) only

    D   All of the above

28 The solubility of a solute does **not** depend on the _____

    A   nature of the solute

    B   nature of the solvent

    C   temperature of the solution

    D   surface area of the solute

29 The solubility of a substance can be increased by _____

    A   increasing the temperature of the solution

    B   stirring the solution

    C   increasing the amount of solute

    D   decreasing the amount of solvent

30 Which of the following is **not** a suspension?

    A   Medicine that must be shaken before use

    B   Mud and water

    C   Milo

    D   7-up drink

Queenstown Secondary School
Secondary 1 Express General Science
Mid-Year Examination 2012

70
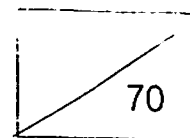
Name: _____(   )   Class: _____

Section B
[Total 40 marks]
Answer all the questions in the space provided.

1   Simon wants to test the hypothesis that a particular plant only opens its flowers in
     the absence of light. He brought several pots of flowers to his laboratory. He gave
     5 ml of water to some flowers, and 2.5 ml of water to the others. He also gave 2 g
     of fertiliser to some flowers and only 1 g of fertiliser to the others. Before Simon
     started experimenting on the flowers, he already accepted his hypothesis that the
     particular plants opened their flowers in the absence of light. For the flower pots
     that were exposed to light, 4 out of 20 pots opened their flowers. However, Simon
     did not record this result, and he merely recorded that all "16 pots did not open
     their flowers".

     (a)   What attitude did Simon lack as a scientist?   [1]

     ....

     (b)   Which is the independent variable and dependent variable in Simon's
              experiment?   [2]

     ....

     ....

     (c)   Did Simon control the variables that are not supposed to be changed? Give
              one reason based on what you have read so far.   [1]

     ....

     ....

     ....

     (d)   Was the Scientific Method adopted by Simon correct? Explain.   [1]

     ....

     ....

     ....
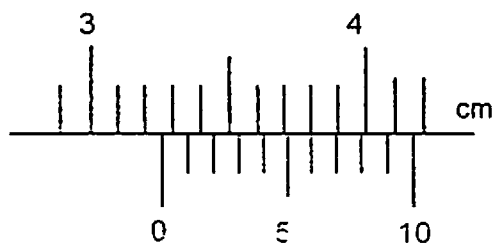
2 Determine the reading shown in the following vernier calipers. [2]

(a)   **(b)**
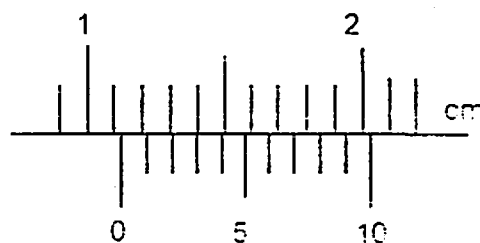
3 Complete the following table with the physical quantities and their corresponding [6]
SI units and symbols.

	Physical Quantity	S.I. Unit	Symbol
(a)	length		
(b)		kilogram	
(c)	temperature		

4 (a) Explain why density is considered a rate. [1]

....

....

(b) The table below shows the density of three different liquids.

Liquid	Density (g/cm³)
Mercury	13.6
Alcohol	0.79
Pure water	1.00

(i) If equal volumes of the above liquids were placed within the beake. .r. . .
4.1, draw and label what is expected to be seen in the beaker. Assume th
three liquids do not mix.

Figure 4.1
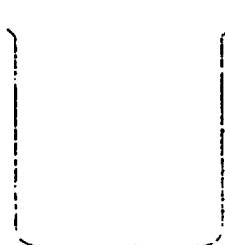
(ii) An ice cube of length 2 cm has a mass of 7.36 g. Calculate the de

(iii) The ice cube is placed in the beaker in Figure 4.1. Draw and tacei .
position of the ice in the beaker.

(iv) If another material is placed in the beaker and it floats on top of ine ..t
can you say about the density of this new material?

....

....

5 Mrs Ng drives her car at a speed of 80 km/h along an expressway. If one iit
enables her to cover a distance of 9 km at this speed, how much petrol does
up if the journey takes 2.5 h?

6 The diagram below shows part of an electrical cable.
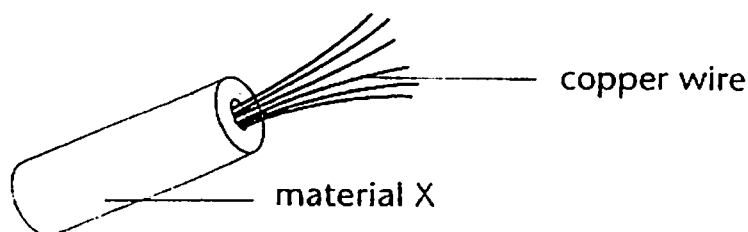
(a) State **two** important physical properties of the above copper wire.   [2]

....

....

....

(b) To protect users from getting electrical shock, the copper wire must not be exposed.

(i) Suggest a suitable material for **X**.   [1]

....

(ii) Explain how the material that you have named in **(b)(i)** protects users from
receiving electrical shock when touching the electrical cable.   [1]

....

....

7 The table below shows some physical properties of substances.

Substance	Melting point (°C)	Boiling point (°C)	Density (g/cm³)	Electrical Conductivity
A	660	2 470	2.70	Good
B	1 890	2 482	5.96	Poor
C	1 083	2 595	9.85	Good
D	1 535	3 105	21.40	Good

(a) Which of the above substance is a non-metal? Explain your answer   [?]

....

....

....

13

(b) State the substance that can be used to make a crucible to contain and heat substance D until it melts. Give a reason for your choice.

....

....

....

(c) When both substances A and D are changed into liquids, they do not mix with each other. State and explain what will happen when they are placed in the same container.

....

....

....

8　**(a)** X changes into a white solid and produces carbon dioxide when heated. State whether X is an element, compound or mixture. Explain your answer
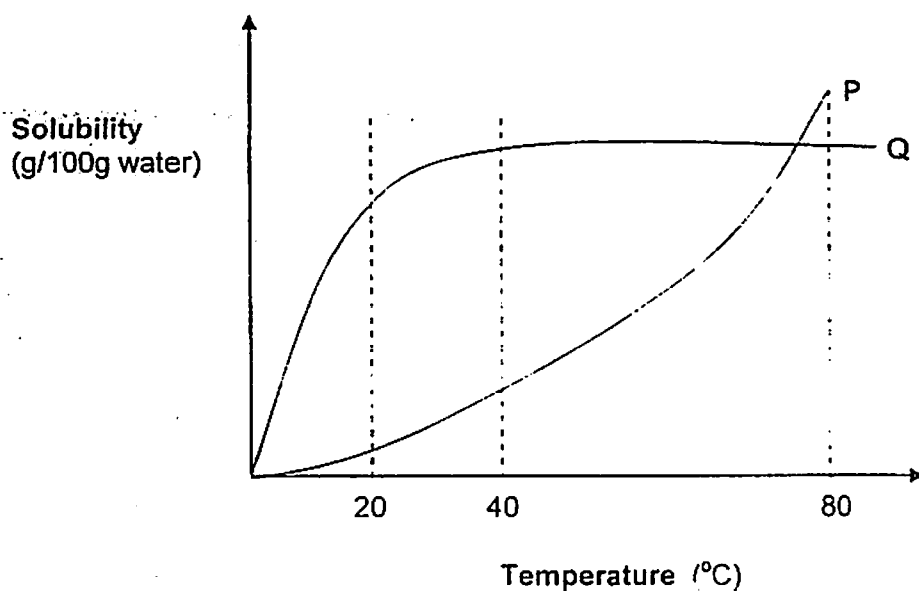
....

....

....

....

(b) In the table below, write down two different general properties between sodium chloride and salt solution.

Sodium chloride	Salt solution

9 The effect of temperature on the solubility of two solutes in the same amount of solvent was investigated. The results were shown in the graph below.

(a) From the graph, which solute, P or Q, dissolved better in water at 20°C?   [1]

....

(b) Which solute's solubility, P or Q, increased very greatly with the increase in temperature, especially after 40°C?   [1]

....

(c) State one other factor that will increase the solubility of P and Q.   [1]

....

Section C
[Total 30 marks]
Answer all the questions. Write your answers on the separate writing papers p...

1 (a) While carrying out an experiment, Susan needs to heat some chemicals in a ·
over a Bunsen flame.

   (i) Which type of Bunsen flame should she use for heating purposes? Give reas··
   support your answer.
   (ii) If Susan needs to leave the Bunsen flame unattended for a short while, w:··
   of flame should she use? Explain your answer.

(b) John and Tommy are given two unknown elements each: element A and el⊢·
   They are told that one of the elements is a metal while the other is a no⁻ ··
   Element A is a reddish-brown solid while element B is a yellowish solic ⸱⸱ ⸱
   temperature. Based on the appearance of the elements, John deduces that ⊢
   B is a non-metal. However, Tommy does not agree that the conclusion shou
   based on the appearance.

   (i) What kind of experiment can Tommy carry out to easily determine the metu
   non-metallic nature of these two elements?

   (ii) Based on the above information, identify element A and element B.

(c) The table below shows some information about three substances X, Y an⸱i ⸱

Substance	Characteristic
X	It dissolves in water but not in alcohol.
Y	It dissolves in alcohol but not in water.
Z	It does not dissolve in both water and alcohol.

Describe how you would use any physical method(s) to separate a mixtur·
all the three substances.

2 (a) Alan drives his car at a speed of 95 km/h. He takes 150 minutes to travel from Town P to Town Q. He then stops at Town Q for 20 minutes for refreshment before continuing his journey from Town Q to Town R. His average speed for the entire journey is 80 km/h. The total time taken to complete this journey is 3.5 h.

(i) Determine the distance between Town P and Town Q. [2]
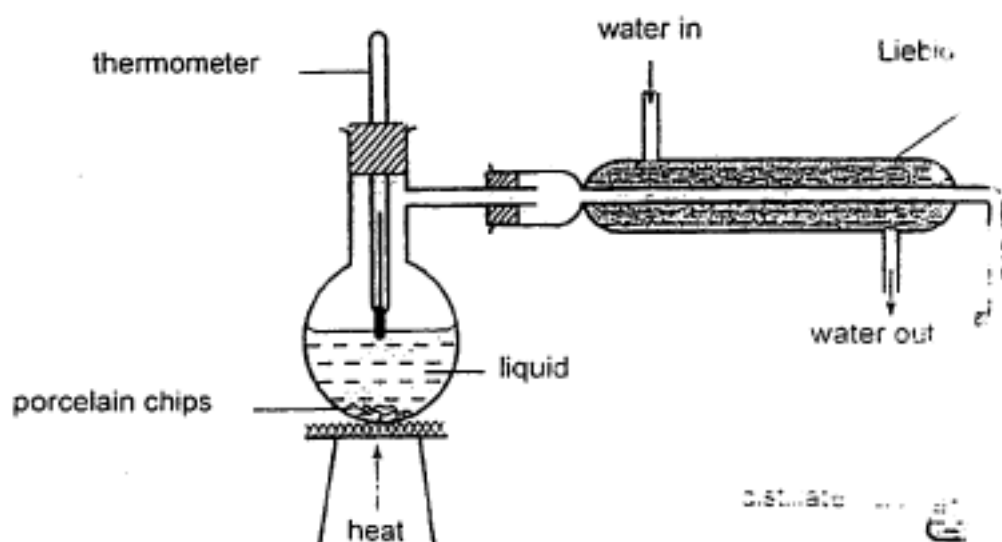
(ii) What is the distance between Town Q and Town R? [3]

(iii) Calculate Alan's speed between Town Q and Town R. [2]

(b) Given that the area of each small square is 1 cm², estimate the area of the figure below. [3]
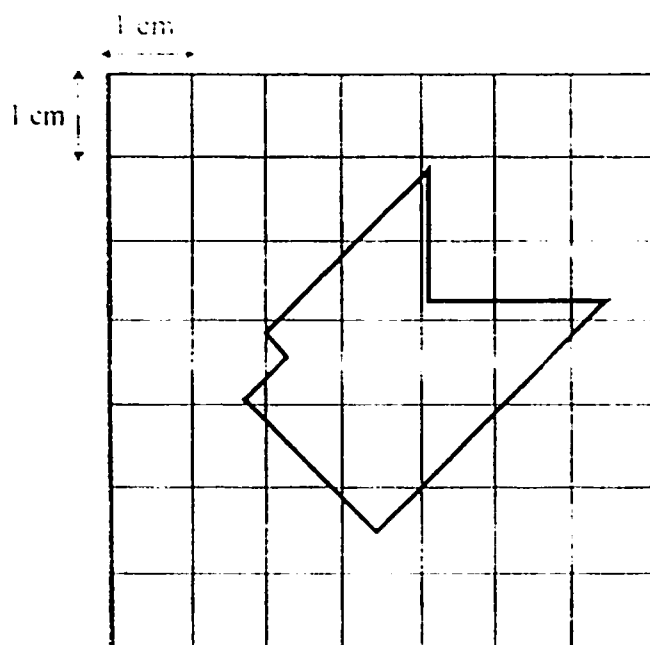
3 (a) The diagram below shows the experimental setup of a distillation proces : : laboratory.

(i) Write down four mistakes which are present in the above experimental setup Present your answers in the following format.

        Mistake 1: ....

        Mistake 2: ....

        Mistake 3: ....

        Mistake 4: ....

(ii) Draw the correct experimental setup for distillation

(b) Study the extract of a food label from a concentrated fruit drink below.

Ingredients: Concentrated juice, sugar, Permitted flavourings. Citrus acid. Vitamin C, Permitted Preservatives

(i) Is the food drink a pure substance or a mixture? Explain your answer.

(ii) If you are a food technologist, suggest a method to test for the purity of flavouring used in the fruit drink. Describe how you would know if the f is pure.

END OF PAPER
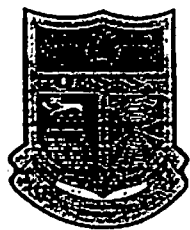
QUEENSWAY SECONDARY SCHOOL

MID-YEAR EXAMINATION 2012

LOWER SECONDARY SCIENCE

Level: SEC. 1 Express

Total Time: **1 hr 30 mins**
Total Marks: **80**

NAME: _____ INDEX NO: _____ CLASS: _____

READ THESE INSTRUCTIONS FIRST:

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

Read these notes carefully.

Write your name, Class and Index No. above.

There are **TWO SECTIONS**. Answer **ALL** questions.

SECTION 1: PHYSICS (35 marks)
Answer all the questions in the space provided.

SECTION 2: BIOLOGY (45 marks)
Answer all the questions in the space provided.

INFORMATION FOR CANDIDATES:
The intended number of marks for questions is given in [ ] at the end of each question or part question.

Hand in **SECTIONS 1** and 2 separately.

You may use a calculator.

This Question Paper consists of 19 printed pages.

[Turn over]
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PHYSICS SECTION

SECTION 1 (A) (10 marks)
Answer all the questions in this section in the table on page 4.

1 Which one the following steps should <u>NOT</u> be taken if results do <u>NOT</u> con⸀ hypothesis?

A Changed the results to fit the hypothesis.
B Check if each step of the experiment is done correctly
C Develop a new hypothesis.
D Repeat the experiment to check if results are accurate

2 John and Ahmad wanted to find out how the length of a spring in the ⸀ force exerted on the ball. They set up the experiment as shown below.
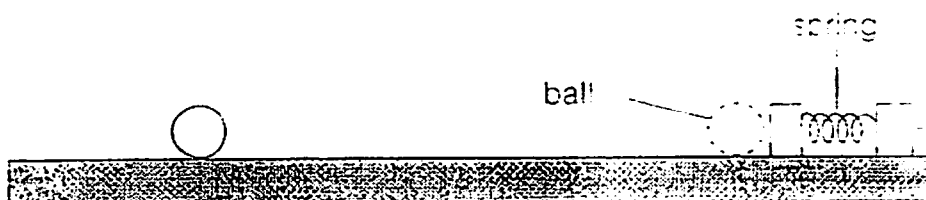
Which variables must they keep constant so that their investigation . fairly?

I   the ball
II   the surface of the table
III the material used to make the spring
IV   the length of the spring

A I and II only
B II and IV only
C I, II and III only
D II, III and IV only

3 Which of the following is correctly drawn?
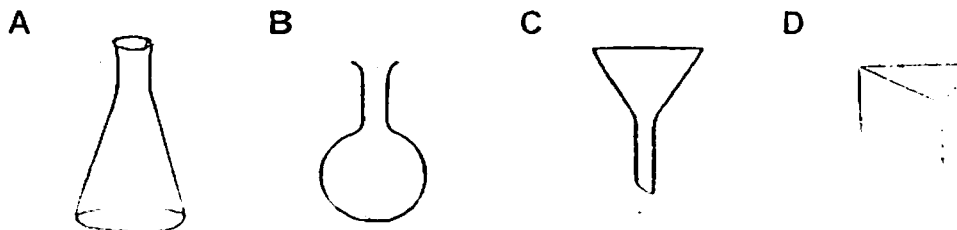
4   Which of the following statements **best** describe a non-luminous flame?

A   Obtained when the air-holes are closed.
B   Not used to heat substances.
C   Orange flame that produces soot.
D   Strong, steady and does not produce soot.

5   The water level in a measuring cylinder is 12 cm^3. It rises by 4 cm^3 when half of a wooden block is submerged in the water. What is the volume of the block?

A   3 cm^3
B   4 cm^3
C   8 cm^3
D   12 cm^3

6   Estimate the area of the odd-shaped object. The area of each square is 4 cm^2.
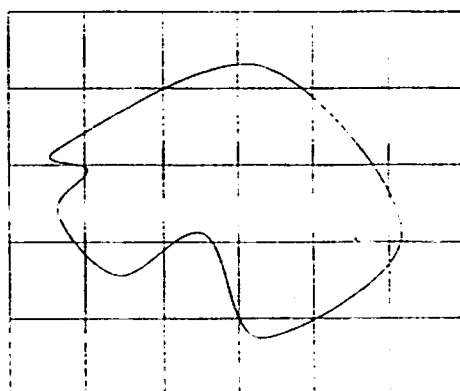
A   9 cm^2
B   10 cm^2
C   36 cm^2
D   40 cm^2

7   An astronaut is walking on the moon. He has _____.

A   no mass and no weight.
B   mass but no weight.
C   weight but no mass.
D   both mass and weight.

8   Seawater, palm oil and alcohol are poured carefully into a container ' ·
     as shown below.
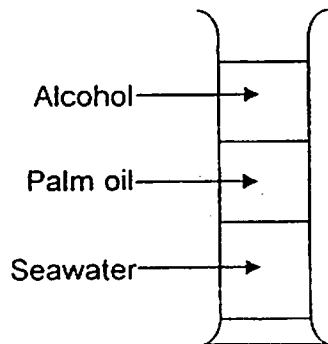
     Which one of the following correctly states the densities of the three iic

	Seawater (g/cm³)	Palm oil (g/cm³)	Alcohol (g/cm³)
A	1.03	0.95	0.81
B	0.81	0.95	1.03
C	1.03	0.81	0.95
D	0.95	1.03	0.81

9   A stopwatch is **not** needed to measure _____ .

     A   the period of a pendulum
     B   the rate of volume flow
     C   one's pulse rate
     D   the rate of petrol consumption

10   Jason takes 20 minutes to download a song from the internet with a fik
     what is the rate of his downloading? (kb = kilobite)

     A 4.17 kb/s   B   4.7 kb/min
     C 250 kb/s   :   D   25 kb/min

ANSWERS:

1)	3)	5)	7)	! 9:
2)	4)	6) ·	8)	10·

END OF SECTION 1(A)

SECTION 1 (B): Structured Questions (17 marks)
Answer all the questions in this section in the spaces provided.

1   Study the statements below and state which statement is an *observation*, which is an *inference*, and which is a *prediction*.   [3]
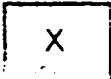
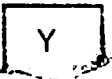| (a)	I can feel the earth tumbling!	
(b)	An avalanche is causing the tumbling.	
(c)	The snow is going to fall on top of us.	

Avalanche: a large mass of snow and ice crashing down the side of a mountain

2   You found a rust cleaning spray container in your house. Part of the label has torn away. Deduce the missing words and diagrams by answering the questions below

> RUST CLEANIING SPRAY   X   Y
> Instructions for use:
> **Keep away** from sparks, flame. and
> **Warning**: Catches fire easily. If swallowed accidentally, immediately
>   Use where there is good ventilation.
>   Harmful if inhaled.

(a)   Which two hazard symbols could be used for X and Y?   [2]

_____

(b)   If swallowed accidentally, what should you immediately do?   [1]

_____

3   The diagram shows the cross-section of a large iron pipe Its external and internal diameters are shown in the vernier calipers as D_1 and D_2 respectively.
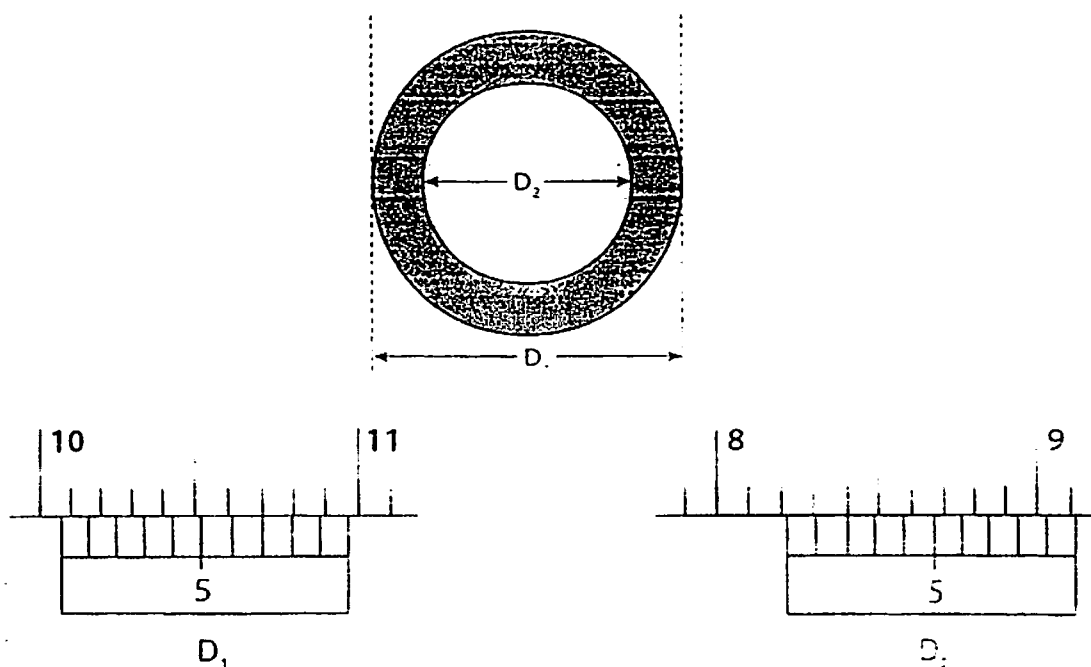
(a)   (i)   What is the external diameter of the iron pipe?   [1]

_____

(ii)   What is the internal diameter of the iron pipe?   [1]

_____

(iii)   Calculate the thickness of the pipe.   [1]
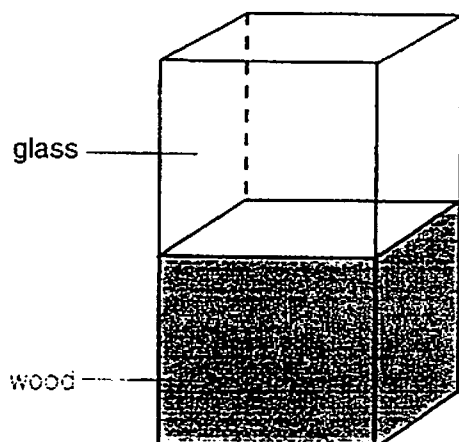
_____

,   (b)   What do we have to check before using the vernier calipers, in order to obtain an accurate measurement?   [1]

_____

(c)   When measuring the external and internal diameters of the pipe, why is it better to take a few readings of D_1 and a few readings of D_2?   [1]

_____

4   A 1 cm³ block of wood is joined to a 1 cm³ block of glass as shown in the diagram.

The density of wood is 0.80 g/cm³. The density of glass is 2.5 g/cm³.

(a)   (i)   What is the mass of the wood?   [1]

       (ii)   What is the mass of the glass?   [1]

(b)   What is the average density of the whole block?   [3]

(c)   Given that density of water is 1 g/cm³, will this whole block float or sink in
       water? Explain your answer.   [1]

Section 1(C) : Free Response Questions (8 marks)
Answer all the questions in this section in the spaces provided

1   (a)   Two pupils are keying short messages with their hand phones
          Leslie keys 120 characters in 5 min.
          Corine keys 254 characters in 10 min 20 s.

     (i)   At what rate is each pupil keying? Give your answer in char...
           sec.

     (ii) Which pupil is keying faster?

_____

   (b)   Peter takes a taxi from home to school. The flag down fare for 2
         and for every 210 m travelled. the taxi fare is 10 cents Passer ...
         charged 10 cents for every 25 s spent waiting. The distance f
         home to school is 4.2 km. The taxi stops at 3 red lights on the
         school. Each stop lasted 50 s

     (i)   How much would Peter pay for the entire trip?

     (ii) If the whole trip takes 4 min 27 s, what is the average spe...
           Leave your answer in m/s.

END OF SECTION 1

Name/Index No: _____ (   )

Class: 10 _____

45
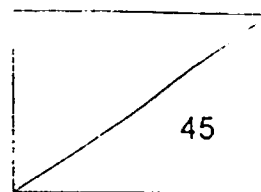
SECTION 2 (A) (15 marks)
Answer all the questions in this section in the table on **page 13**.

1   A leaf from an Elodea plant was placed on a slide with a drop of iodine solution and observed at a magnification of 400X. However, the individual cells could not be clearly seen. This is because
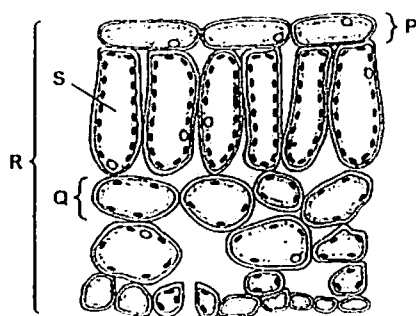
A   a dried leaf sample was not used
B   the magnification used was not high enough
C   a few layers of cells were overlapping one another
D   no stains were used so the nucleus and cytoplasm could not be seen

2   The diagram shows a typical plant cell.
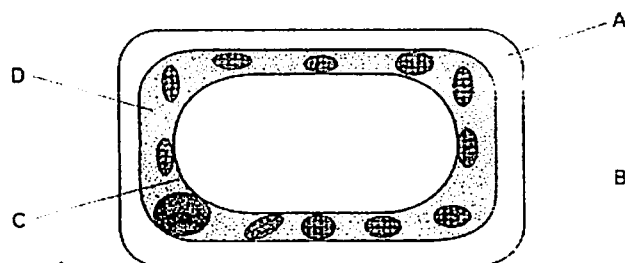
Which structure allows all substances to pass through?
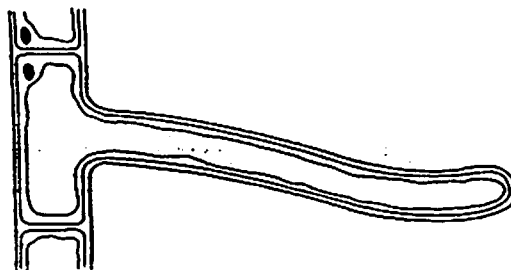
3   The diagram shows a section through a leaf.


Which is an organ and which is a tissue?

	organ	tissue
A	P	R
B	Q	S
C	R	P
D	S	Q

4   The diagram shows a specialized cell from a plant. For which function is the cell modified?

A   absorption of water
B   photosynthesis
C   storage of food
D   support

5   The figure below shows an apparatus set up to investigate the rate of photosynthesis in a water weed. During the process, a substance, A is given off.
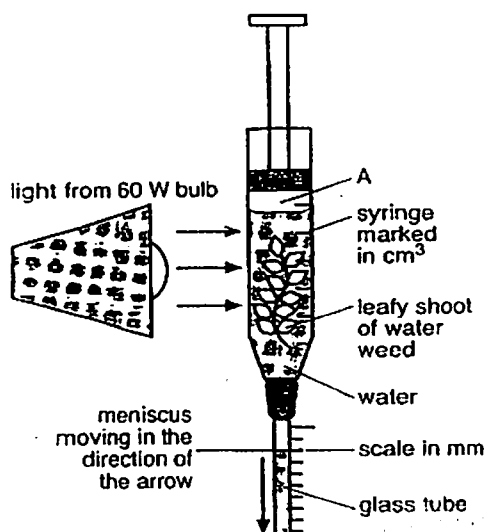
What is A?

A   Vacuum.
B   Oxygen.
C   Carbon dioxide.
D   Nitrogen.

6   The table below shows the comparison of percentage composition in four sets of air samples. Which one shows the correct comparison between inhaled and exhaled air?

	Inhaled Air			Exhaled Air		
	Oxygen (%)	Carbon dioxide (%)	Water vapour	Oxygen (%)	Carbon dioxide (%)	Water vapour
A	16	0.3	High	21	3	low
B	16	4	High	21	0.03	low
C	21	0.03	low	16	4	High
D	21	3	low	16	0.3	High

7 The graph shows the concentration of carbon dioxide in the air surrounding a plant measured over 24 hours.
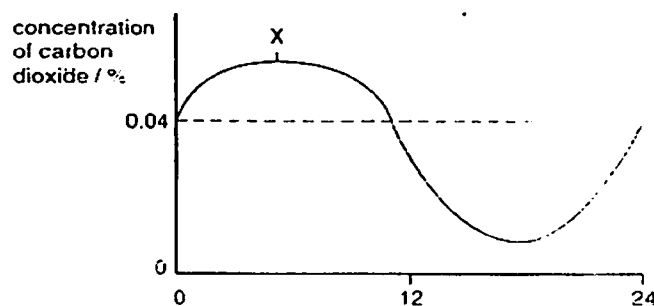
Which explains the carbon dioxide concentration at time X?

	light intensity	plant process
A	darkness	respiration
B	darkness	transpiration
C	daylight	photosynthesis
D	daylight	respiration

8 What do all living things release during **aerobic** respiration?

	energy	oxygen	carbon dioxide	
A	✓	✗	✓	key
B	✓	✗	✗	✓ = released
C	✗	✓	✓	✗ = not released
D	✗	✓	✗	

9 The diagram below shows two animal cells, cell 1 and cell 2, after they were placed in separate solutions.

Cell 1   Cell 2

Which solutions were cell 1 and cell 2 most likely placed in?

|	Cell 1	Cell 2
A	Concentrated sugar solution	Concentrated sugar solution
B	Solution with a higher water potential than the cell sap	Solution with a lower water potential than the cell sap
C	Solution with a lower water potential than the cell sap	Distilled water
D	Distilled water	Concentrated sugar solution

10 In our lungs, there are air sacs which are surrounded by blood vessel
out of the air sacs into the bloodstream because _____.

A the concentration of carbon dioxide is lower in the air sacs than
bloodstream
B the concentration of oxygen is equal in the air sacs and in the blu
C the concentration of oxygen is higher in the bloodstream than . t
D the concentration of oxygen is lower in the bloodstream than in th..

11 Three potato slices of the same size and dimensions were placed in t =
of different concentrations for 40 minutes. The cells from the three sli
examined under a microscope. A typical cell from each solution is

Solution S   Solution T   Solution U
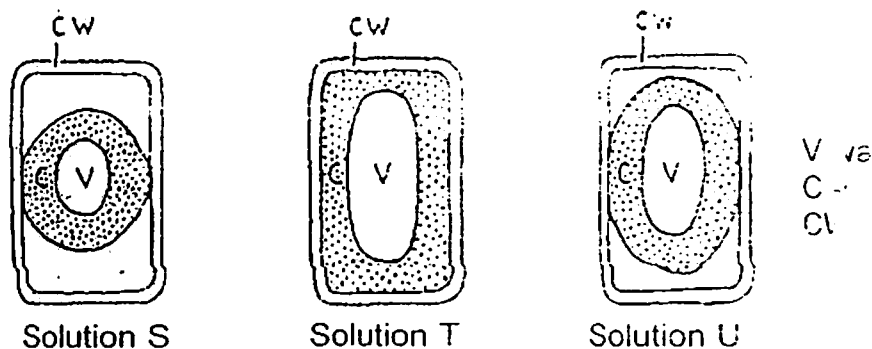
Which of the following is the best conclusion from the observations

A Solution S is more concentrated than Solution U.
B Solution T has the lowest water potential among the 3 solut
C Solution S has the highest water potential among the 3 solut
D Solution U has an equal water potential to the cell sap

12 Which arrow shows what happens in osmosis?

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Sec 1E Low
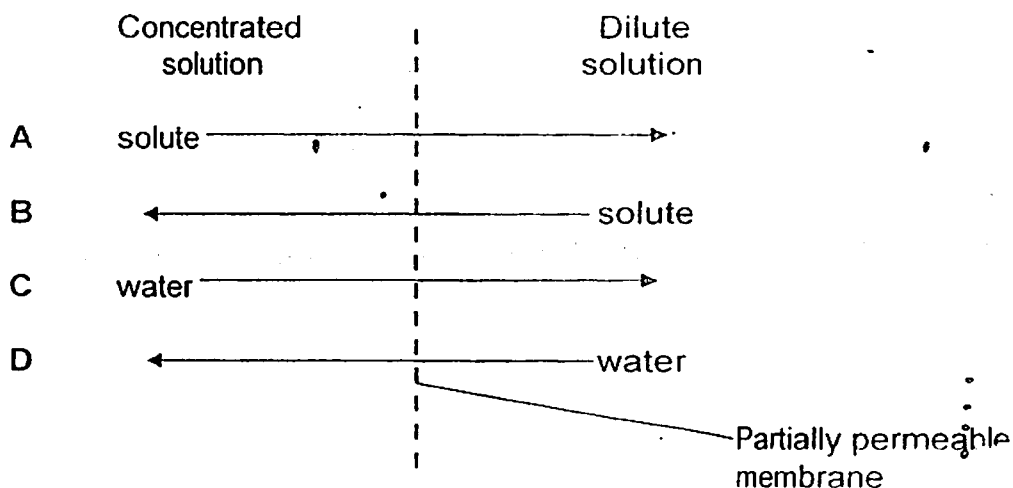
13   Which of the following statements define what a community is?

A   A group of organisms of the same species.
B   Communities of different organisms interacting with one another and the physical environment.
C   The food relationship amongst organisms.
D   Different groups of organisms living together in the same habitat.

14   A relationship between two organisms whereby one organism benefits while the other is neither harmed nor benefits is called _____.

A   commensalism   C   parasitism
B   mutualism   D   prey and predator

15   The diagram shows some stages in the carbon cycle. W, X, Y and Z are carbon compounds.
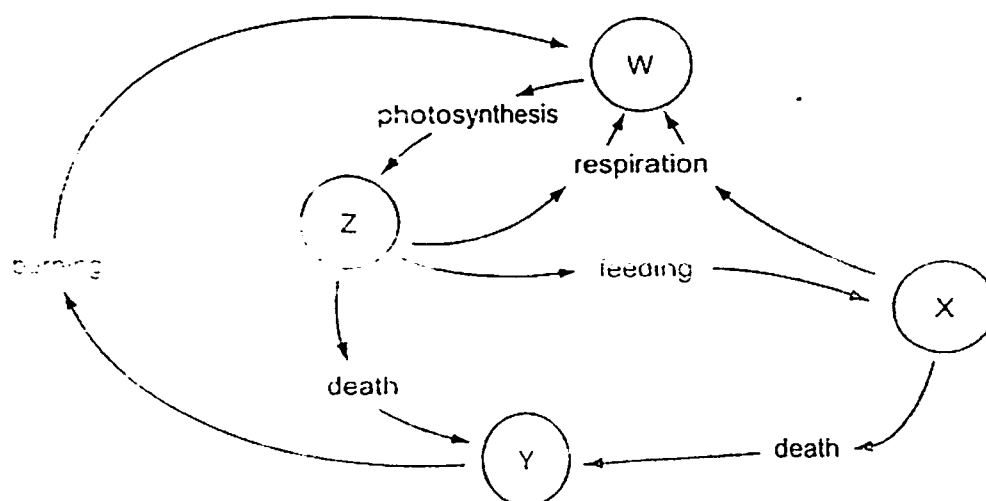
What is W?
A   Carbon compounds in animals
B   Carbon compounds in plants
C   Carbon dioxide
D   Coal and oil

ANSWERS:

1)	4)	7)	10)	13)
2)	5)	8)	11)	14)
3)	6)	9)	12)	15)

END OF SECTION 2(A) Need a home tutor? Visit smiletutor.sg

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SECTION 2 (B): Structured Questions (22 marks)
Answer all the questions in this section in the spaces provideo.

1   Fig. 1.1 shows four specialised cells.
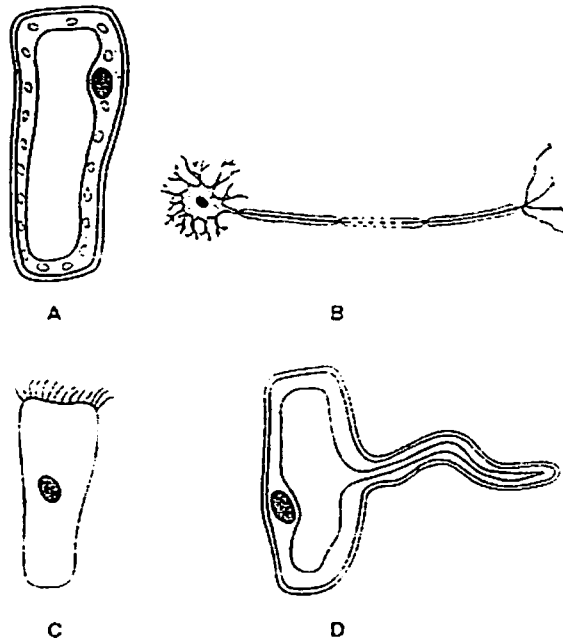
Fig 1.1

(a)   (i)   Complete the table below to identify them as animal or plant cells
[2]

Cell	Animal or plant
A	
B	
C	
D	

(ii)   State two features found in all plant cells but not in animal cells   [2]

_____

(b)   For cell A, shown in Fig. 1.1, state one feature that makes the cell different from the other three cells. Explain how this feature helps in the function of this cell.
[2]

Cell	Feature	Function
A		

2   The diagram below shows an experiment set up by a student.

Visking tubing ———|——— Iodine solution

50 % Starch solution ———|
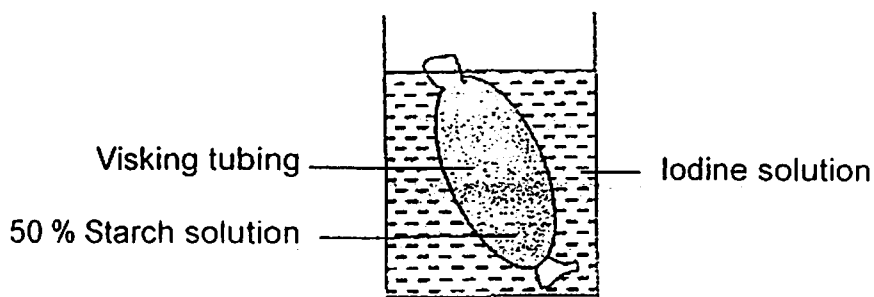
(a)   (i)   State what would be observed after half an hour.

_____

(ii)   Name the process that has caused the change in this experiment.   [1]

_____

(iii) Explain clearly why the process stated in (a)(ii) has occurred.   [2]

_____

_____

_____

_____

(b)   The student used another visking tubing and set up another experiment as shown in the diagram below.

Visking tubing ———|——— 70 % Sugar solution

50 % Sugar solution ———|
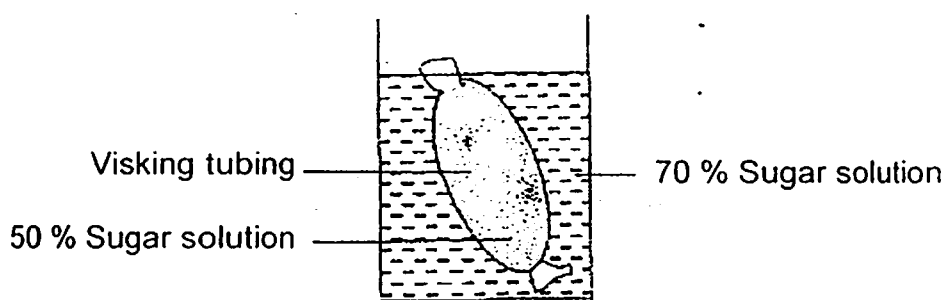
Describe & explain what would happen to the visking tubing after half an hour.
                                                                    [3]

_____

_____

_____

3 (a) The diagram below shows a food web for a fresh water reser...

unicellular animals ———→ midge larvae ——————————

unicellular green plants ———→ water fleas ———————→ hydr

pond weeds ————→ pond snails ———————————→
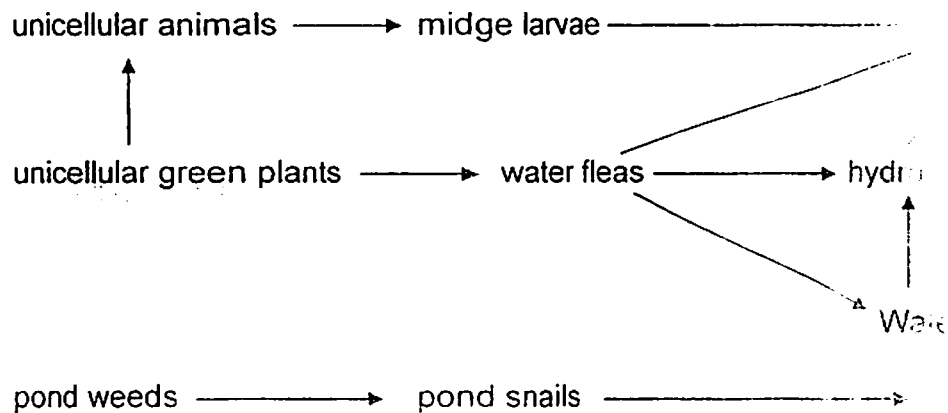
(i) Name one organism which is both a secondary and ...

_____

(ii) Using the food web, write a complete food chain with 3 li

_____

(iii) How many food chains with 4 links can be formed from

_____

(b) The figure below shows how energy is passed along a food ch...

140 kJ of energy
carnivore
energy lost

X

780 kJ of energy
energy lost

producer

8000 kJ of energy
energy lost

energy entering the food chain
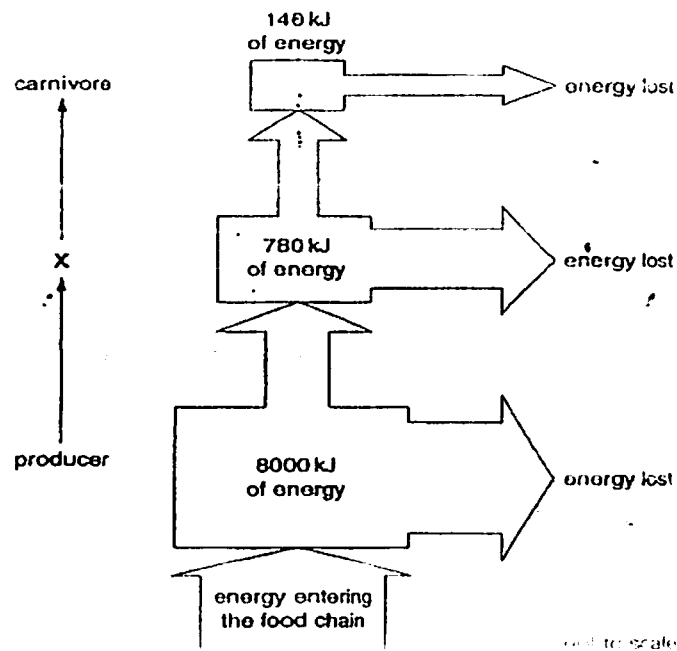
(i) What is the source of energy entering this food chain?

_____

(ii) What word should be written at the stage marked X on the diagram? [1]

_____

(iii) In this food chain, how much energy is lost between the producer stage and stage X? [1]

_____ kJ

(iv) Explain how this energy is lost. [2]

_____

_____

_____

(c) The figure below shows a food chain.

Maple tree ⟶ Caterpillar ⟶ Small bird ⟶ Eagle

In the space below, draw a labelled pyramid of numbers which shows the organisms in this food chain. Numerical values are not required. [1]
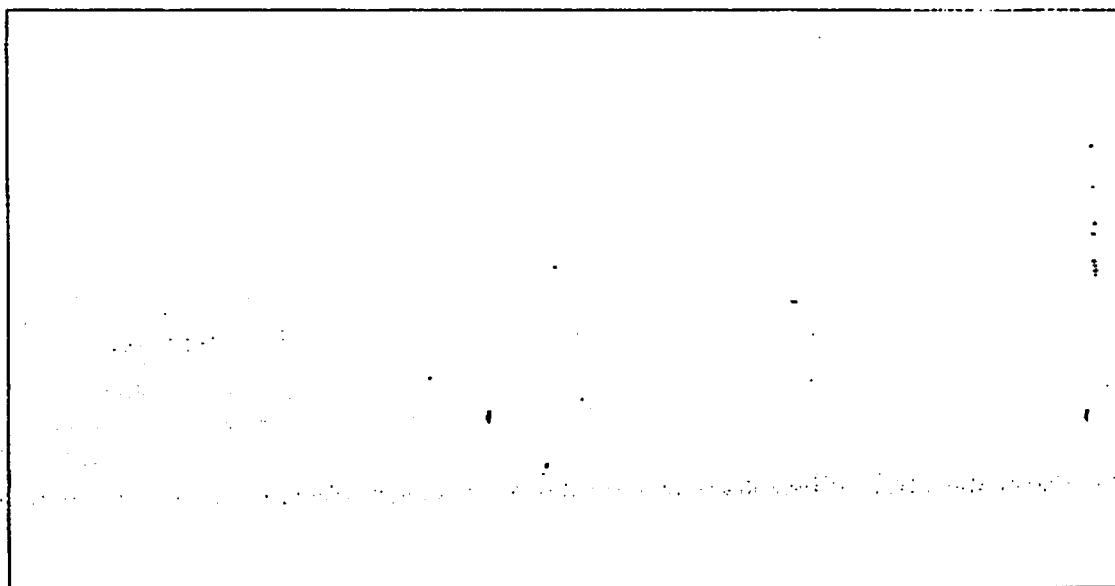
Section 2(C) : Free Response Questions (8 marks)
Answer all the questions in this section in the spaces provideo.

1 A student investigates the mass of food produced during photosynthesis in a leaf.

I. He keeps a plant in the dark for 24 hours.

II. He then cuts a disc from a leaf, and conduct a starch-test.

III. Next he places the plant in sunlight for two hours, so that photosynthesis takes place.

IV. He then cuts another disc of the same size from the same leaf. and repeated the test as in step II.

This procedure is shown in Fig 2.1.

first disc ——➤ starch test

second disc after a 2 hour period of photosynthesis ——➤ starch test
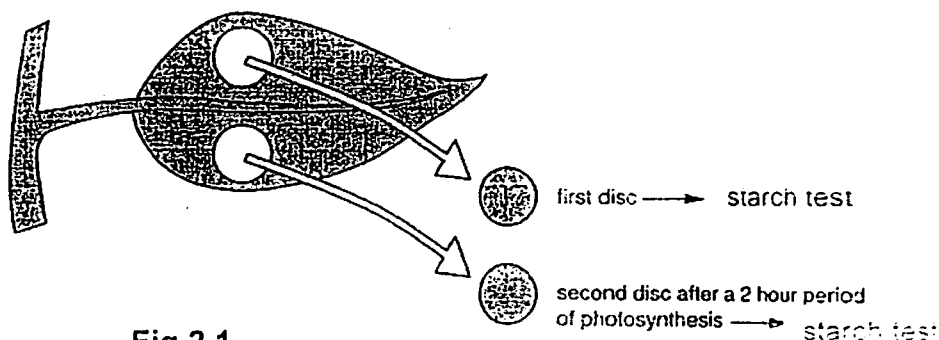
Fig 2.1

(a) Explain why the student places the plant in the dark for 24 hours before cutting out the first disc. [1]

_____

_____

(b) When testing a leaf for starch, why is it first placed in boiling water? [1]

_____

_____

(c) State the use of alcohol in this test. [1]

_____

(d) Write a **word** equation to show the process of photosynthesis. [2]

_____

_____

(e) In the table below, write down three differences between respiration and photosynthesis. [3]

Photosynthesis	Respiration

END OF SECTION 2

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QUEENSWAY SECONDARY SCHOOL
Mid-Year Examination 2012
Sec 1E Lower Secondary Science Mark Scheme

BIOLOGY SECTION:

SECTION 2(A): 15 marks

1) C	6) C	11) A
2) A	7) A	12) D
3) C	8) A	13) D
4) A	9) C	14) A
5) B	10) D	15) C

SECTION 2(B): BIOLOGY SECTION (30 marks)
SECTION 2(B): 22 marks

1   (a)   (i)   [2- ½m each]

Cell	Animal or plant
A	Plant
B	Animal
C	Animal
D	Plant

(ii)   (Cellulose) Cell wall/ large central sap vacuole.   [2]

(b)   Answers for B,C ,D for reference only.   [2]

cell	feature	function
A	Chloroplasts (1m)	Contains *chlorophyll* to trap light energy for photosynthesis. (1m)
B	long processes/ nerve fibres/ dendrites/ axon	transmits nerve impulses
C	Cilia	sweep mucus from trachea to pharynx/ moves ovum along the oviduct
D	long outgrowth	increases surface area for rapid absorption of water and mineral ions.

2   (a)   (i)   **Starch solution** inside tubing /
Visking tubing turns **blue black /
dark blue**   [1]

(ii)   **Diffusion** of iodine   [1]

(iii)   Iodine particles are small enough [1/2] to pass through visking tubing which is partially permeable [1/2] ;
higher concentration of iodine outside tubing than inside [1/2] + moves into tubing [1/2] ;   [2]

(b)   Visking tubing becomes smaller in size / shrink /softer /flacci ;
Water potential higher inside tubing than outside;
Water particles **moves from inside to outside** by osmosis ;   [3]

3 (a) (i)   Hydra/water beetle   [1]

       (ii)   unicellular green plants → water fleas → water beetles   [1]

       (iii) 4   [1]

   (b) (i)   The sun   [1]

       (ii)   Herbivore   [1]

       (iii) 8000 – 780 = 7220 kJ   [1]

       (iv)   Energy is lost through respiration (as heat) / defaecation(as faeces) / excretion (as urine) (any two of the processes)   [2]

   (c)   [1]

SECTION 2(C): 8 marks

1 (a) This is to **destarch** the plant to ensure that the presence of starch is due to photosynthesis carried out during the experiment **and not prior to it**.   [1]

   (b) Stop all chemical reactions.   [1]

   (c) Alcohol to remove the chlorophyll/decolourise the leaf.   [1]

                              (sunlight, chlorophyll)
   (d) carbon dioxide + water →   glucose + oxygen + (water)   [2]
       (minus ½m for every mistake in equation)

   (e) any 3 from table below   [3]

Photosynthesis	Respiration
Energy is stored	Energy is released
Glucose is formed	Glucose is broken down
Takes place in the presence of light	Takes place all the time
Takes place in cells containing chlorophyll	Takes place in all living cells

THE END

QUEENSWAY SECONDARY SCHOOL
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PHYSICS SECTION:

SECTION 1(A): Multiple Choice Questions (10 marks)

1) A	6) C
2) C	7) D
3) B	8) A
4) D	9) D
5) C	10) A

SECTION 1(B): Structured Questions (17 marks)

1	(a)	Observation		[1]
	(b)	Inference		[1]
	(c)	Prediction		[1]
2	(a)	Flammable		[1]
		Toxic		[1]
	(b)	Seek medical treatment.		[1]
3	(a)	(i)	10.07 cm	[1]
		(ii)	8.22 cm	[1]
		(iii)	(10.07 – 8.22) / 2 = 0.925 cm	[1]
	(b)	Zero error		[1]
	(c)	To ensure reliability of results or increase accuracy.		[1]
4	(a)	(i)	0.8 x 1 = 0.8 g	[1]
		(ii)	2.5 x 1 = 2.5 g	[1]
	(b)	Total mass = 2.5 + 0.8 = 3.3 g		[1]
		Total volume = 2 cm^3		[1]
		Density = 3.3/2		
		= 1.65 g/cm^3		[1]
	(c)	Sink		[½]
		It's density is greater than water.		[½]

C0182

Section 1(C): Free Response Questions (8 marks)

1 **(a)** **(i)** Keying rate of Leslie = 120 / (5x60) = 0.4 character/s
Keying rate of Corine = 254 / 620 s = 0.410 character/s ⸱⸱

(ii) Corine is keying faster.

(b) **(i)** Cost for 4.2 km = (4200 / 210) x $0.10 = $2
Cost for waiting for 3 traffic lights = 3x (50/25) x $0.10 = $0 ⸱
Total cost = $2.50 + $2 + $0.60 = $5.10

(ii) Total time taken in seconds = (4 x 60) + 27 = 267 s
Average speed of the taxi = 4200 / 267 = 15.7 m/s

THE END

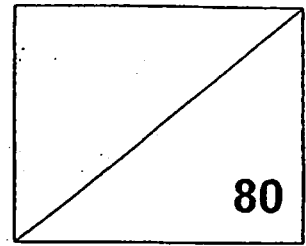|	Class	Reg. No
Name		

Instruction to candidates:

1. Write your Name, Class and Register number on all the work you hand in.
   Do not use staples, paper clips, highlighters, glue or correction fluid.
2. Answer ALL questions.
3. For Section A, there are four answers A, B, C and D. Choose the one you consider correct and record your choice by shading in the OTAS provided.
4. For Sections B and C, all answers should be written in the spaces provided on the question paper.
5. A Periodic Table is attached at the end of the paper.

Section A: Multiple Choice Questions [30 marks]
Answer all the questions in the OTAS sheet provided.

1   Which of the following is the correct procedure for lighting a Bunsen burner?

A   Open the air-hole, turn on the gas tap, light the burner, adjust air hole
B   Turn on the gas tap, open the air hole, light the burner, adjust air hole
C   Close the air-hole, turn off the gas tap, light the burner, adjust air hole
D   Close the air-hole, turn on the gas tap, light the burner, adjust air hole

2   Which laboratory apparatus below is used to support a beaker of water while boiling over a flame?

A   Retort stand
B   Test tube holder
C   Test tube rack
D   Tripod stand

3   Where would you expect to find this symbol?
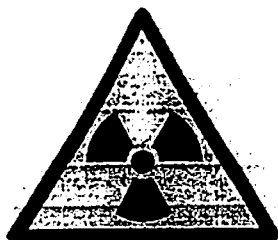
A   On a flask containing mercury.
B   On an X-ray machine.
C   On a fan.
D   On a dish containing infectious bacteria.

4   Which of the following is true about a non-luminous flame?

A   It can be seen from afar.
B   It is blue in colour.
C   It produces soot.
D   It is obtained by closing the air hole in a Bunsen burner.

5   Four students were working in the laboratory. Which student is **not** following the rules properly?

A   Tim: Stoppering reagent bottles properly after use
B   Tom: Pouring used substances back into the reagent bottle carefully.
C   Tam: Handling all chemicals and glassware in the laboratory with care.
D   Tony: Checking the labels on reagent bottles before using any substances.

6   Which part of the bunsen burner is used to control the amount of air entering the burner?

A   Barrel   B   Collar   C   Air hole   D   Jet

7   Why is the luminous flame of the bunsen burner not suitable for heating a test tube?

A   The test tube will crack.
B   The test tube will be covered with soot.
C   The test tube will catch fire.
D   The test tube will be red hot.

2

8   Cyclists and pedestrians in a heavily polluted city were seen wearing masks that remove pollutants from the air. This is an example of _____.

A   distillation   B   evaporation   C   chromatography   D   filtration

9   The diagram show a method used to separate a mixture of salt and sand. What could solid A, liquid B and solid C be?
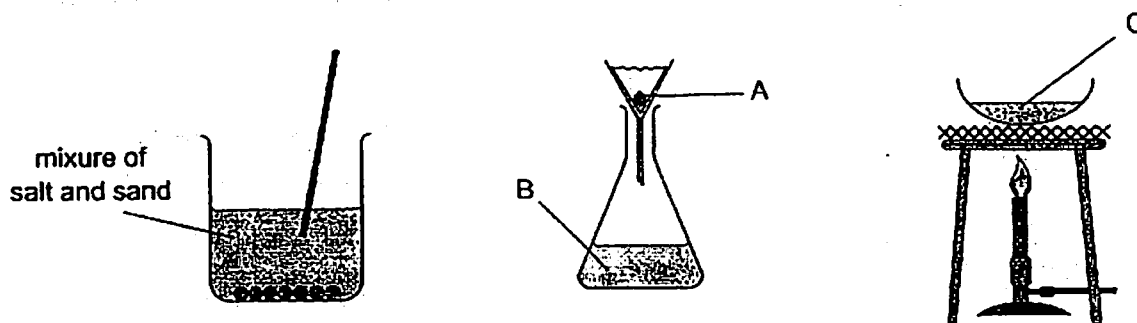
	Solid A	Liquid B	Solid C
A	Salt	water	sand
B	Salt	salt solution	sand
C	Sand	water	salt
D	Sand	salt solution	salt

10   The diagram shows a chromatogram of several inks.
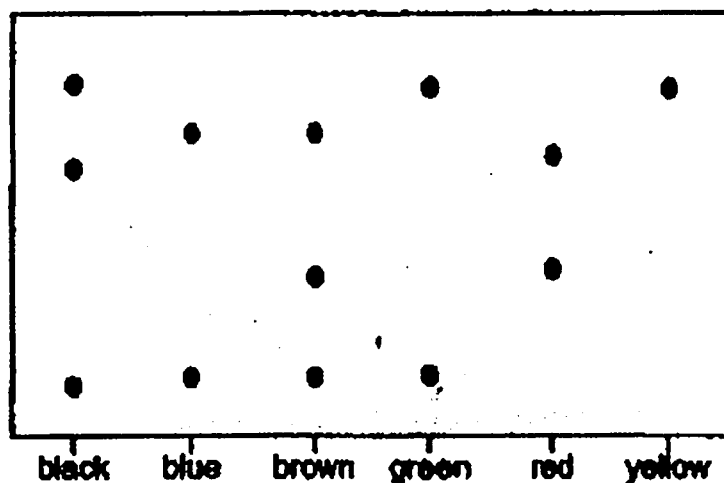
Which statement is correct?

A   Black ink can be made by mixing green, red and yellow inks.
B   Brown ink can be made by mixing blue and red inks.
C   Yellow ink can be used to make brown ink.
D   Yellow ink may be present in green ink.

3

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11   Which one of the following mixtures can be separated using magnetic attraction?

A   sand and copper
B   sand and iron
C   glass and sand
D   iron and steel

12   The diagram shows a sample of seawater in the process of distillation.
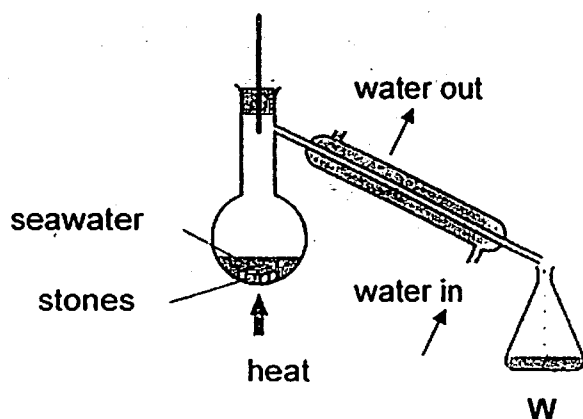
What will be collected in W at the end of the experiment?

A   stones   B   water
C   water vapour   D   salt

13   To test for the purity of a substance, the best method to use is

A   chromatography
B   filtration
C   evaporation
D   condensation.

14   The metal zinc is an element. What does this tell you about its properties?

A   It will undergo a change in state when heated.
B   It cannot be broken down into simpler substances.
C   It will not undergo a change in state when heated.
D   It cannot combine with other elements to form new substances.

4

15 The element with electronic configuration 2. 8. 6. _____.

A forms an ionic compound with sodium
B is a metal
C forms an ion of charge 2+
D reacts only with non-metals

16 Which one of the following correctly gives the numbers of the different particles to be found in an aluminium ion?

	Protons	Neutrons	Electrons
A	10	27	13
B	13	14	27
C	13	26	13
D	13	14	10

17 Which one of the following particles contains 10 electrons, 11 protons and 12 neutrons?

A $^{24}_{12}Mg^{2+}$ B $^{23}_{11}Na^{+}$ C $^{22}_{10}Ne$ D $^{21}_{10}Ne$

18 In which one of the following sets do all three particles have the same total number of electrons?

A Cl^{-} Br I^{-}
B F^{-} Ne Na^{+}
C H^{-} H H^{+}
D Li^{+} Na^{+} K^{+}

19 Chlorine atoms and chloride ions

A are chemically identical.
B are allotropes of chlorine.
C have the same number of electrons.
D have the same number of protons.

20   The electronic configurations of four atoms are shown below. Which atom is chemically unreactive?

A

B
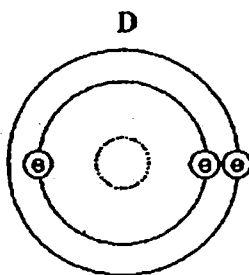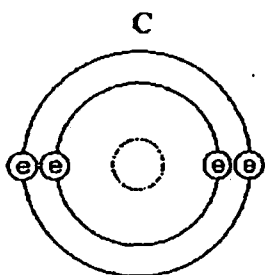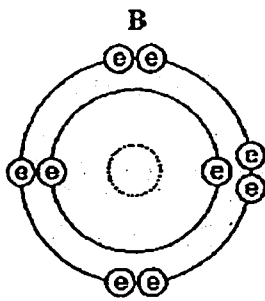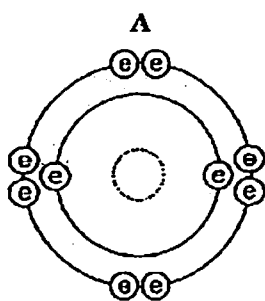
key

◯ = nucleus

ⓔ = electron

C

D

21   The diagram below shows the molecule of a compound. Which pair of elements could Y and Z be?
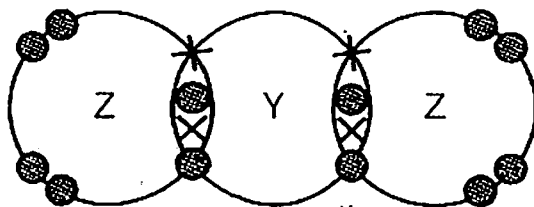
X – electron of Y

◉ – electron of Z

	Y	Z
A	Calcium	Chlorine
B	Sodium	Chlorine
C	Carbon	Oxygen
D	Sulphur	Oxygen

22   Which of the following statements is true about the Periodic Table?

A   Elements in the same period have similar chemical properties
B   Elements are arranged according to increasing relative atomic mass
C   Elements in Group 0 are all gases at room temperature
D   Boiling point increases from left to right in the Periodic Table

6

23   Magnesium and chlorine are in the same period of the Periodic Table because

A   they react to form an ionic compound.
B   they have the same electronic structure.
C   the electrons occupy three electron shells.
D   they form a compound with formula $MgCl_2$.

24   A man suffering from an excess of acid in his stomach has no indigestion tablets. Which substance could he now take to lower his acidity?

A   aspirin (pH 6)
B   lemon juice (pH 5)
C   bicarbonate of soda (pH 8)
D   salt water (pH 7)

25   Which of the following reacts with dilute sulphuric acid to give a gas and water as two of the products?

A   zinc carbonate
B   zinc
C   zinc hydroxide
D   zinc oxide

26   Which of the following is a property of an acid?

A   It feels soapy.
B   It has a sour taste.
C   It turns red litmus blue.
D   It react with another acid to form salt.

27   Which reaction shows neutralization reaction of an acid and an alkaline?

A $Ca + 2HCl \rightarrow CaCl_2 + H_2$
B $Mg(OH)_2 + 2HCl \rightarrow MgCl_2 + 2H_2O$
C $Na_2CO_3 + 2HCl \rightarrow 2NaCl + CO_2 + H_2O$
D $KOH + NH_4Cl \rightarrow KCl + NH_3 + H_2O$

28   What is the vertical column in the Periodic Table known as?

A   Family
B   Group
C   Period
D   Series

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00190

29   Which of the following statements about the periodic table is **false**?

A   Both metals and non-metals are listed.
B   It is organised into groups and periods.
C   Both elements are compounds are listed in the table.
D   Both man-made and naturally occurring elements are listed.

30   Liquid *A*, when added to calcium carbonate, produces gas *B* which produces white precipitate in limewater. Which one of the following represents liquid *A* and gas *B* correctly?

lime water turns milky (due to gas B)

calcium carbonate
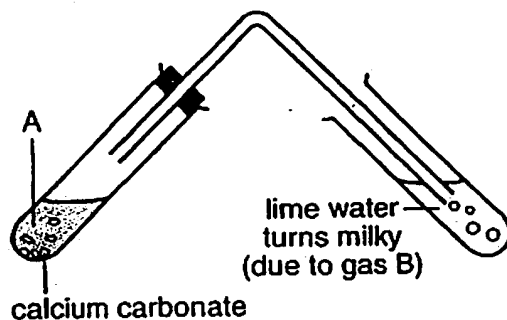
	Liquid *A*	Gas *B*
A	Calcium hydroxide	Carbon dioxide
B	Sodium hydroxide	Hydrogen
C	Hydrochloric acid	Carbon dioxide
D	Sulphuric acid	Hydrogen

8

Section B: <u>Structured Questions</u> [30 marks]
Answer all the questions in the spaces provided.

1   A chemist in a food industry used chromatography to find out if two food colours, X and Y are safe to eat. He compared the chromatograms with those of safe edible colours, A, B, C, D and E.
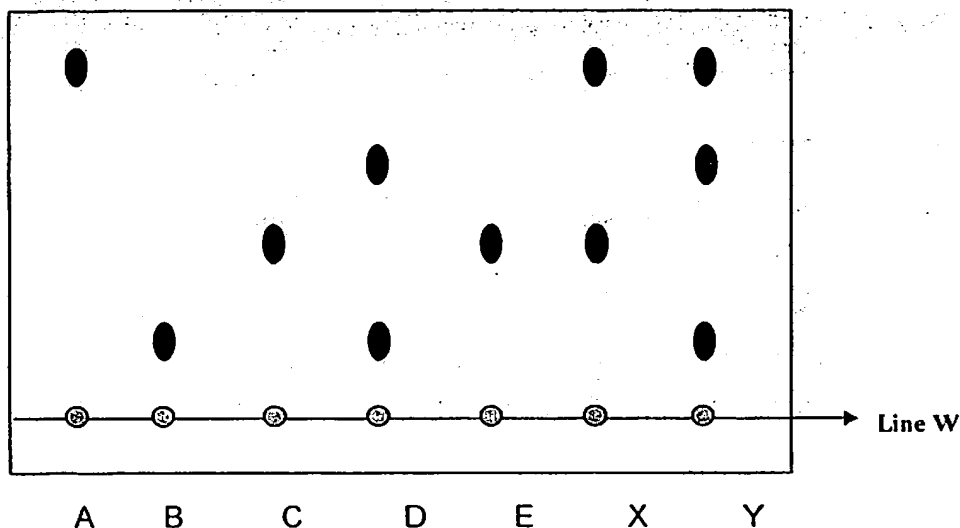
(a) Name one solvent that is commonly used in chromatography.

....[1]

(b) Can the solvent touch the Line W?

....[1]

(c) (i)   Which colour(s) does sample X contains?

....[1]

     (ii)   Hence, is sample X safe to use in food? Explain your answer.

....

....[2]

(d) Which colour(s) is/are found in both sample X and Y?

....[1]

(e) Which colour(s) show a pure sample?

....[1]

9

2 (a) Complete the following table.

| | Mass number | Atomic number of element | Number of | | |
			electrons	protons	neutrons
Sodium atom	23			11	
Calcium ion	40		18		
Chloride ion	35.5	17			20

(b) The diagram below shows a compound which consists of sulfur, oxygen and hydrogen atoms. It is widely used for batteries for cars and fertilizers etc.
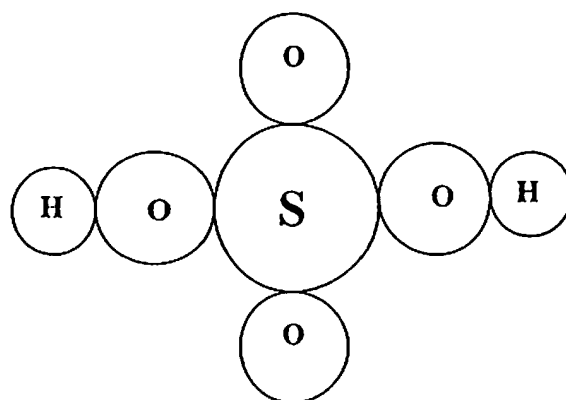
(i) Deduce its chemical formula. ....

(ii) How many atoms make up this compound ....

(iii) State the type of bonding in this compound ....

10

3 A new element Zenorine has been isolated and placed below fluorine in Group VII in the Periodic Table. Zenorine also reacts violently with molten sodium to form a white solid.

(a) How many valence electron(s) would a zenorium atom have?

....[1]

(b) State the formula of a zenorium ion if its symbol is *Ze*.

....[1]

(c) State two physical properties of Zenorium.

....

....[2]

(d) Draw a 'dot-and-cross' diagram to show the bonding in the compound of zenorium with sodium. Your diagram should show the outermost electrons only.

[3]

4 Balance the following chemical equations by writing in the coefficient (number) next to the formulae.

(a) ___ Mg + ___ HCl → ___ $MgCl_2$ + ___ H_2 [1]

(b) ___ Na + ___ H_2O → ___ NaOH + ___ H_2 [1]

(c) ___ $Ca(OH)_2$ + ___ HCl → ___ $CaCl_2$ + ___ H_2O [1]

(d) ___ H_2 + ___ O_2 → ___ H_2O [1]

(e) ___ Na + ___ Cl_2 → ___ NaCl [1]
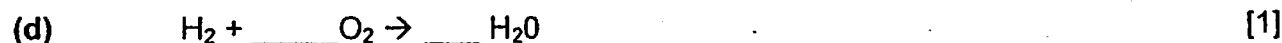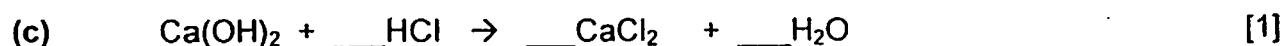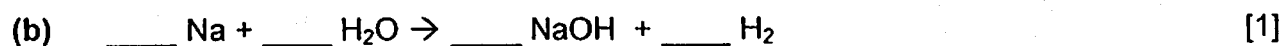
5   The following chart shows the pH values of some solutions.

pH scale

14 —— sodium hydroxide
13
12 —— limewater
11
10
9
8
7
6
5
4 —— ethanoic acid
3
2 —— citric acid
1
0 —— hydrochloric acid
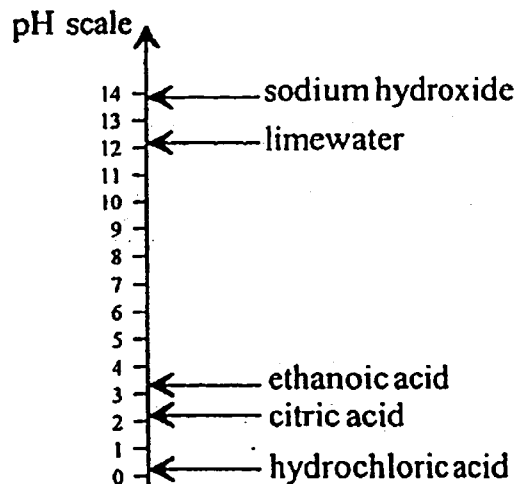
(a)   Which solution is the most acidic and which is the most alkaline?

....

(b)   Name the two products formed when hydrochloric acid reacts with soo

....

12

Section C: Essay Questions [20 marks]
Answer all the questions in the spaces provided.

6 (a) Read the following reflection written on a note book of a student.

> Today, I learnt about Group I elements, also known as alkali metals. They all have one electron in their outer shells. By losing one electron, they form positive ions. These metals are soft and can be easily cut by knife.
>
> My teacher demonstrated the reaction between sodium and chlorine. The sodium burnt and a white solid was formed! Isn't this amazing?
>
> I also watched video clips on their reactions with cold water. When the sodium metal is lowered into a beaker of cold water, the metal darts around very quickly and it catches fire. I also noticed the solution, containing Universal Indicator, turned from green to blue. Oh yes ... ... There was this gas produced too! After seeing how reactive sodium was, I wonder what the reaction between francium and cold water would be like ... ...

(i) State two physical properties of alkali metals, that are not typical of most metals.

....[1]

(ii) Name the gas produced when alkali metals react with cold water.

....[1]

(iii) Describe how you would test for the presence of the gas mentioned in (ii).

....[1]

(b) Explain why the solution, containing Universal Indicator, turns from green to blue when sodium reacts with cold water.

....

....[2]

(b) The mouth contains saliva which is a weak alkali. When sweets containing sugar are eaten, bacteria in the mouth change the sugar into acids.

Describe a test, with the result obtained, to show that saliva is alkaline.

Test ....[1]

Result ....[1]

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(c) The following diagram shows the pH values of various substances found in home.

pH	1	2	3	4	5	6	7	8	9	10	11
		lemon juice	vinegar					toothpaste			washing powder

ammonia

(i) Which substance is the most acidic? ....

(ii) Which substance is the most alkaline? ....

(iii) Which two substances will form water when mixed together?

....

2 (a) Use the Periodic Table to answer this question.

(i) What property of every atom decides the order of the element Periodic Table?

....

(ii) What is the name given to the group which contains only

relatively soft, low density metals : ....

diatomic non-metals: ....

(iii) Which element is in Group V and period 3?.......................

(iv) Which element has a proton number of 79? ....

14

(b) There are four elements, P, Q, R and S in the same period of the Periodic Table. The information about these elements are given below.

Element P forms covalent compounds with Group VII elements.

Element Q forms an ionic compound by combining with two atoms of Group VII elements.

Element R reacts with water explosively.

Element S exists as an inert gas which are used in the manufacture of steel and light bulbs.

(i) State a similarity of these four elements in terms of atomic structure.

....[1]

(ii) Arrange these elements in the order of increasing atomic number.

....[1]

(iii) In which group of the Periodic Table does R belong to?

....[1]

(iv) Explain the meaning of an inert gas.

....

....[2]

~END OF PAPER~

The Periodic Table of the Elements

Group																	
I	**II**												**III**	**IV**	**V**	**VI**	**VII**	**0**

						1 H hydrogen 1											4 He helium 2
7 Li lithium 3	9 Be beryllium 4	**Key** relative atomic mass **atomic symbol** name atomic number											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12												27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	64 Cu copper 29	65 Zn zinc 30		70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	– Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48		115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La lanthanum 57	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80		204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	– Po polonium 84	– At astatine 85	– Rn radon 86
– Fr francium 87	– Ra radium 88	– Ac actinium 89															

*58-71 Lanthanoid series	140 Ce cerium 58	141 Pr praseodymium 59	144 Nd neodymium 60	– Pm promethium 61	150 Sm samarium 62	152 Eu europium 63	157 Gd gadolinium 64	159 Tb terbium 65	162 Dy dysprosium 66	165 Ho holmium 67	167 Er erbium 68	169 Tm thulium 69	173 Yb ytterbium 70	175 Lu lutetium 71
†90-103 Actinoid series	232 Th thorium 90	– Pa protactinium 91	238 U uranium 92	– Np neptunium 93	– Pu plutonium 94	– Am americium 95	– Cm curium 96	– Bk berkelium 97	– Cf californium 98	– Es einsteinium 99	– Fm fermium 100	– Md mendelevium 101	– No nobelium 102	– Lr lawrencium 103

16

Answers for Sec 1E MYE:

Section A:

1	2	3	4	5	6	7	8	9	10
D	D	B	B	B	B	B	D	C	A

11	12	13	14	15	16	17	18	19	20
B	C	A	B	A	D	B	B	D	A

21	22	23	24	25	26	27	28	29	30
C	C	C	C	A	B	B	B	C	C

Section B:

1a) water / ethanol [1]

b) No [1]

c) i) A and E [1]

   ii) Yes [1] , it contains the edible colours A and E [1]

d) A [1]

e) A, B, C and E [1]

2a)

	Mass number	Atomic number of element	Number of		
			electrons	protons	neutrons
Sodium atom	23	11	11	11	12
Calcium ion	40	20	18	20	20
Chloride ion	35.5	17	18	17	20

Every 2 correct answers – 1m

Total – 4m

b) i) H_2SO_4 [1]

   ii) 7 [1]

   iii) covalent bonding [1]

3 a) 7 [1]

   b) Ze^- [1]

c) Low conductor of heat [1], low mp and bp [1]

d)

4a) ___ Mg + _2_ HCl → ___ MgCl$_2$ + ___H$_2$ [1]

b) _2_ Na + _2_ H$_2$O → _2_ NaOH + ___ H$_2$ [1]

c) ___Ca(OH)$_2$ + _2_ HCl → ___CaCl$_2$ + _2_ H$_2$O   [1]

d) _2_ H$_2$ + ___O$_2$ → _2_ H$_2$0   [1]

e) _2_ Na + __ Cl$_2$ → _2_ NaCl   [1]
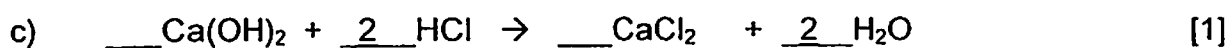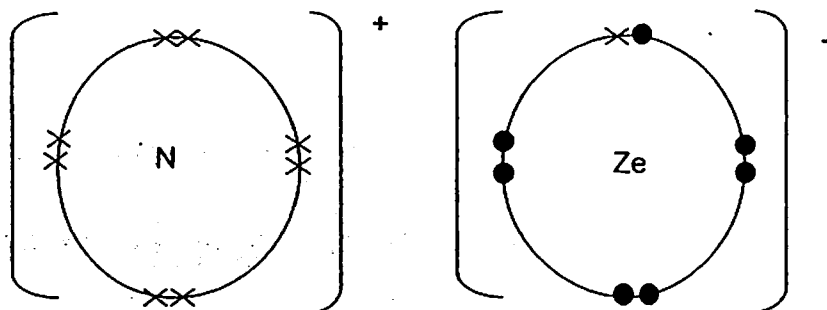
{award one mark for each part only if all the correct numbers have been filled}

5a) Most acidic: Hydrochloric acid ; Most alkaline: Sodium hydroxide

5b) Salt [1] and water [1]

5c) Toothpaste is slightly alkaline [1]

which can neutralise the acid formed in our mouths [1].

Section C:

1a) i) They have low melting point and soft. [1]

ii) hydrogen gas [1]

iii) use a lighted splint and if hydrogen gas is present, a pop sound will be heard. [1]

b) When sodium reacts with cold water, the solution is alkaline hence it will turn from green to blue.

c) Test: Use a red litmus paper. [1]

Result: The red litmus paper will turn blue. [1]

d) i) lemon juice [1]

ii) ammonia [1]

iii) lemon juice and ammonia [1]

2a) i) atomic number [1]

ii) Group 1 [1]

Group 7 [1]

iii) Phosphorus [1]

iv) Gold [1]

b) i) They have the same number of shells. [1]

ii) R, Q, P and S [1]

iii) Group 1

iv) It means that it will not react with other atoms as it has a stable octet configuration.

Name: .... **Reg. No. .....** **Class: ....**

St.Margaret's Secondary School

Mid-Year Examination 2012

·Founded·1842

Secondary One Express
Paper 1 (30 marks)

10 May 2012
Duration: 2 Hours (For both Papers 1 and 2)
Total Marks: 100   (For both Papers 1 and 2)

Additional Material: OTAS

READ THESE INSTRUCTIONS FIRST
Do not open this Booklet until you are told to do so.

YOU MAY START WITH EITHER PAPER 1 OR 2.

Write your name, index number and class on the OTAS sheet and in the spaces provided on this page.

Answer all 30 questions in this paper.

For each question, there are four possible answers, A, B, C and D. Choose the one you consider

correct and shade your choice of answer on the OTAS sheet provided, with a soft 2B pencil.

Erase unwanted answers thoroughly from the answer sheet.

Each correct answer will score one mark.

Calculators are allowed in this paper.

This question paper consists of 12 printed pages.

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1. Which statement is not a good practice in the Science laboratory?

A   Pouring unused chemicals back into their original bottle.
B   Reading instructions and understanding them prior to the start of the experiment.
C   Making the Bunsen flame luminous in between heating.
D   Using a measuring cylinder instead of a beaker to measure volume of water.

2. Which label should be on the bottle of concentrated hydrochloric acid?

A	B	C	D
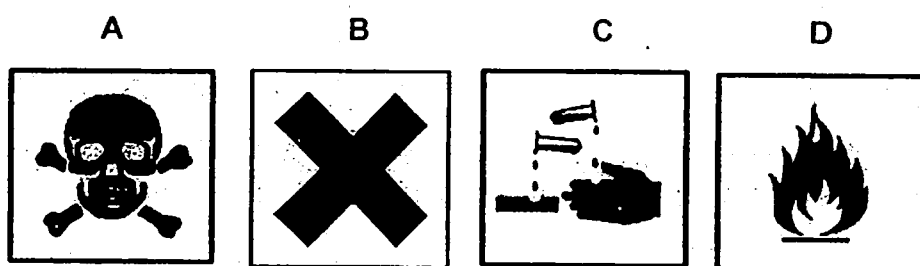
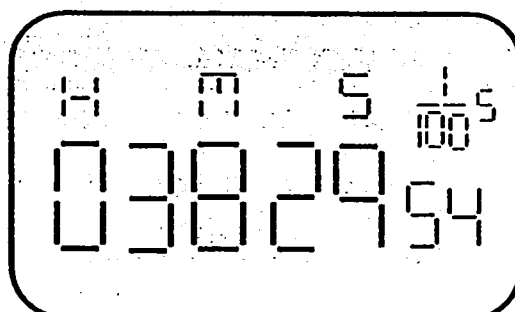3. The diagram below shows a block of wood next to a metre scale.

block of wood
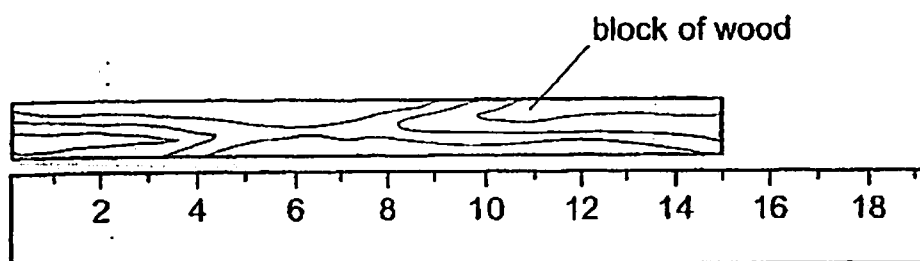
What is the length of the block?

A   13.5 m
B   14 m
C   14 m 5 cm
D   15 m

3

4. The diagram below shows the reading of a stopwatch used to measure the duration of the sports day event.

How long was the event?

A 3829.54 s
B 3 h 8 min 29.54 s
C 2309.54 s
D 38 h 29 min 54 s

5. The table below shows the results of an experiment that a group of students designed to study the human heart rate.

	Person X	Person Y	Person Z
Number of beats	712	345	72
Time taken/ min	10	3	1

Which of the following statements about the heart rate of the three persons is true?

A Person Z has the highest heart rate.
B Person Y's heart rate is twice that of Person X.
C Person Z and Person X have the same heart rate.
D Person Y has the highest heart rate.

6. It takes 0.25 s for the pendulum to swing from X to Y. What is the period of the pen...
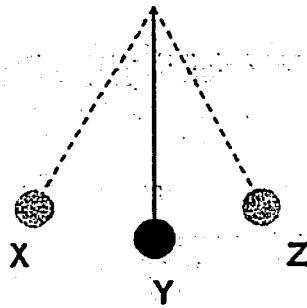
> A   0.50 s
> B   0.75 s
> C   1.00 s
> D   2.50 s

7. A thick rope burns at a rate of 8 cm per minute. If the rope burns from one en...
    time taken for 4.5 m long rope to burn completely?

> A   15.5 min
> B   28.125 min
> C   0.5625 min
> D   56.25 min

8. Elise ran from her home to the grocery shop 3 km away. She started out at ...
    arrived at the shop at 2.30 pm. After buying some groceries, she left the shop
    and reached home at 3.30 pm. Which statement correctly describes the jour...

> A   Her speed when she was heading home was twice as fast as when sh...
>   out for the grocery shop.
> B   Her speed when she was heading for the grocery shop was twice as fas...
>   when she was heading home.
> C   Her average speed for the whole journey was 3 km/h.
> D   She ran at the same speed when she was heading for the grocery sh...
>   when she was heading home.

5

9. At the annual Sports Carnival, a team from each of the following classes took part in a 4 x 100 m relay race and the records of their team timing are as shown.

Classes	Time taken (s)
1A	65.5
1B	65.0
1C	53.4
1D	55.0

What was the average speed of the team who won the race?

A   1.53 m/s
B   1.87 m/s
C   6.11 m/s
D   7.49 m/s

10. A firecracker was launched into the sky. After a time of 3 seconds, the fire-cracker reached its peak height at 9.5 m. What was the average speed of the firecracker?

A   0 m/s
B   3.17 m/s
C   6.33 m/s
D   12.67 m/min

11. The speed of light is 300 000 000 m/s. Light from the Sun takes 8000 s to reach Mars. How far is Mars from the Sun?

A   0.0000267 km
B   18750 km
C   37500 m
D   2 400 000 000 km

12. Which statement about mass is true?

A   The mass of an object is constant everywhere.
B   The mass and weight of an object are equal.
C   The mass of an object depends on its volume.
D   The mass of an object is zero on Mars.

13. Three counterweights of 100 g, 5 kg and 50 mg each are needed to balance an object Z on the beam balance. What is the mass of object Z?

    A   155 g
    B   5150 g
    C   5100.05 g
    D   5.105 kg

14. Two cube boxes are resting on the floor. Cube B has sides which are twice as long as those of cube A.

x cm $2x$ cm
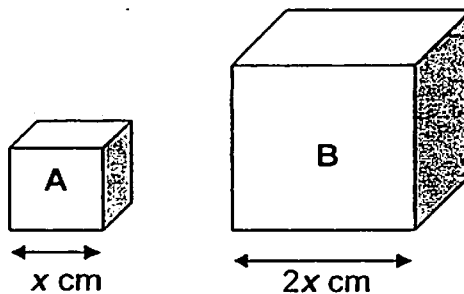
If both cubes have the same weight, which statement is correct?

    A   Pressure exerted by A is 2 times the pressure exerted by B.
    B   Pressure exerted by A is half the pressure exerted by B.
    C   Pressure exerted by A is the same as the pressure exerted by B.
    D   Pressure exerted by A is 4 times the pressure exerted by B.

15. The base of a cardboard box measures 30 cm by 45 cm. A 16 N cake is placed inside the box and this box is placed on the table. What is the pressure exerted by the box containing the cake on the table? (*Take the weight of the cardboard box to be negligible.*)

    A   0.01 N/cm^2
    B   0.12 N/cm^2
    C   0.36 N/cm^2
    D   0.53 N/cm^2

16. A force of 20 N is used to pull a block of mass 400 g across a rough surface at a constant speed.

What is the work done to overcome friction?

A 0 Nm
B 100 Nm
C 800 Nm
D 2000 Nm

17. The most work is being done against gravity when _____.

A a 10 N is pushed 10 m across a rough floor.
B a 10000 N elephant is stationary.
C a 730 N lady carries her groceries to her car.
D a 500 N man walks up a flight of stairs.

18. A ball of mass 80 g leaves a tennis racket with kinetic energy of 240 J. It rises vertically to a height of _____.

A 0.333 m
B 3 m
C 300 m
D 19200 m

19. The diagram shows three similar blocks of wood were pushed up three differ??? ???

I	II	III
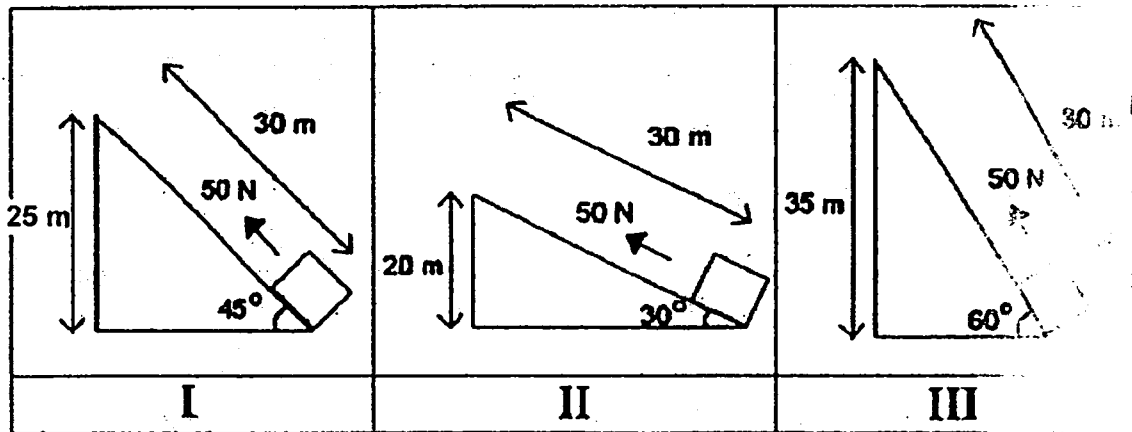
Which diagram shows the most work done against gravity?

A   I
B   II
C   III
D   The work done in all three cases is the same.

20. The following diagram shows a machine.

Which if the following levers belong to a different class of lever from the mac? above?

A   B   C   D
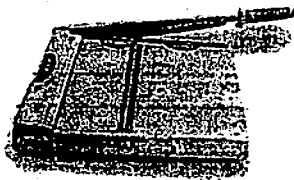
21. Tom and Tim are standing on the see-saw as shown below. Given that the see-saw is perfectly balanced and Tom weighs twice as much as Tim. What is the distance between Tim and the fulcrum?

Tom   Tim
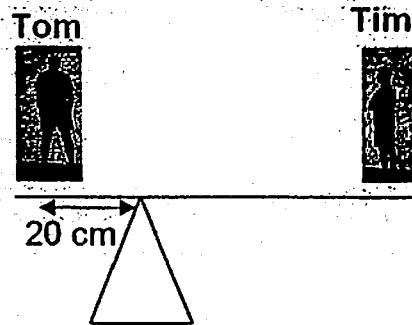
20 cm

A   20 cm
B   40 cm
C   60 cm
D   100 cm

22. Slotted weights of 30 g each are hung on a uniform metre rule as shown. The weight hanger has the same weight as each slotted weight shown. Which diagram shows a uniform balanced metre rule?

A

B

C

D
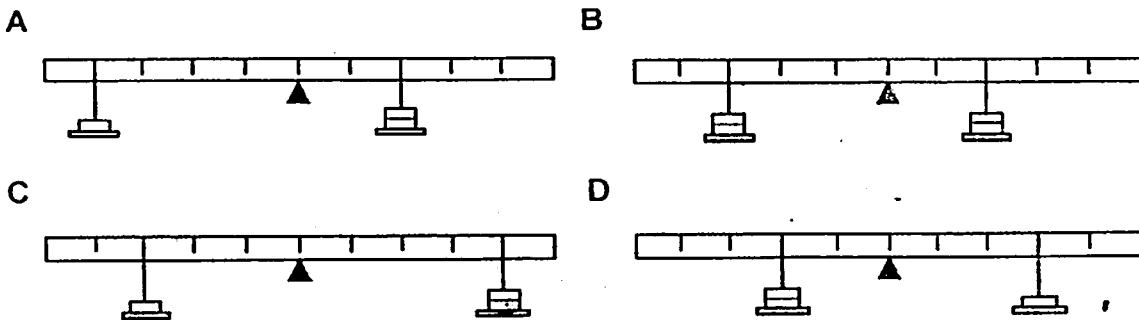
23. A scientist removed the nucleus from an amoeba. For several days it continued to move and feed but it did not reproduce. An intact amoeba reproduced twice in that period of time. Based on the information provided, we can conclude that the nucleus is necessary for the cell to _____.

A   move
B   divide
C   survive
D   feed

24. Which part of the cell controls the transfer of substances into and out of the cell?

    A   Vacuole
    B   Cytoplasm
    C   Cell wall
    D   Cell membrane

25. Man is made up of organs, tissues and cells. Which of the following describes the blood and brain?

	Sperm	Blood	Brain
A	Cell	Organ	Tissue
B	Cell	Tissue	Organ
C	Tissue	Cell	Organ
D	Organ	Organ	Tissue

26. The diagram shows a plant cell as seen under a microscope.
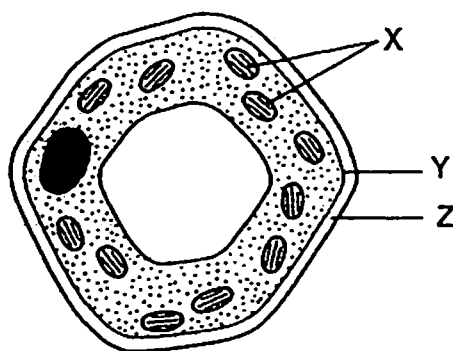
What are the functions of the labelled parts?

	Provides support and shape	Synthesis of carbohydrate
A	X	Z
B	Y	X
C	Z	Y
D	Z	X

27. Why is a leaf placed in boiling water before it is placed in ethanol during the test?

    A   To decolourise the leaf.
    B   To stop the leaf from using up starch.
    C   To make the leaf brittle.
    D   To break the cell membrane.

28. A leafy shoot is placed in a closed, transparent container with some carbon dioxide indicator solution which changes colour as shown in the table below.

Leaf

Carbon dioxide Indicator solution
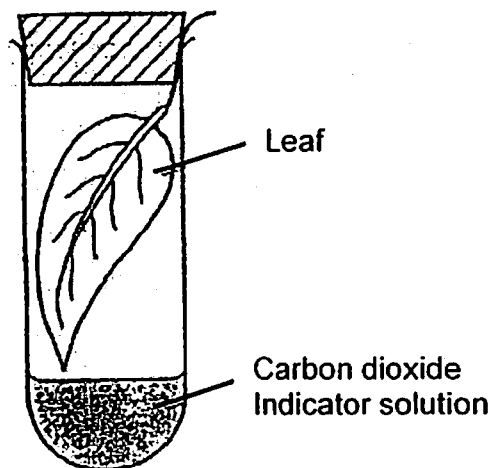
Colour	Percent of carbon dioxide	
Purple	0.01	Less than normal
Red	0.04	Normal
Yellow	0.10	More than normal

Which colour will the carbon dioxide indicator solution be at noon and at night?

	At noon	At midnight
A	Purple	Yellow
B	Red	Purple
C	Yellow	Purple
D	Purple	Red

29. Which of the following is the primary source of energy for photosynthesis?

A   Carbon dioxide.
B   Oxygen.
C   The sun.
D   Plants.

30. The diagram shows an experimental set-up to investigate photosynthesis.
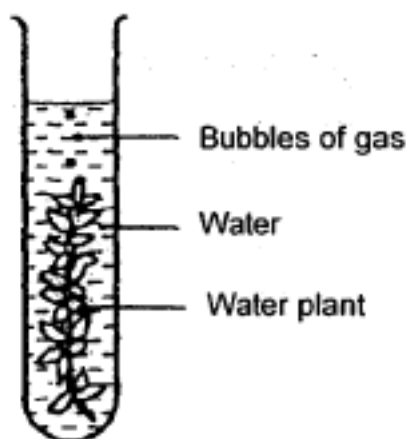
Which set of conditions will cause the plant to produce the most bubbles?

	Sodium Hydrogen Carbonate	Temperature/ ^0C	Light
A	Present	25	Bright
B	Present	100	Bright
C	Absent	40	Dim
D	Absent	30	Dim

Name: .... Reg. No. ..... Class: ......

St. Margaret's Secondary School

Mid-Year Examination 2012

Founded 1842

LOWER SECONDARY SCIENCE

Secondary One (Express)
Paper 2 (70 marks)

10 May 2012

Duration : 2 hours (For both Paper 1 and 2)
Total Marks : 100 (For both Paper 1 and 2)

Instructions to candidates

YOU MAY START WITH EITHER PAPER 1 OR 2.

1. Write your name, index number and class at the top of the page;
2. **Paper 2 consists of Section A and Section B.**
   Answer **all** questions in **Section A** and **4 out of 5 of the questions in Section B**
   in the spaces provided.
3. Marks to each question or part of a question are indicated in brackets [ ]
   at the end of the questions.
4. Calculators are allowed . For numerical answers, all essential working
   must be clearly shown. Omission of working will result in the loss of marks.

Papers	Marks obtained
Paper 1 (30 mks)	
Paper 2-A (30 mks)	
Paper 2-B (40 mks)	
Total (100 mks)	

This paper consists. of **17** printed pages

00216

2

Section A (30 marks)

1   A group of students wanted to find out if seawater evaporates faster than distilled water. They used 4 laboratory apparatus to test they hypothesis.

a.   Complete the table below by listing missing names and functions of the apparatus used in this experiment.

Apparatus	Function
Wire gauze	
	For raising a flame above the table high enough for heating.
	To evaporate the liquid in a solution over a Bunsen burner.
Tripod stand	

[4]

b.   State two controlled variables in this experiment.

....

.... [1]

c.   State a possible hypothesis for this experiment.

....

.... [1]

2   Study the diagram below carefully.
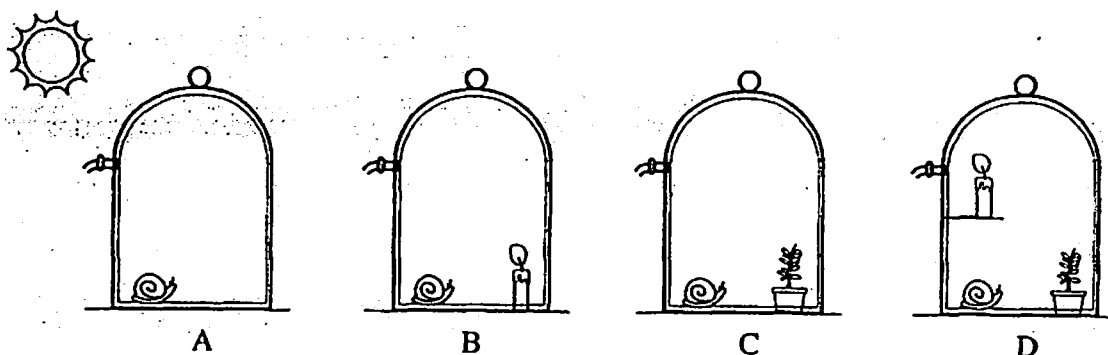
Glass container A contains a snail.

Glass container B contains a snail and burning candle.

Glass container C contains a snail and a potted plant.

Glass container D contains a snail, a burning candle and a potted plant.

Equal amounts of air were pumped into the glass containers shown above and the openings were sealed. The containers were place in bright light.

a.   In which container will the snail survive the longest time? Explain your answer.

....

....

....

....

[2]

b.   John proceeds to transfer glass container D into a dark room for 12 h. At the end of the 12 h period, the snail in container D died. Why did the snail die? Explain your answer.

....

....

....

.... [2]

3　A boulder weighs 12.0 kg on Earth and was taken to Planet Z for an experiment. The gravitational field on Earth is 10 N/kg. The diagram below shows a 500 g mass hanging from a spring balance on Planet Z.

200 N
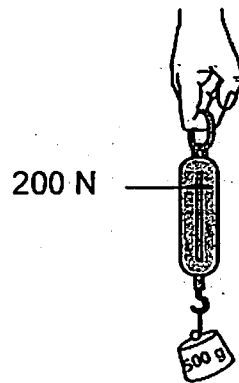
a.　Calculate the gravitational pull on Planet Z.

Answer : ....　[2]

b.　i) Calculate the weight of the boulder when it was on Planet Z.
ii) Did the boulder have a greater weight on Planet Z than on Earth?

Answer : i)...............................　[2]
ii)..............................　[1]

4   While trying to understand "Cells" better, John made a model of an animal cell as shown in the diagram below. He used the following items; small plastic bag, a ball, a thick liquid and some jelly beans. He placed all the items in the plastic bag and tied it up.
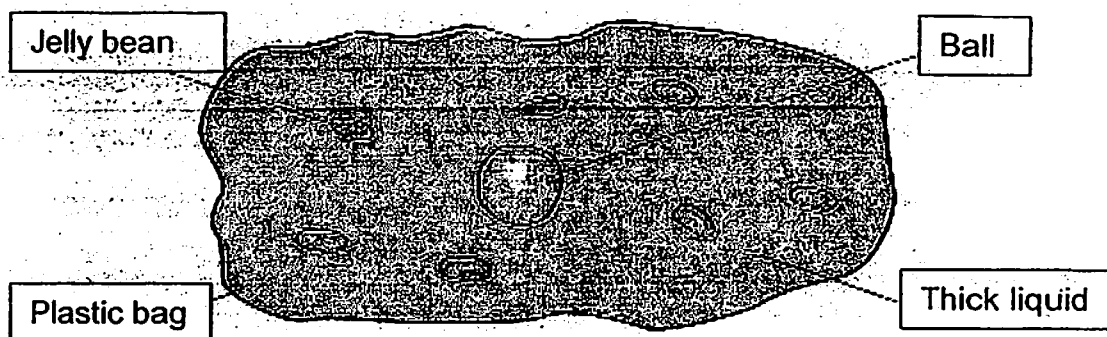

a.   Given that each part of the model represents an animal cell, name the part of the cell and its function in the table below.

Item	Part of cell	Function
Thick liquid		
Jelly bean		

[4]

b.   Describe two changes you would make to this model if you were asked to build a model of a plant cell instead?

....

....

....

....

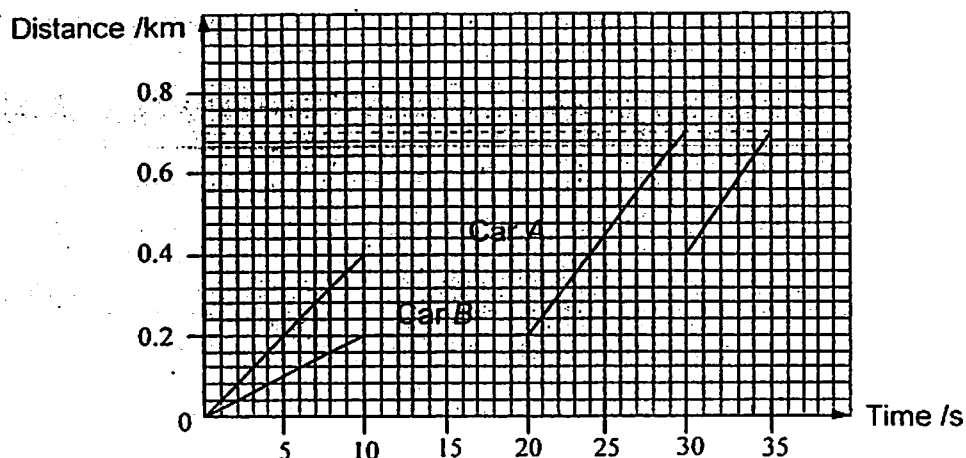...

[2]

5   The graph below shows the journey of two different cars, A and B. The two cars travelled from point X to point Y. A took 35 s for the journey while B took 30 s. Use the information in the graph to answer the following questions.

a.   What was the distance between point X and Y?

Answer : .... [1]

b.   What is the average speed of Car A for the entire journey?

Answer : .... [2]

c.   If Car A maintain its initial speed in the first 10 s of the journey and did not change its speed, would Car A reached point Y before Car B? Use calculation to explain your answer.

Answer: .... [3]

6   A trapezium block weighs 100 kg and has the dimensions shown below.

11 cm

5 cm

2 cm

9 cm

6 cm
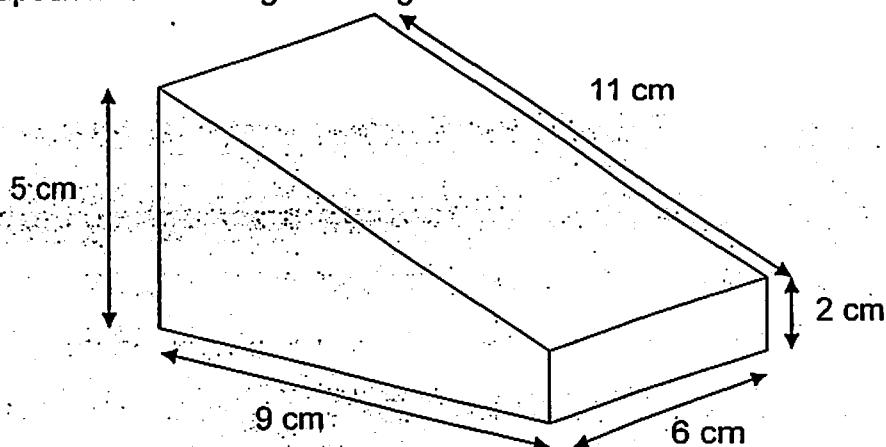
Calculate the least pressure exerted by the block when it is placed on the table.

Answer.. [3]

Section B (40 marks)
There are 5 questions in this section. ONLY choose and complete <u>4 out of 5</u> of these questions.

7   Sammy works in a rice factory. He needs to lift 80 kg of rice up 1.5 m to the store room using a lever; by standing on the lever.
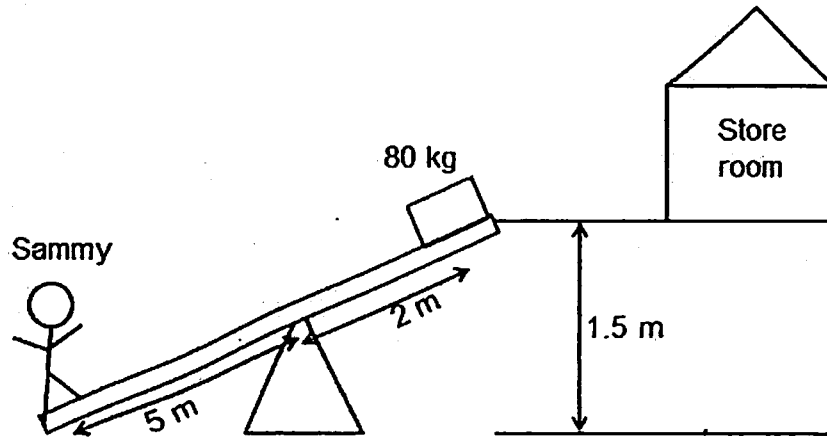
a.   What class lever is Sammy using to lift the rice? Explain your answer.

....

....

....

....   [2]

b.   What is the minimum weight of Sammy in order for the lever to work?

Answer : ....   [3]

c. What is the work done against gravity to lift the rice to the level of the store room?

Answer : .... [2]

d. Sammy's friend Jenny felt that less work would be done against gravity if she carried the rice up the stairs to the store room. Do you think Jenny was correct? Explain your answer.

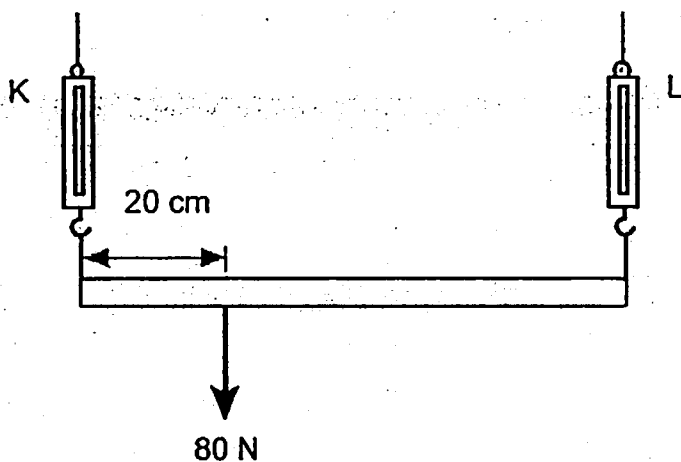..

....

.... [2]

e. Draw a line on the diagram to symbolize the weight of the rice. [1]

8   A light rod 150 cm long is supported at both ends by two spring balances K and L. A weight of 80 N is hung 20 cm from K along the rod. What does each of the balance read?
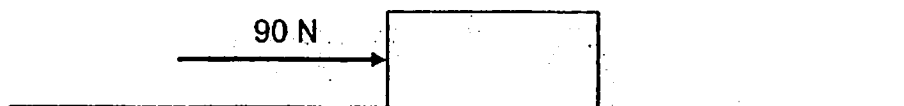

80 N

a.   What does each of the balance read? Take the weight of the rod to be negligible.

Answer : .... [4]

b.   The weight of the rod is 90 N and it acts 75 cm from K. If the weight of the rod was taken into account, what will be the reading at balance L?

Answer : .... [2]

c. A man pushes a box with a mass of 65 kg across a rough surface by exerting a force of 90 N.
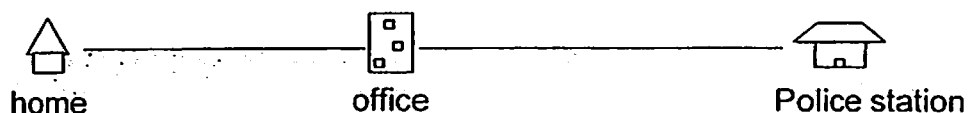

i. If the box moves across a distance of 14 m what is the work done against friction by the man?

Answer : .... [2]

ii. Why is the weight of the box not taken into consideration in the calculation in (c)(i)?

....

....

....

.... [2]

9   Mr. Tan drove from home to the office at a speed of 75 km/h. His friend drove
     from the police station to the office at 120 km/h.

     home   office   Police station

a.   If Mr. Tan and his friend both started off at 1200 h and reached the office at
     1600 h, calculate the distance between Mr. Tan's home and the police
     station.

     Answer : .... [3]

b.   If Mr. Tan had driven at a speed of 120 km/h, how much earlier would he
     have reached the office than his friend?

     Answer : .... [3]

c.   State two possible effects of forces.

....

....

.... [2]

d.   A physics teacher has a mass of 70 kg. She is wearing high heel shoes and standing on both feet. If her shoe has a contact area of 220 cm^2 each, what is the pressure exerted on the ground?

Answer : .... [2]

10   A plant was kept in the dark cupboard for a day. A leaf from the plant was plucked and tested for starch with iodine solution.

     a.   What will happen to the iodine solution? Explain your answer.

....

....

....

....

.... [3]

     b.   The leaf is considered an organ. Do you agree with this statement? Explain your answer using examples.

....

....

....

....

.... [3]

15

c. The diagram below shows a cell.

Green organelle
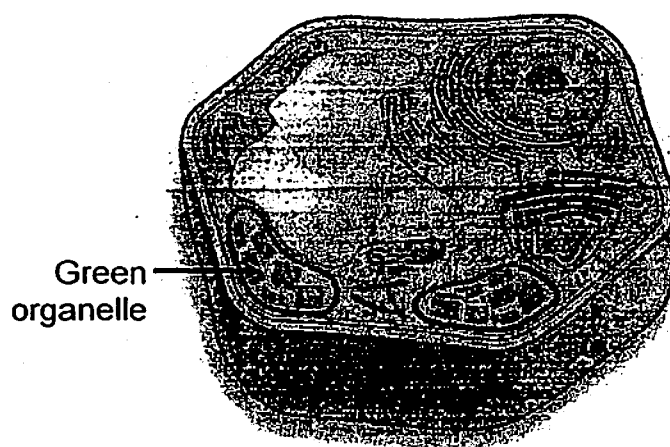
i Is the cell above a plant or animal cell? Explain your answer.

....

....

.... [3]

ii In which organ are you most likely to find this cell in?

.... [1]

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16

11 a. Refer to the data below and answer the following question (a).

	Marina Barrage	Eco-Pond
Dissolved oxygen (mg/λ)	2.5	6.1
Light Intensity (λux)	4600	7900
pH	6.5	7.1
Temperature (°C)	25	29

Which of the location contains more underwater vegetation? Explain your answer.

....

....

....

....

.... [3]

b. A human nerve cell and a plant guard cell are similar in certain ways different in other ways. State three structural differences between th nerve cell and plant guard cell.

....

....

....

....

.... i|

c. Refer to the diagram below to answer questions (i) and (ii).

Human Chromosomes
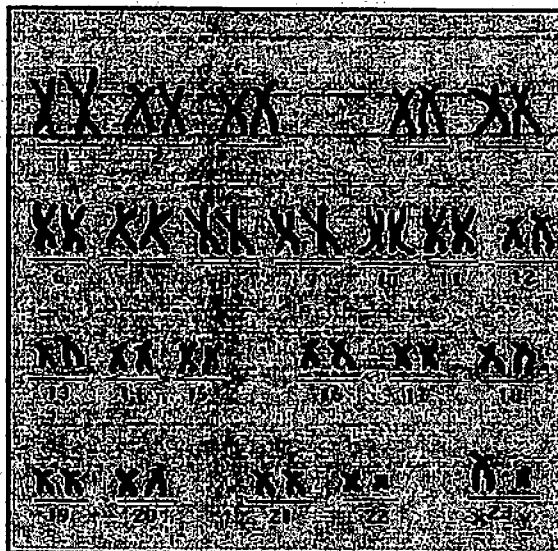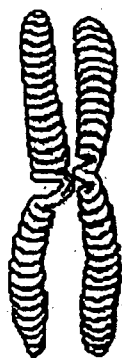
i Where are the structures seen in the diagram found in a cell?

.... [1]

ii What are the three main functions of the organelle in your answer (i)?

....

....

....

.... [3]

St Margaret's Secondary School
Mid-Year Examination 2012
Lower Secondary Science
Secondary Two Express

Marking Scheme

Paper 1 (30 marks)
1 mark for each correct answer
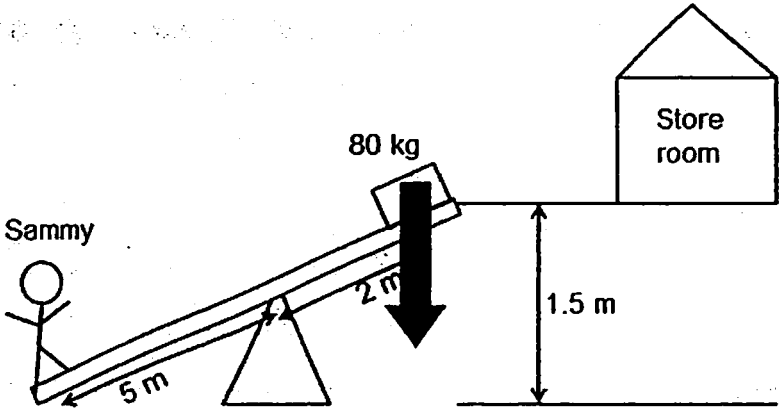
1	A	6	C	11	D	16	B	21	B	26	D
2	C	7	D	12	A	17	D	22	D	27	B
3	D	8	D	13	C	18	C	19	C	28	A
4	C	9	D	14	D	19	C	24	D	29	C
5	D	10	B	15	A	20	C	25	B	30	A

Paper 2 (70 marks)

Qn	Section A – 30 marks		Mks	Remarks
1a	**Apparatus**	**Function**	4	Words in bold are keywords No half mark allocated No marks if apparatus is spelt wrongly
	Wire gauze	To ensure **heat** is **evenly distributed** over the **bottom of the evaporating dish.** (1)		
	Bunsen burner (1)	For raising a flame above the table high enough for heating.		
	Evaporating dish (1)	To evaporate the liquid in a solution over a Bunsen burner.		
	Tripod stand	For **supporting** apparatus **during heating**(1)		
1b	**ANY TWO (½ mark each)** Volume of liquid used/ Temperature of liquid/ Precision of stopwatch/ Same apparatus used to measure volume of liquid		1	
1c	**ANY ONE** Seawater evaporates faster than distilled water/ Distilled water evaporates faster than seawater		1	
2a	Container C (½) It contains the **most amount** of **oxygen**(½) for the snail to respire. This is because in the bright light, the plant **photosynthesizes**(½) faster than it respires. Hence the **plant produces oxygen**(½).		2	Words in bold are keywords
2b	The snail died as there was a **lack of oxygen**(½). In the dark, the plant will **not produce oxygen**(½). by **photosynthesis.** (½). The candle will continue to **burning taking in oxygen.** (½).		2	Words in bold are keywords
3a	W = mg Gravity on Planet Z = W/m = 200/ 0.5 = 400.N/kg		 1 1	Minus ½ if final answer does not have units

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3bi)	Weight of boulder on Planet Z = mg = 12.0 x 400 =4800 N	 1 1	Minus ½ if final answer does not have units ECF for gravity of Planet Z
3bii)	Weight of boulder on earth = mg = 12.0 x 10 = 120 N The boulder had a greater weight on Planet Z than on Earth.	 ½ ½	Minus ½ if final answer does not have units ECF for gravity of Planet Z
4a	<table><tr><td>Item</td><td>Part of cell</td><td>Function</td></tr><tr><td>Thick liquid</td><td>Cytoplasm(1)</td><td>**Chemical reactions** take place(1)</td></tr><tr><td>Jelly bean</td><td>Vacuole(1)</td><td>**Stores/contains water** and **nutrients** needed for living organism to survive. (1)</td></tr></table>	4	Words in bold are keywords No marks if part of cell is spelt wrongly
4b	**ANY TWO (1 mark each)** Change the jelly beans to **one big central compartment** in the plant cell. Add a **rigid/ strong material around the plastic bag** to represent the plant **cell wall.** Add **green colour objects** into the thick liquid to symbolise **chloroplasts.**	2	Words in bold are keywords
5a	Distance between point X and Y = 0.7 km	1	
5b	Average speed of Car A = total distance/ total time = 0.7 km/ 30 s =0.0233 km/s (to 3.s.f.)	 1 1	Minus ½ if final answer does not have units ECF for total distance Minus ½ mark if the final answer is not given in 1.d.p/ 2.d.p / 3.s.f

5c	Time taken for Car *B* to reach point Y = 30 s Speed of Car A for the first 10 s = 0.4/ 10 =0.04 km/s Time taken for Car A to reach point Y at a speed of 0.04 km/s = 0.7/0.04 = 17.5 s Car A would have reached point Y faster than Car B if it did not change its speed.	 1 1 1	Minus ½ if final answer does not have units
6	Least pressure would be largest possible contact area. Largest possible contact area = 11 x 6 = 66 cm^2 Force = 100 x 10 = 1000 N The least amount of pressure exerted = 1000/ 66 =15.2 N/cm^2 Or 152000 N/m^2	 1 1 1	Minus ½ if final answer does not have units Minus ½ mark if the final answer is not given in 1.d.p/ 2.d.p / 3.s.f
Section B (40 marks)			
7a	First class lever The **fulcrum is in the middle of the effort and load**.	1 1	Words in bold are keywords
7b	Clockwise moments = Anticlockwise moments Clockwise moments = 2 x 800 = 1600 Nm Anticlockwise moments = 5 x Weight of Sammy Minimum weight of Sammy = 1600/ 5 = 320 N	 1 1 1	Minus ½ if final answer does not have units
7c	Work done against gravity = 800 x 1.5 =1200 Nm or 1200J	 1 1	Minus ½ if final answer does not have units J is accepted

7d	No **The distance moved in the direction of the force is constant and the force/ weight of rice is constant.**	1 1	No ½ mark awarded
7e.		1	The arrow is the bold black arrow as seen, must be vertically down. No marks for wrong direction of arrow of force.
8a	Taking balance K as the pivot: Clockwise moments = 80 x 20 = 1600 Ncm Anticlockwise moments = Force at L x 150 Force at L = 1600/ 150 =10.7 N (to 3.s.f.) Taking balance L as the pivot: Clockwise moments = Force at K x 150 Anticlockwise moments = 80 x 130 =10400 Ncm Force at K = 10400/ 150 =69.3 N (to 3.s.f.)	1 1 1 1	Minus ½ if final answer does not have units Minus ½ mark if the final answer is not given in 1.d.p/ 2.d.p / 3.s.f
8b	Taking balance K as the pivot: Clockwise moments = (90 x 75) + (20 x 80) = 8350 Ncm Anticlockwise moments = Force at L x 150 Force at L = 8350/150 =55.7 N (to 3.s.f.)	1 1	Minus ½ if final answer does not have units Minus ½ mark if the final answer is not given in 1.d.p/ 2.d.p / 3.s.f
8ci	Work done = 90 x 14 = 1260 Nm or 1260J	1 1	Minus ½ if final answer does not have units

8cii	The weight is **acting downwards** not against friction but against gravity. Hence it is **not acting in the same direction** as the distance moved against friction.	1 1	Words in bold are keywords
9a	Time taken = 4h Distance travelled by Mr Tan = 75 x 4 = 300 km Distance travelled by his friend = 120 x 4 =480 km Distance between home and police station = 480 + 300 = 780 km	 1 1 1	Minus ½ if final answer does not have units
9b	Distance between home and office = 300 km Time taken to travel to office = 300/ 120 = 2.5 h Amount of time earlier = 4 − 2.5 = 1.5 h	1 1 1	Minus ½ if final answer does not have units 1h 30 min/ 90 min also accepted
9c	**ANY TWO (1 mark each)** Change the **shape** of an object Change the **size** of an object Change the **state of rest** of an object Change the **speed** of a **moving object** Change the **direction** of a **moving object**	2	Words in bold are keywords
9d	Force = 70 x 10 = 700N Area =,220 x 2 =440 cm² Pressure = force/ area = 700/ 440 =1.59 N/cm² (to 3.s.f.)	½ ½ 1	Minus ½ if final answer does not have units Minus ½ mark if the final answer is not given in 1.d.p/ 2.d.p / 3.s.f
10a	The iodine solution will **remain brown**. **Light energy/sunlight is required** for photosynthesis. Hence **photosynthesis did not take place and starch was not**	1 1 1	Words in bold are keywords

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	produced.		
10b	Yes the leaf is an organ.	1	Words in
	The leaf is made up of **different tissues**.	½	bold are
	Example; epidermal tissue and vascular tissue **(Min. one e.g.)**	½	keywords
	Each tissue is made up of **similar cells**.	½	
	Example; epidermal tissue is made up of epidermal cells. **(Min. one e.g.)**	½	
10ci	It is a plant cell.	1	Words in bold are keywords
	ANY TWO (1 mark each)	2	
	Contains **cell wall**		
	Has **chloroplasts**		
	Has a **central large vacuole**		
10cii	Leaf	1	
11a	**Eco-Pond**	1	Words in
	More dissolved oxygen	1	bold are
	More light for photosynthesis	1	keywords
11b	**Cell wall present** in guard cell and absent in nerve cell.	1	Words in
	Central large vacuole present in guard cell and absent in nerve cell.	1	bold are keywords
	Chloroplasts present in guard cell and absent in nerve cell.	1	
11ci	Nucleus	1	
11cii	**Control centre** for chemical reactions	1	Words in
	Repairs worn-out parts	1	bold are
	Responsible for **cell division/ cell reproduction**	1	keywords

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Marks	
	/ 100

MID-YEAR EXAMINATION 2012

Name of Pupil	:	_____ ( )
Class	:	_____
Subject / Code	:	Science
Level	:	Sec 1 Express
Date	:	9th May 2012
Duration	:	2 hours
Setter	:	Mdm Meenu

INSTRUCTIONS TO CANDIDATES
Write your name, class and class register number in the spaces provided on the cover page.

Section A
For each question there are four possible options A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate Optical Answer Sheet provided.

Section B and Section C
Answer all the questions.
Write your answers in the spaces provided on the question paper.

INFORMATION FOR CANDIDATES
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 100. Calculators are allowed in this paper.

Section A	(30)	
Section B	(30)	
Section C	(40)	
Total	(100)	

This question paper consists of **25** printed pages, including this cover page

Section A [30 marks]
For each question there are four possible options A, B, C and D. Choose the one you consider correct and record your choice in soft pencil on the separate Optical Answer Sheet provided.

1   Which one of the following apparatus is used to separate an insoluble substance from a soluble substance?

    A   boiling tube

    B   filter funnel

    C   pipette

    D   test tube

2   Which of the following hazardous symbols should be used for a chemical that is both harmful and explosive?

    A   i and ii

    B   i and iii

    C   ii and iv

    D   iii and iv

3   Which part of the Bunsen burner is adjusted to open or close the air-hole?

    A   barrel

    B   collar

    C   gas jet

    D   gas pipe

2

4 Which of the following best describes a non-luminous flame?

A blue-green in colour, producing a noise
B orange in colour, very hot
C orange in colour, producing a lot of soot
D pale blue in colour, not easily seen

5 Which of the following has the greatest amount of matter?

A 1000 mg of gold
B 1 kg of rice
C 10 000 g of meat
D 10 000 mg of feathers

6 What is the reading shown by the electronic stopwatch below?
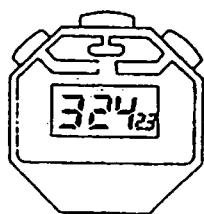
A 3 minutes and 24.23 seconds
B 3 minutes and 24.24 seconds
C 6 minutes and 15.4 seconds
D 6 minutes and 45.4 seconds

3

7   The following diagram shows an irregular shape.

2 cm

2 cm
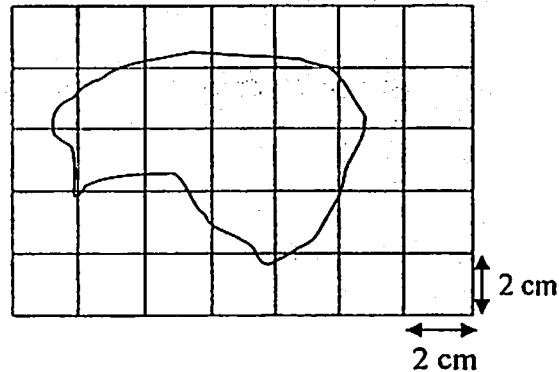
The approximate area of the irregular figure would be _____.

A   5 cm^2

B   10 cm^2

C   20 cm^2

D   40 cm^2

8   The diagram below shows an experiment in which two solids, P and Q were
dropped into two liquids, X and Y. Which of the following statements is true?
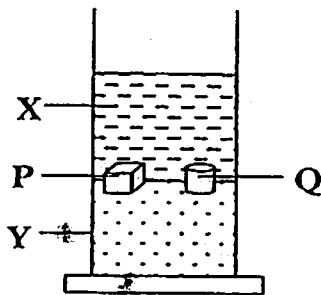
A   Liquid X is denser than solid P.

B   Liquid Y is denser than solid Q.

C   Solid P is denser than liquid Y.

D   Solid P and liquid X must have the same density.

4

9   The table below shows the results of an experiment in which X is placed in four different liquids. What could be the density of X?

liquid	density of liquid (kg/m³)	observation
mercury	1400	floats
seawater	1100	sinks
distilled water	1000	sinks
paraffin	700	sinks

A   between 1100 kg/m³ and 1400 kg/m³

B   between 1000 kg/m³ and 1100 kg/m³

C   exactly 1100 kg/m³

D   exactly 1000 kg/m³

10   The diagram below shows a cubic aluminum block measuring 4 cm on each side and it has a mass of 768 g. What is the density of the cubic aluminium block?

4 cm

4 cm

4 cm
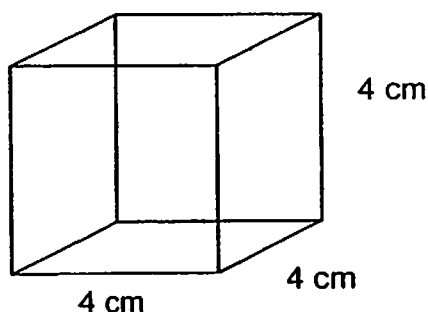
A   12 g/cm³

B   14 g/cm³

C   16 g/cm³

D   18 g/cm³

5

00244

11 A small piece of metal with a volume of 50 cm^3 and a mass of 100 g was placed completely submerged in a container of an unknown liquid. It was found that the metal floated in the middle of the unknown liquid. Which of the following statements correctly explain the observation?

        i.   The metal and the unknown liquid have similar densities.
        ii.   The unknown liquid has an approximate density of 2.0 g/cm^3.
        iii.   The metal is denser than the unknown liquid.
        iv.   The metal is less dense than the unknown liquid.

A   i and ii

B   i and iv

C   ii and iii

D   ii and iv

12 Diamond is used as a cutting tool because _____.

A   it has a high melting point

B   it is a poor conductor of electricity

C   it is one of the hardest substance known

D   it is heat resistant

13 Imagine that you are an engineer in an aircraft factory. You have to develop a new material for aircraft bodies. Which of the following physical properties should your new material have ?

A   It must be heavy and hard.

B   It must have low density and be strong.

C   It must have low density and have high elasticity.

D   It must be shiny and a good conductor of electricity.

6

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14 A bag that is made of a material of high _____ can carry a heavy load without giving way.

    A   density
    B   flexibility
    C   melting point
    D   strength

15 The base of the cooking pans are always made up of metals because

    _____.
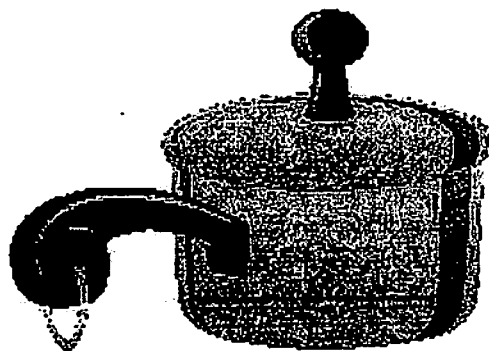
    A   metals are good conductors of electricity
    B   metals are shiny
    C   metals are good conductors of heat
    D   metals are malleable

7

16 Which of the following materials is wrongly classified?

	material	classification
A	blanket	fibre
B	comb	ceramic
C	key	metal
D	yoghurt cup	plastic

17 Which of the following scenarios is caused by gravitational force?

A   a rise in level of the swimming pool

B   a car moving up a slope

C   a parachutist descending towards the ground

D   a rocket taking off on earth

18 An astronaut weighs lighter on moon's surface than on earth's surface. Which of the following statements is **false**?

A   The weight of the astronaut is caused by non-contact forces acting on him.

B   The gravitational force is stronger on Earth than on moon.

C   The lighter weight on moon is caused by the reduction of his mass.

D   The astronaut experiences gravitational pull on both Earth and moon.

19 Which of the following demonstrates nuisance caused by friction in our daily lives?

A   climbing the stairs

B   lighting a matchstick

C   heat generated in the moving parts of a machine

D   writing a memo on a paper

8

20 Which of the following cannot be changed by a push or pull acting on the object?

    A   mass of an object

    B   size of an object

    C   shape of an object

    D   speed of an object

21 Which of the following forces can be exerted on an object without requiring physical contact?

    A   air resistance

    B   frictional force

    C   magnetic force

    D   tensional force

22 The cube weighs 50N and exerts a pressure of 102 N/ m^2 on the ground. What is the measurement of r in cm?
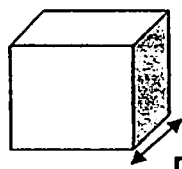
    A   55 cm

    B   70 cm

    C   103 cm

    D   143 cm

23 The diagram below shows four different shapes of objects of different weight resting on a horizontal surface. Which of the following figure would exert the highest pressure on the surface? (Take $\pi = \frac{22}{7}$)
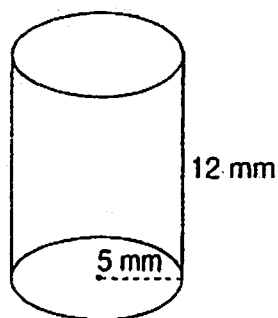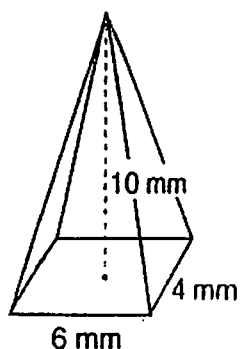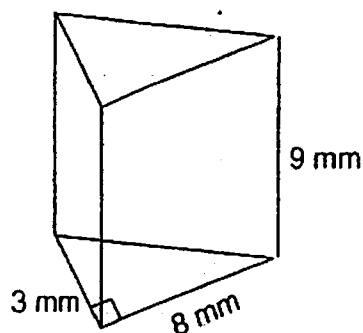
| Figure A | Figure B | Figure C | Figure D |
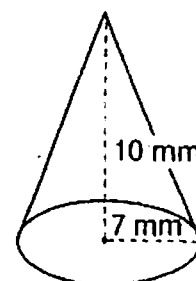
24 A metal is used to raise a large stone as shown below. At which position should the force be applied for the least effort required to move the stone?
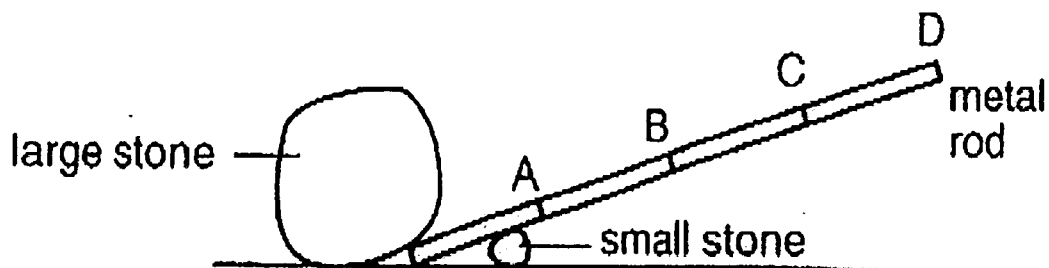
25 The diagram below shows a wheel barrow. Identify the location of the pivot when it is being lifted to move.

10
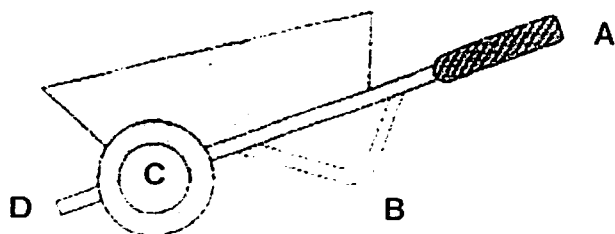
26 Which of the following combinations shows an element, a compound and a mixture?

A   air, water, petroleum

B   argon, neon, helium

C   neon, seawater, sugar

D   water, carbon dioxide, sugar

27 How many elements does magnesium carbonate ($MgCO_3$) contain?

A   2

B   3

C   4

D   5

28 Which of the following shows the correct symbols of copper, barium and magnesium?

	copper	barium	magnesium
A	Co	Ba	Ma
B	Cu	Ba	Mg
C	Co	Ba	Mg
D	Cu	Br	Mg

29 When magnesium is burnt in air, _____ is formed.

A   an alloy

B   a compound

C   a mixture

D   a new element

11

30 Which of the following is/are compound?
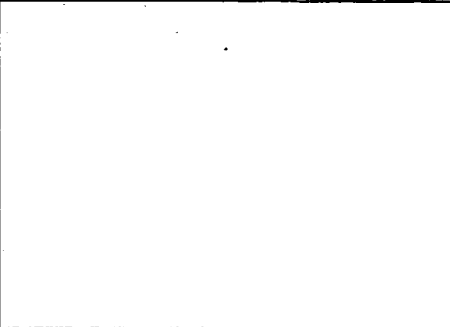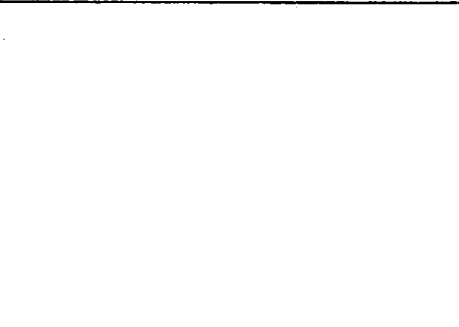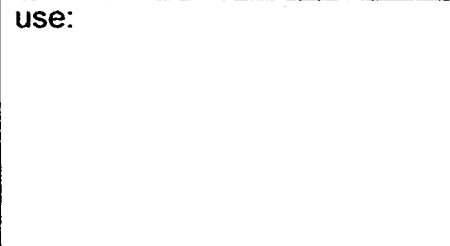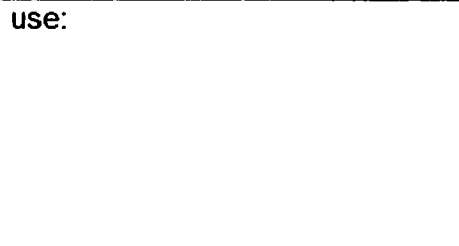
       (i) water
       (ii) carbon
       (iii) oxygen
       (iv) steel

A   (i)

B   (ii), (iii)

C   (i),(iv)

D   (ii),(iii) and (iv)
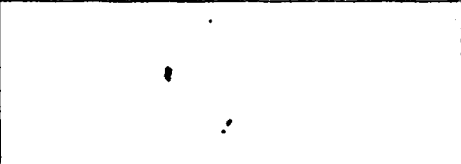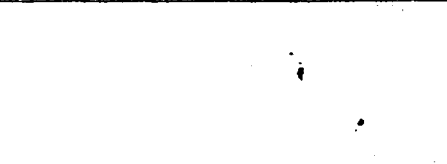
Section B [30 marks]
Answer all the questions in the spaces provided.

1   (a)   Draw the sectional diagram of the following apparatus and state
          one use for each of them.   [4]

retort stand	beaker
use:	use:

(b)   State 3 differences between a luminous flame and a non-
       luminous flame.   [3]

luminous flame	non-luminous flame

13

(c)   Andrew is doing some experiments in the laboratory.

What is the type of flame Andrew can use to boil a test tube of water? Give a reason why this flame is used.   [2]
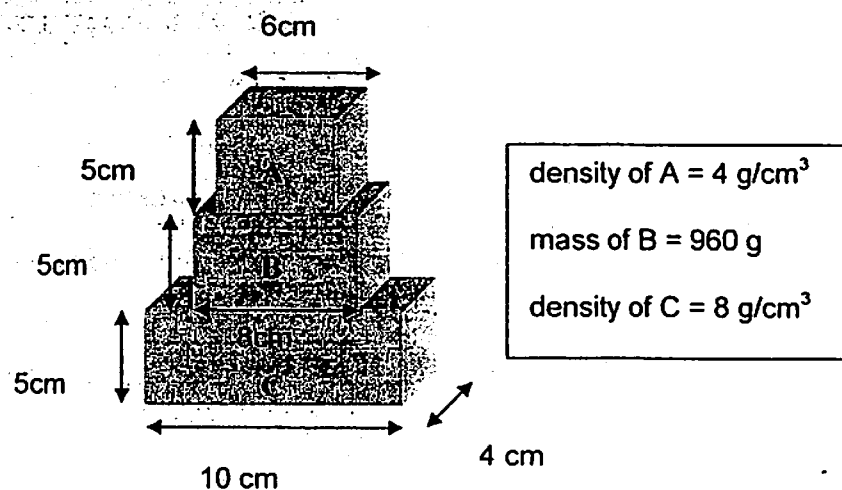
_____

_____

2   Convert the following measurements into the respective units.   [2]

(a)   37 cm   =   _____ mm

(b)   0.05 m   =   _____ cm

(c)   1250 ml   =   _____ l

(d)   2 km   =   _____ m

14

3. The figure below shows a toy that is made up of 3 cuboids of three different materials.

density of A = 4 g/cm³

mass of B = 960 g

density of C = 8 g/cm³

6cm

5cm

5cm

5cm

10 cm

4 cm

(a) Define density. [1]

_____

(b) Using the information above, calculate the total volume of the toy. [2]

(c) What is the total mass of the toy? [3]

(d) Hence calculate the overall density of the toy. [2]

(e) If you accidently dropped the toy in a beaker of water, would it float or sink in water? Give a reason for your answer. [2]

_____

15

4   Moh's scale of hardness is a scale used to classify the hardness of matter.
It goes from 1 to 10. The higher the number, the harder the substance is.
Hence, the hardest substance will be given 10 and the softest will be given 1
on the Moh's scale.

The table below shows a list of substances and their respective hardness on
Moh's scale. Study the table carefully and answer the following questions.

substance	moh's scale
talc	1
fingernail	2
$1 coin	3
steel	6
quatz	8
diamond	10

(a)   What is meant by "hardness"?

_____

(b)   Which substance will be scratched by all the other substances
listed in the table above?

_____

(c)   Mary has a piece of plastic that she thinks has a hardness of
can she do to check if she is correct?

_____

_____

16

5　Classify the objects according to the type of materials they are made of:

[5]

(a)

(b)

(c)

_____

_____

_____

(d)

(e)

_____

_____

Section C [40marks)
Answer all the questions in the spaces provided.

1 An unknown oily liquid, X, has been found floating on a river at the Sungei Buloh marsh reserve.

You have been tasked to determine the density of the oily liquid X.

(a) (i) State the two physical quantities you need to know to find the density of the liquid X. [2]

_____

(ii) Describe briefly the steps taken to find the density of the liquid X. [3]

_____

_____

_____

_____

(iii) You have discovered that liquid X has a special property. Liquid X floats on water at room temperature of about 30°C. But when it is cooled down to a temperature of 24°C, it sinks in water. The density of water is 1.0g /cm³.

What can you deduce about the density of liquid X when its temperature is below 24°C? [2]

_____

_____

_____

18

(b)   The table below shows the densities of some substances.

substance	solid/ liquid	density in g/ cm³
alcohol	liquid	0.80
turpentine	liquid	0.90
water	liquid	1.00
mercury	liquid	13.60
cork	solid	0.25
ice	solid	0.92
aluminium	solid	2.70
copper	solid	8.90

(i)   Name one solid which floats in turpentine.   [1]

_____
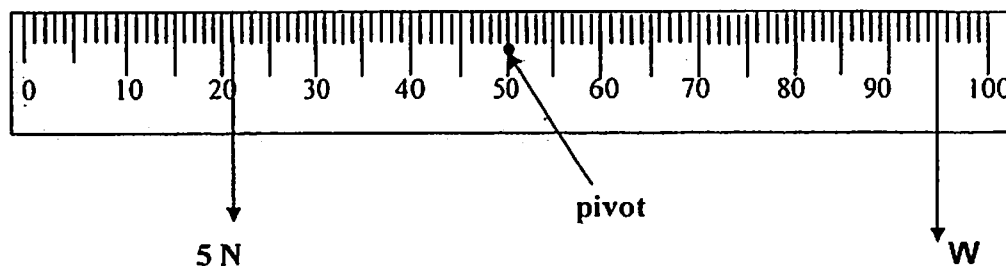
(ii)   Name one liquid that sinks in water.   [1]

_____

(iii)   Name one solid that floats in mercury but sink in water.   [1]

_____

19

2   (a)   A uniform metre rule balances horizontally on a pivot at its mid-point when a weight of 5 N is suspended on the left side of the rule and a weight W is suspended on the right side of the rule as shown in the diagram.

5 N   W
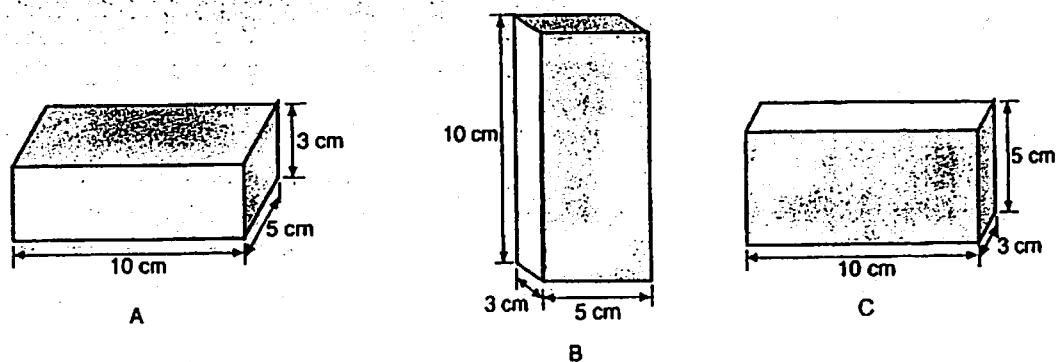
(i)   Calculate W. Show your working clearly.   [2]

(ii)   The weight of 5 N is decreased to 2 N. Should the weight, W be shifted towards or away from the pivot in order the ensure that the metre rule is balanced?   [1]

(iii)   Calculate the new position of the weight, W, on the scale of the metre rule such that the metre rule is balanced.   [2]

20

(b)   A brick of 150 N was placed in three different positions A, B and C as shown in the diagrams below.

A

B

C

Calculate the pressure exerted by the brick on the ground in the three different positions A, B and C. Show your working clearly below.

[3]

(c)   Explain the following scenarios:

(i)   why a person is able to lie on a bed of nails,   [1]

_____

_____

_____

(ii)   but, a sharp nail will poke through the sole of his shoe.   [1]

_____

_____

21

3 (a) (i) Define **electrical conductivity** of a material. [1]

_____

(ii) Describe how you would investigate the electrical conductivity of object A made of an unknown material. List all the apparatus you would use. [4]

List of apparatus: _____

_____

Procedure: _____

_____

_____

_____

(b)   Glass is a useful material used in many objects in our daily lives. For example, many of us wear spectacles with lenses that are made of glass. Plastics are an alternative material for making the lenses of spectacles.

(i)   Write down two properties that glass possesses which makes it a suitable material for spectacle lenses.   [2]

_____

_____

(ii)   State if glass is a solid, liquid or gas at room temperature.   [1]

_____

(iii)   State one advantage and one disadvantage of using plastics instead of glass in making spectacle lenses.   [2]

Advantage:

_____

Disadvantage:

_____

23

4   (a)   Define 'element'.   [1]

        (b)   Study the chemical formula of a substance shown below.

$$Na_3PO_4$$

             (i)   Name the elements in this compound.   [2]

             (ii)   Which of the elements in this compound is a metal?   [1]

             (iii)   What is the ratio of the constituents in this compound?   [2]

24

(c)   The diagram below shows the positions of the elements W, X, Y and Z in
the periodic table.

I	II												III	IV	V	VI	VII	VIII
																		Y
X																	Z	
										W								

(i)   Which two elements conduct electricity?   [2]

_____

(ii)   Classify the elements W, X, Y and Z into metals and non-
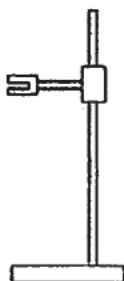metals.   [2]

_____

_____

25

SECTION A – MULTIPLE CHOICE QUESTIONS: [30 MARKS]

1	B	6	A	11	A	16	B	21	C	26	C
2	C	7	D	12	C	17	C	22	B	27	B
3	B	8	B	13	B	18	C	23	C	28	B
4	D	9	A	14	D	19	C	24	D	29	B
5	C	10	A	15	C	20	A	25	C	30	A

SECTION B – STRUCTURE QUESTION [30 marks]

1	(a)		retort stand	beaker	
					[2]
			use: To hold apparatus during experiment. Do not accept hold test tube or hold beaker.	use: To contain or hold chemicals and liquids. Do not accept measure volume of water.	[2]

	(b)		luminous flame	non-luminous flame	
			yellow/ orange in colour	blue in colour	[1]
			produces a lot of smoke and soot	produces little/ no smoke or soot	[1]
			unsteady flame	steady flame	[1]

Air hole closed   Air hole opened can accept

Do not accept luminous flame is blue and orange as the students never specify whether its inner cone or outer cone.

	(c)	Non-luminous flame.	[1]
		As it is hotter than luminous flame. (OR)	[1]
		It is steady.	
2	(a)	370	[1/2]
	(b)	5	[1/2]
	(c)	1.25	[1/2]
	(d)	2000	[1/2]
3	(a)	The density of a substance is the mass of the substance per unit volume. Do not use formula density= mass/volume	[1]
	(b)	Volume of A = 5 x 6 x 4 = 120 cm^3	[1/2]
		Volume of B = 5 x 8 x 4 = 160 cm^3	[1/2]
		Volume of C = 5 x 10 x 4 = 200 cm^3	[1/2]
		Total volume of the toy = 120 + 160 + 200 = 480 cm^3	[1/2]
		-1/2 mark if no units given for volume of A,B and C	
	(c)	Mass of A = 4 x 120 = 480g	[1]
		Mass of C = 8 x 200 = 1600g	[1]
		Total mass of toy = 480 + 960 + 1600 = 3040g	[1]
		-1/2 mark if no units given for volume of A,B and C	
	(d)	Overall density of toy =overall mass/ overall volume	[1]
		= 3040g / 480 cm^3 = 6.33g / cm^3	[1]
		Can have ecf	
	(e)	It will sink.	[1]
		As its density is more than water.	[1]
4	(a)	Hardness of a material is its ability to scratch another material.	[1]
	(b)	Talc	[1]

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	(c)	She should scratch it with steel and quartz.	[1]
		If the plastic scratches steel and gets scratched by quartz it is of hardness 7.	[1]
5	(a)	metals	[1]
	(b)	fibres	[1]
	(c)	glass	[1]
	(d)	ceramics	[1]
	(e)	Plastics For all these questions -1/2 if wrong spelling	[1]

SECTION C – STRUCTURED QUESTIONS [40 marks]

1				
	(a)			
		(i)	Mass	[1]
			volume	[1]
		(ii)	Find the volume of liquid X using a measuring cylinder.	[1]
			Find the mass of liquid X using an electronic balance.	[1]
			Calculate the density which is the mass of the object divided by the volume of the object.	[1/2] [1/2]
	(b)	Its <u>density is more</u> than <u>water</u> at temperature below 24°C.		[2]
	(c)	(i)	cork	[1]
		(ii)	mercury	[1]
		(iii)	copper (OR) aluminium	[1]
2	(a)			
		(i)	5X 0.29= W X 0.45 W=3.22N Student may give answers in cm 5x29=Wx45 W=3.22N	[1] [1]

		(ii)	W should be shifted towards the pivot in order to ensure that the metre rule is balanced.	[1]
		(iii)	2 x 0.29 = 3.22 x L L = 0.18 m New Position = 0.68 m **OR** **2x29=3.22 x L** **L= 18.0cm** **New position = 50+ 18.0=68.0cm** ***Students may give answers in cm provided the value is correct.***	[1] [1/2] [1/2]
(b)			Pressure exerted in position A = 150 / 0.005 = 30000 N/m^2 or Pa **if ans is in cm then** 150/50= $3N/cm^2$ Pressure exerted in position B = 150 / 0.0015 = $100000N/m^2$ or Pa **if ans is in cm then** 150/15= $10N/cm^2$ Pressure exerted in position A = 150 /0. 003 = 50000 N/m^2 or Pa **if ans is in cm then** 150/30=$5N/cm^2$ ***Students may give answers in N/cm^2 or Pa if they get the correct value and do not convert the dimensions of block in cm to m.*** ***-1/2 m for no unit or wrong unit.***	[1] [1] [1]
(c)		(i)	Your body's weight is distributed over dozens or hundreds of nails. There is large contact area on the nails. Hence, the pressure you've put on each individual nail is drastically reduced. Hence no injury.	[1]
		(ii)	If there were only one nail, the entire force created by the weight of the body would be distributed over the very small area presented by the tip of the one nail. In this case, the force per unit area, that is, the ratio of the force to the area, would be very great (because the area is small) and would likely result in	[1]

3	(a)		piercing of the skin, and injury.	
		(i)	It is a measure of how easily electricity can pass through it.	[1]
		(ii)	Apparatus: wires, bulb and dry cell or material A	[1]
			Procedure: Connect the circuit and place the object A such that it closes the circuit.	[1]
			If object A conducts electricity, the bulb will light up .	[1]
			If object A does not conduct electricity, the bulb will not light up.	[1]
			As long as the students are able to describe the procedure give marks.	
	(b)			
		(i)	Transparent and hard/ clear.	[2]
		(ii)	Solid	[1]
		(iii)	Adv: Plastic is not as brittle as glass OR Plastic is light.	[1]
			Dis: Glass is harder than plastic which makes the lens more scratch resistant.	[1]
4	(a)		Element is a pure substance which cannot be broken down into simpler substances by chemical methods.	[1]
	(b)			
		(i)	Na- sodium, P-phosphorus, F-fluorine, O- oxygen ½ m if 2 correct 1 m if 3 correct 2 m if all 4 correct	[2]
		(ii)	sodium	[1]
		(iii)	The ratio of Na: P: O= 3: 1 : 4 1m if student write 3:1	[2]

	(c)			
		(i)	X and W	[2]
		(ii)	Metals: X and W.	[1]
			Non –metals: Y and Z.	[1]

END

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