8

Name	Index Number	Class

JURONG SECONDARY SCHOOL
2016 MID YEAR EXAMINATION
Secondary 2 Express

Science (Physics)

10 May 2016

Total Duration: 2 hours

READ THESE INSTRUCTIONS FIRST

Write neatly using a ballpoint pen either in dark blue or black. (Neither a pencil nor a highlighter is to be used.)

All diagrams or labelling must be drawn neatly and clearly with a pencil (except words must be written with a ball pen)

Each question in Section A has **4** possible answers. Select the most suitable answer and write **A**, **B**, **C** or **D** in the boxes provided on page 6.

For questions in Section B and C, answer **all** questions on the lines/spaces provided.

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

For Examiner's Use	
Section A	10
Section B	14
Section C	10
Sub-Total	34

This paper consists of 12 printed pages including this cover page.

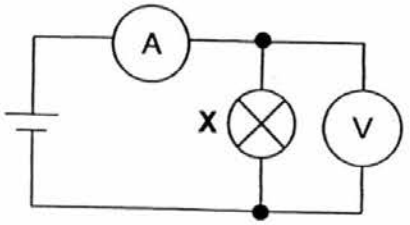
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Section A: Multiple Choice Questions (10 marks)

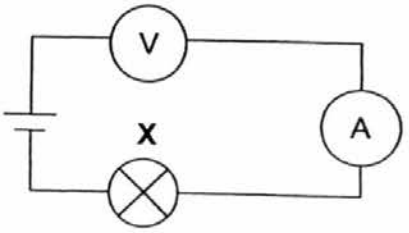
Each question in Section A has 4 possible answers. Select the most suitable answer and write A, B, C or D in the boxes provided on page 6.

1 Which of the following set-ups **cannot** be used to determine the resistance of bulb **X**?

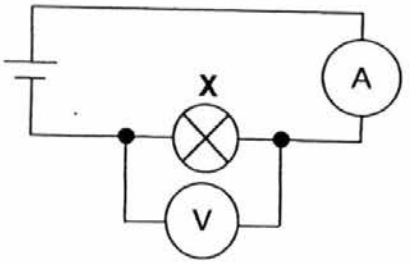
A



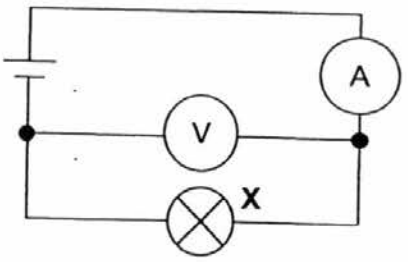
B



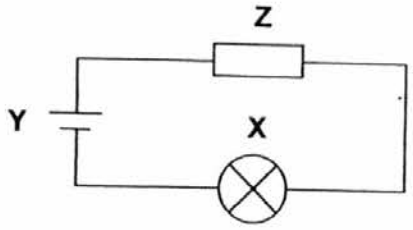
C



D



2 The figure below shows a circuit with three electrical components, **X**, **Y** and **Z**.



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

A **X** converts light energy into electrical energy.

B **Y** converts electrical energy into light energy.

C **X** and **Z** converts electrical energy into other forms of energy.

D **Y** and **Z** converts thermal energy into other forms of energy.

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3 What would happen if a 3 A fuse in an appliance is replaced with a 5 A fuse?

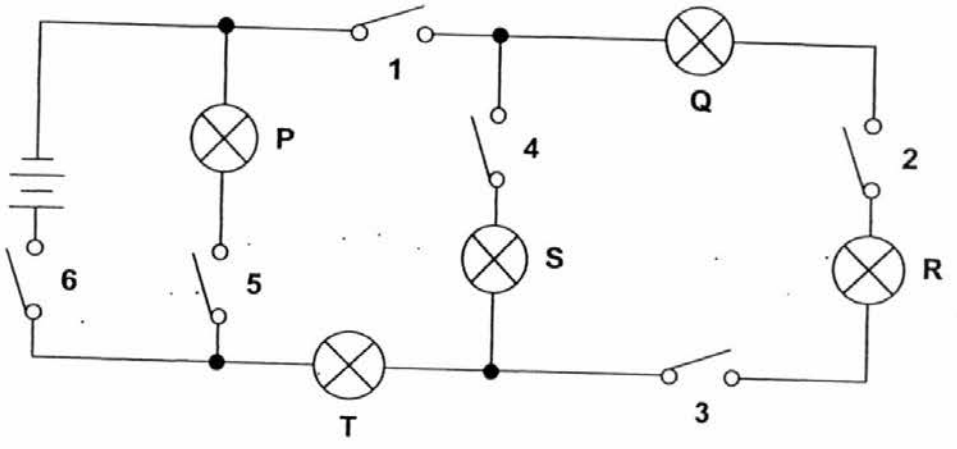
A The appliance would become more dangerous to use.

B The appliance would not work.

C More current would flow through the appliance.

D The user would be better protected against electric shock.

4 Which of the following switches should be closed for bulbs **P** and **R** to light up?



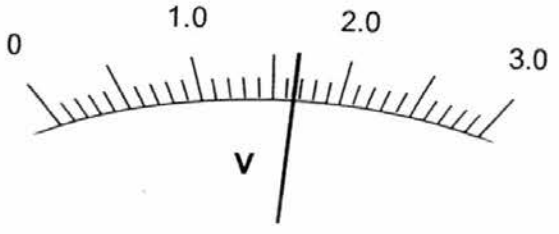
A 1, 4, 5 and 6

B 1, 2, 3, 4 and 6

C 1, 2, 3, 5 and 6

D 1, 2, 3, 4, 5 and 6

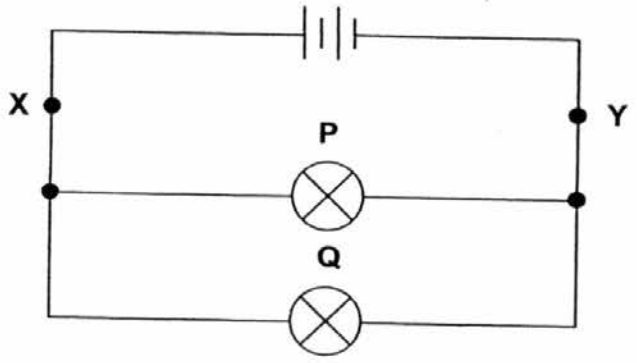
5 What is the reading of the meter in the figure below?



A 1.55 V **B** 1.60 V **C** 1.65 V **D** 1.70 V

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6 A student sets up a circuit as shown in the figure below. Both bulbs, **P** and **Q**, light up.



He then joins points **X** and **Y** with a wire.

What will he observe?

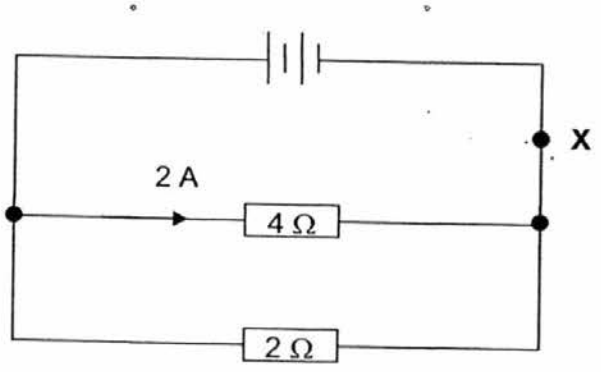
A Both bulbs continue to light up.

B Only bulb **P** lights up.

C Only bulb **Q** lights up.

D Both bulbs do not light up.

7 The figure below shows a circuit. The current flowing through the 4 Ω resistor is 2 A.



What are the possible values of current flowing through the 2 Ω resistor and point **X**?

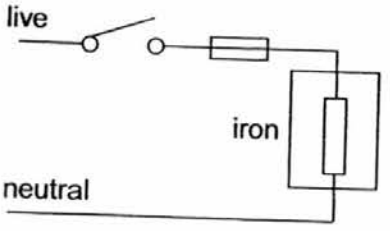
	current through 2 Ω resistor / A	**current through X / A**
A	1	4
B	1	6
C	4	4
D	4	6

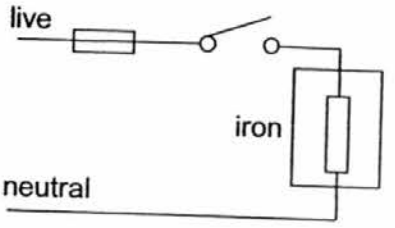
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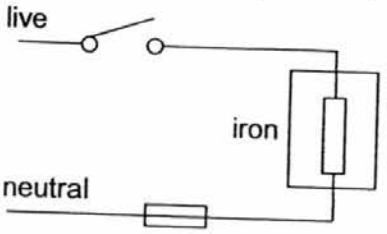
8 Which of the following protects users from electric shock when using an electrical appliance?

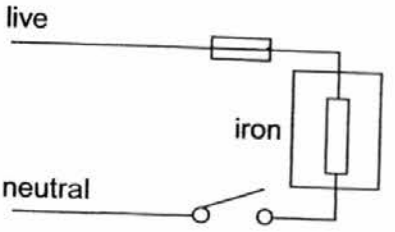
A switch
B earth wire
C neutral wire
D live wire

9 Which of the following set-ups shows the **correct** placement of the switch and the fuse connected to an electric iron?

A


B


C


D


10 Which of the following is **true** about electric current?

A An electric current consists of moving charges.
B An electric current consists of moving atoms.
C An electric current consists of moving electrons.
D An electric current consists of moving protons.

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Question	1	2	3	4	5	6	7	8	9	10
Answer										

Section B – Structured Questions (14 marks)

Answer all questions and show all relevant workings on the spaces provided.

11 A student set up a circuit with two identical bulbs, **X** and **Y**, as shown in Fig. 11.1. The ammeter reading is 0.6 A.

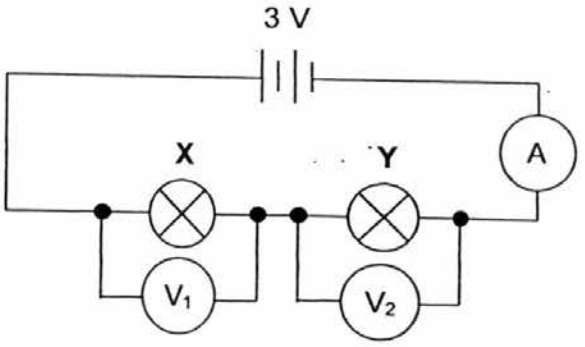


Fig. 11.1

(a) State what are the readings on the two voltmeters. Show your working clearly.

V_1 = _____

V_2 = _____ [1]

(b) State what is the current flowing through each bulb. Explain your answer.

_____

_____ [1]

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(c) The student then removes bulb **Y** from the circuit as shown in Fig. 11.2.

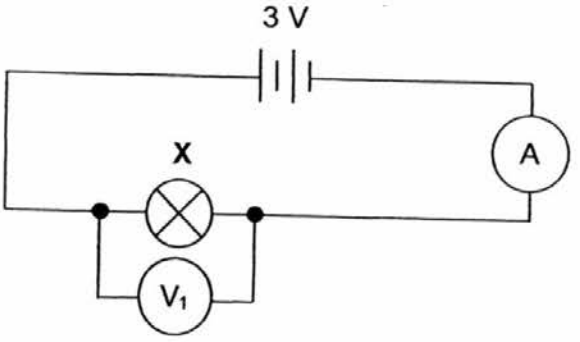


Fig. 11.2

State how the ammeter reading changes. Explain your answer.

_____

_____ [2]

12 Fig. 12.1 shows three identical light bulbs. You are given two dry cells and a switch.

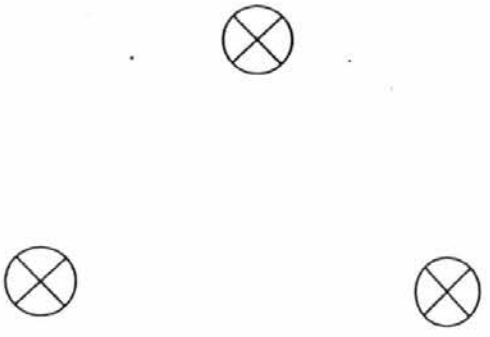


Fig. 12.1

On Fig. 12.1 above, draw a closed circuit diagram such that

(a) when one of the bulbs fails, the other two will remain lighted; [2]

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(b) by using an electrical component, the brightness of the bulbs can be varied, and [1]

(c) by using another electrical component, the total potential difference of the circuit can be measured. [1]

13 Fig. 13.1 shows several dangerous uses of electrical appliances in the kitchen.

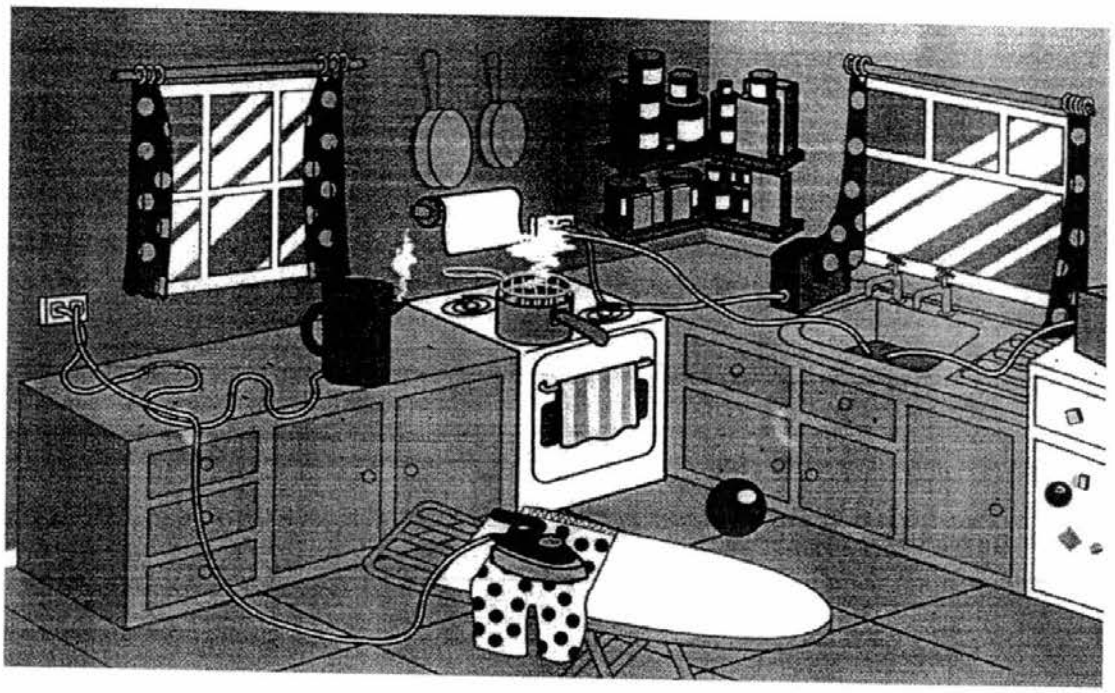


Fig. 13.1

On Fig. 13.1, circle **two** dangerous uses of electrical appliances and complete Table 13.2.

Table 13.2

	situation	electrical hazard	one safety precaution to take
(i)			
(ii)			

[3]

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14 Fig. 14.1 shows the circuit diagram of an electric bell.

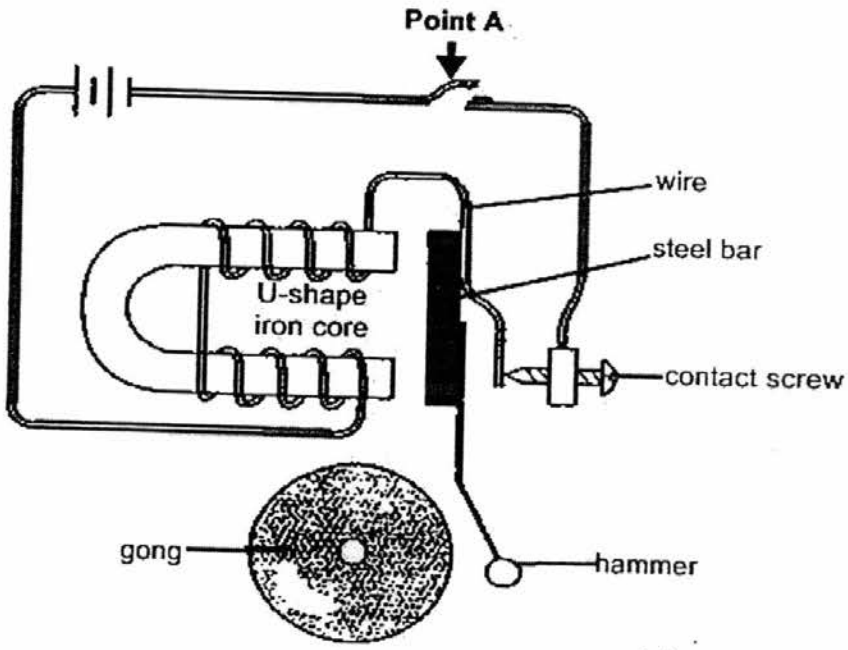


Fig. 14.1

When point **A** is pressed downward, current flows and the hammer will strike the gong.

(a) State the effect caused by the current which allows the hammer to strike the gong.

_____ [1]

(b) On Fig. 14.1, label the direction of the conventional current flow with an arrow. [1]

(c) State one method to increase the force in which the hammer strikes the gong.

_____ [1]

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Section C: Free-Response Questions (10 marks)

Answer all questions on the spaces provided. Show all relevant workings.

15 Fig. 15.1 shows a bar chart of the electrical energy consumption for four families living in 4-room HDB flats for the month of April 2016.

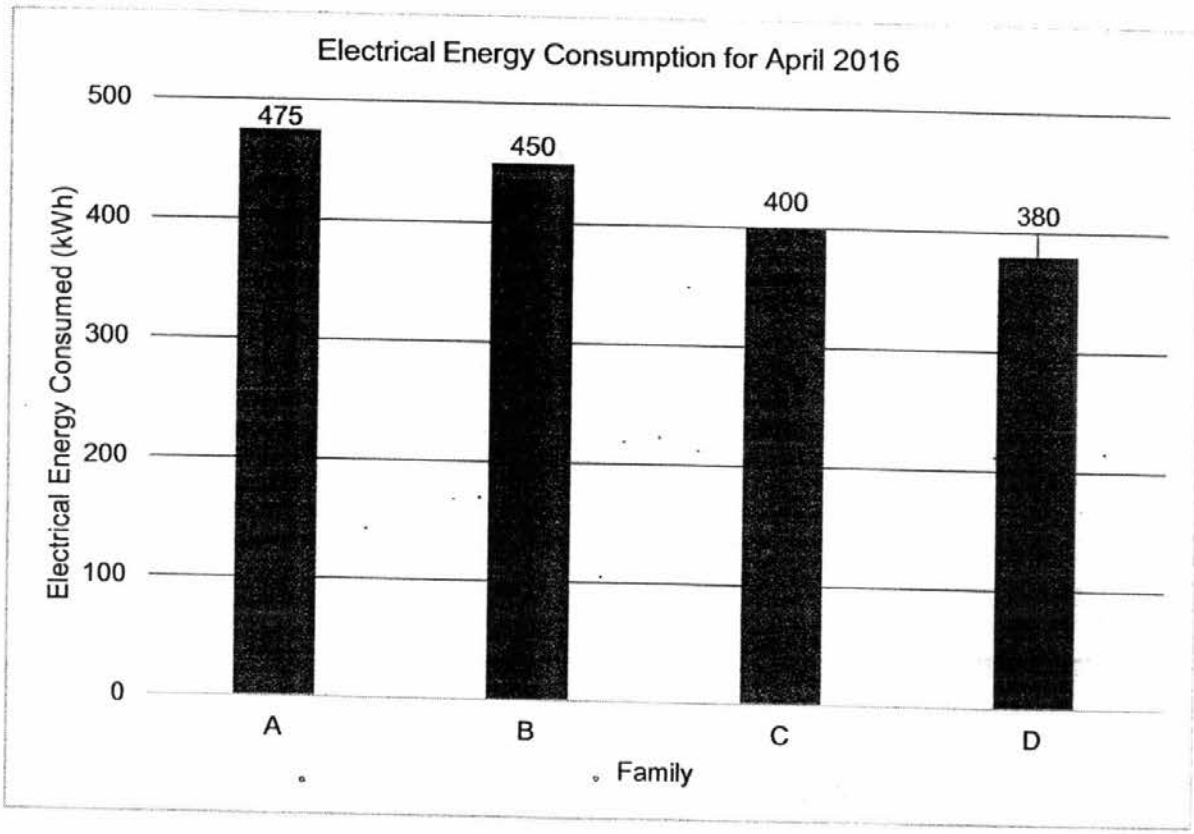


Fig 15.1

(a) The national average consumption for the 4-room HDB flat is 400 kWh.

(i) State which family or families have electrical energy consumption that fall below the national average.

_____ [1]

(ii) State which family or families have electrical energy consumption that are above the national average.

_____ [1]

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(b) Table 15.2 shows the number of family members in each family.

Table 15.2

Family	A	B	C	D
No. of family members	6	4	5	3

"To check whether a family consumes more electrical energy than the other, we just need to compare their total electrical energy consumption for the month." Comment on the fairness of this statement by using the information in Fig. 15.1 and Table 15.2.

[2]

(c) Suggest **two** electrical energy saving tips for the families when they are using the refrigerator.

[2]

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(d) Another family, **E**, uses the appliances as shown in Table 15.3 for a day.

Table 15.3

Appliance	Power rating	Time used
Refrigerator	0.3 kW	24 hours
Air-conditioner	1 kW	8 hours
4 lights	40 W each	4 hours 30 minutes
Computer	350 W	2 hours 30 minutes

(i) Define what is *power*.

_____

_____ [1]

(ii) Calculate the cost of electrical bill for the month of April (30 days). The unit cost of electrical energy is 25 cents per kilowatt-hour.

Cost = _____ [3]

- End of Paper -

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

Wrong unit, no unit, wrong capitalization of unit: [-1 mark] maximum

Section B – Structured Questions

11 (a) $V_1 = V_2 = 3/2$
$= 1.5$ V

[1]

No working / incorrect working, no mark awarded.

(b) 0.6 A

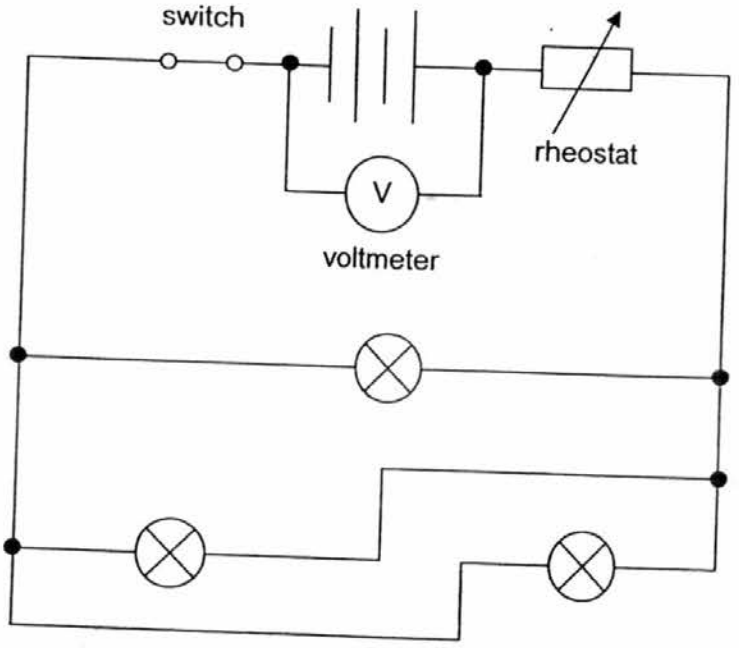
Current at every point in a series circuit is the same. [1]

(c)
- Ammeter reading increases/ ammeter reading is 1.2 A [1]
- When one bulb is removed, total resistance/ effective resistance decreases in a series circuit. [1]

Do not accept: resistance decreases

Note: if the first point is wrong though the second point is correct, zero mark is awarded (wrong concept)

12



[4]

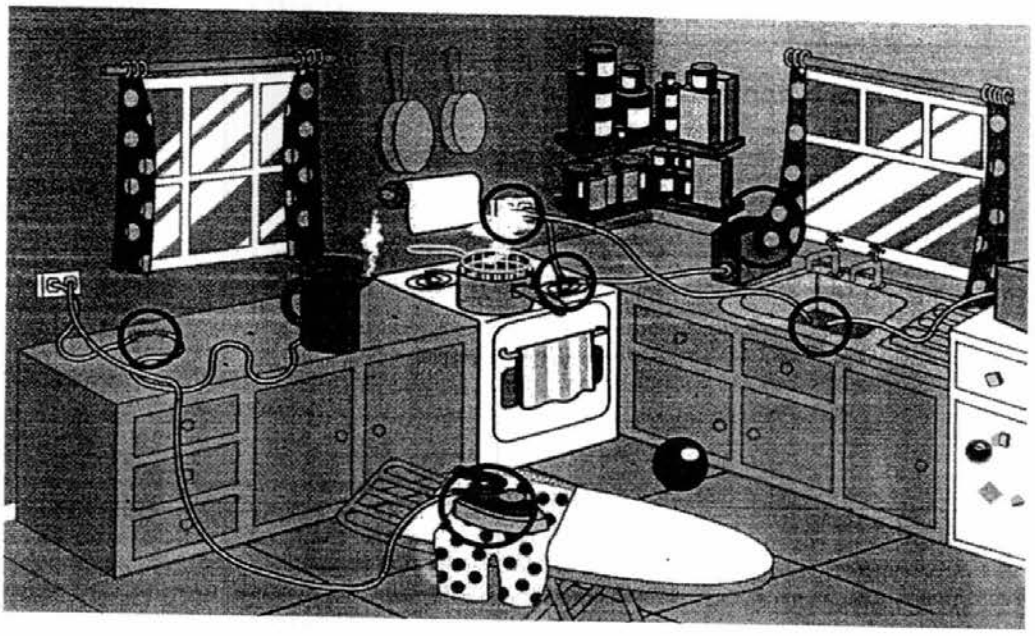
1 mark – bulbs in parallel arrangement (with nodes drawn)
1 mark – closed switch and two batteries connected correctly
1 mark – correct placement and correct circuit symbol of variable resistor/ rheostat

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(accept other possible answers)

1 mark – correct placement and correct circuit symbol of voltmeter (with nodes drawn)

13



	situation	electrical hazard	one safety precaution to take
(i)	Kettle with <u>frayed</u> or <u>damaged</u> <u>wire</u>/ <u>insulation</u> of wire is <u>worn out</u> is still in use	electric shock	Do not use electrical appliances with old or frayed wires. Replace the frayed wires.
(ii)	Wire submerged in water	electric shock	Never use electrical appliances in wet places.
(iii)	Curtain on top / at the opening of toaster	electrical <u>fire</u>	Make sure no object obstructs the operation of electrical appliances.
(iv)	Wire near heat source (insulation of wire may melt and expose wires underneath)	electrical fire / electrical shock	Never place wire near heat source.
(v)	Iron is left turned on / iron on the pants	electrical fire	Do not leave electrical appliances turned on when not in use / left unattended.
(vi)	Water vapour from the pot condenses on the switch	electric shock	Do not operate electrical appliances/ do not use sockets which are near the cooking source when there is cooking. Do not accept: move the cooking away from the nearby sockets.

[3]

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Any two of the situations listed above.

Every 2 correct answers – 1 mark

Note:

- The identification of the danger in the figure must match with the description and must be correct, otherwise no mark is awarded for all 3 columns.

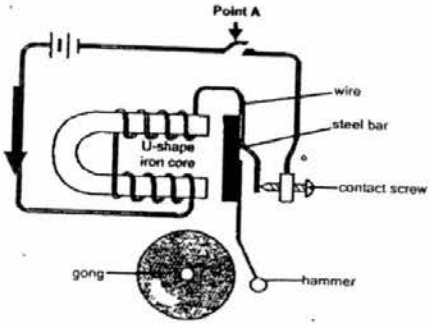
No circling of dangerous use – minus 1 mark

Do not accept:

- food is cooked but gas cooker is not turned off/ pot on the gas cooker left unattended
- kettle is boiling and is left unattended
- kettle is near the edge of the table (not an electrical hazard)
- kitchen paper towel near heat source
- loose wires on the floor may result in tripping over the wires (not an electrical hazard)

14 (a) magnetic [1]

(b)



[1]

(c)
- Increase the number of turns of wire around the U-shape iron core.
- Increase the number of batteries used.
- Increase current.

[1]

Any one of the above.

Accept: stronger battery

Section C – Free-Response Questions

15 (a) (i) D [1]

* no mark awarded for excess

(ii) A and B [1]

* both answers to get 1 mark
* no mark awarded for excess

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(b)

Family	A	B	C	D
Electrical energy consumed per person / kWh	475 / 6 = 79.2	450 / 4 = 112.5	400 / 5 = 80	380 / 3 = 126.7

- Family D consumed the least amount of electrical energy (380 kWh), per person consumption is the highest (126.7 kWh).
- Family A consumed the highest amount of electrical energy (475 kWh), per person consumption is the least (79.2 kWh). [1]

1st mark: comparison between electrical energy per household consumption versus electrical energy per person consumption; must give specific examples

Accept: comparison between
- Family B and Family D
- Family C and Family D
- Family A and Family B
- Family A and Family C

Therefore, statement is not fair as number of family members in the household also plays a part in the amount of electrical energy consumed as could be seen from Family A and Family D. Family A has the lowest electrical energy consumption per person though it has the most number of members compared to Family D which has the highest electrical energy consumption per person though it has the least number of members. [1]

2nd mark: quote specific examples stating that number of family members matter and it will affect the energy consumption per household

Accept:
- Fewer number of family members, yet consumes more electrical energy as a family (e.g. B versus C)
- more number of family members would mean more electrical energy consumed as a family (e.g. A versus B)

(c)
- Set the thermostat in the refrigerator/ temperature to the recommended setting. Overcooling the refrigerator requires more electrical energy.
- Allow hot food to cool before putting it in the refrigerator.
- Do not keep the fridge door open longer than necessary / close the door when not in use.
- Do not fill the refrigerator fully and leave some spaces. [2]
- Minimise the number of times of opening the refrigerator.

Any two of the above.

Do not accept:
- buy energy saving refrigerator
- increase temperature of the refrigerator
- switch off the refrigerator when going overseas

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(d) (i) The amount of <u>electrical energy</u> converted to <u>other forms of energy</u> in <u>one second</u>. [1]

Accept: rate at which energy is used / amount of energy used per second

Do not accept: electricity

(ii) Using E = Pt

Appliance	Power rating	Time used	Electrical energy consumed per day
Refrigerator	0.3 kW	24 hours	7.2 kWh
Air-conditioner	1 kW	8 hours	8 kWh
4 lights	0.04 kW x 4	4.5 hours	0.72 kWh
Computer	0.35 kW	2.5 hours	0.875 kWh

Electrical energy consumed per day = 7.2 + 8 + 0.72 + 0.875
= 16.795 kWh [1]

Total electrical energy consumed for April = 16.795 x 30 (e.c.f)
= 503.85 kWh [1]

Electrical bill = 503.85 x 0.25 (e.c.f)
= $125.96 (to 2 d.p) [1]

Accept: $126

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Name	Index Number	Class

JURONG SECONDARY SCHOOL
2016 Mid-Year Examination
Secondary 2 Express

Science (Chemistry)

10 May 2016

Additional materials: Nil

Total Duration : 2 hours

Read these instructions first

Write your name and index number on the cover page in the spaces provided.

You are only allowed to use a ball pen (either of dark blue or black ink) to write neatly. (Neither a pencil nor highlighter may be used).

All diagrams or labelling must be drawn neatly and clearly with a pencil (words must be written with a ball pen).

A calculator may be used if required.

Do not read the questions until told to do so.

Section A: Multiple-choice questions [10 marks]
Section B: Structured questions [13 marks]
Section C: Data-based Question [10 marks]
Answer **all** questions in the spaces provided in the question paper.

A copy of the Periodic Table is attached on page 10.

Section	Marks
A	
B	
Total	33

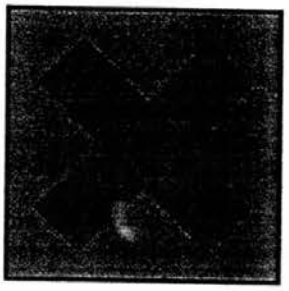
This document consists of **10** pages including this page.

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Section A: Multiple Choice Questions (10 marks)
Write the correct options A, B, C or D in the spaces below.

Question	1	2	3	4	5	6	7	8	9	10
Answer										

A1 The diagram shows a hazard symbol on a chemical bottle.



Which statement about the symbol is correct?

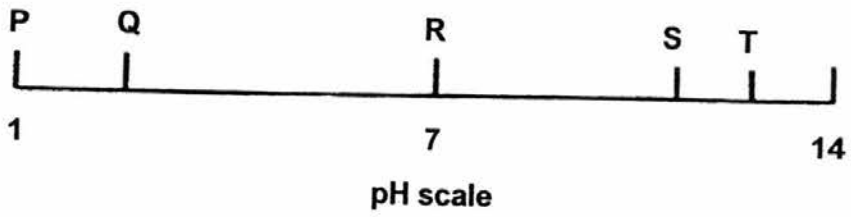
A The substance will not catch fire easily.
B The substance is non-corrosive.
C The substance is poisonous of a biological nature.
D The substance produces vapour that can irritate the eyes.

A2 Which statement about sulfuric, hydrochloric and nitric acids is correct?

A They react with calcium to produce carbon dioxide gas.
B They react with calcium carbonate to produce carbon dioxide.
C They react with calcium hydroxide to produce hydrogen gas.
D They react with calcium to produce water.

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A3 The pH values of five aqueous solutions, **P**, **Q**, **R**, **S** and **T**, of equal concentrations, are shown.



pH scale

What could the solutions be?

	aqueous ammonia	ethanoic acid	hydrochloric acid	potassium chloride	potassium hydroxide
A	P	S	T	Q	R
B	S	Q	P	R	T
C	P	Q	R	S	T
D	Q	R	S	T	P

A4 **D**, **E** and **F** are three solutions with pH values of 2, 5 and 8 respectively. The three solutions are mixed together as shown.

I. solution **D** + solution **E**
II. solution **E** + solution **F**
III. solution **D** + solution **F**

Which solutions, when mixed together, could form a solution of pH 7?

A **II** and **III** only
B **I** and **II** only
C **I** and **III** only
D **II** only

A5 Which of the equations is **not** correct?

A copper(II) hydroxide + sulfuric acid → copper(II) sulfate + water
B iron + sulfuric acid → iron(II) sulfate + hydrogen gas
C sodium carbonate + hydrochloric acid → sodium chloride + carbon dioxide
D magnesium carbonate + nitric acid → magnesium nitrate + carbon dioxide + water

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A6 An aqueous solution has a pH value of 2.

What information can be derived from this fact about the ions present in the solution?

	concentration of H^+ ions	concentration of OH^- ions
A	low	low
B	low	high
C	high	low
D	high	high

A7 Which gas changes damp blue litmus paper red and then bleaches?

A carbon dioxide gas

B oxygen gas

C hydrogen gas

D chlorine gas

A8 A solution containing a high concentration of hydrogen ions.

I. It has a pH of less than 7.
II. It liberates chlorine gas when added to a carbonate.
III. It conducts electricity.

Which statements best describes the solution?

A statements **I**, **II** and **III**

B statements **I** and **II** only

C statements **I** and **III** only

D statements **II** and **III** only

A9 Which pair of substances will react to produce water as one of their products?

A calcium nitrate and zinc sulfate

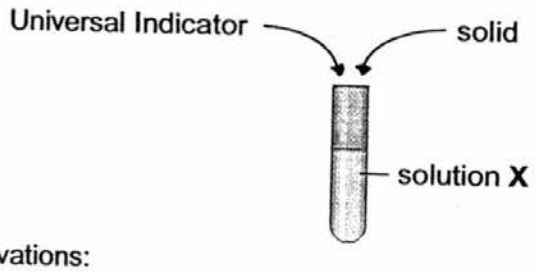
B hydrochloric acid and sodium carbonate

C ethanoic acid and magnesium

D sulfuric acid and sodium chloride

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A10 A solid is used to react with an unknown solution. Universal indicator is then added to the solution **X** that is formed. A lighted splint is used to test for the gas that is evolved.



Observations:
Universal indicator turns purple.
A colourless, odourless gas extinguishes a lighted splint with a pop sound.

Which correctly explains the observations?

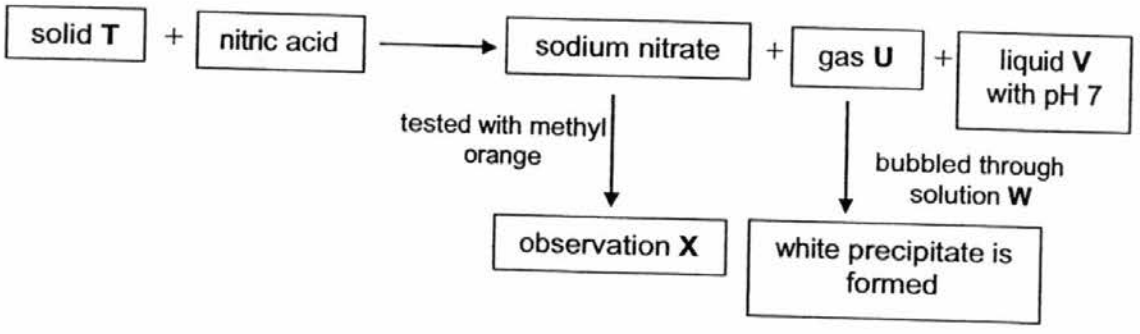
I. Solution X is alkaline.
II. The evolved gas is hydrogen gas.
III. Solid is likely to be a carbonate.

A statements I and II
B statements I and III
C statements II and III
D statements I, II and III

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Section B: Structured Questions [13 marks]
*Answer **all** questions in the spaces provided.*

B1 Study the flow diagram and answer the questions that follow.



(a) **Name** the unknown substances **T**, **U**, **V** and **W**.

solid **T**: .....
gas **U**: .....
liquid **V**: .....
solution **W**: ..... [4]

(b) Describe observation **X** when sodium nitrate is tested with methyl orange.

..... [1]

(c) Nitric acid can also react with an alkali to produce sodium nitrate.

(i) Name the alkali.

..... [1]

(ii) Write a word equation for the reaction between nitric acid and the alkali.

..... [1]

B2 Moist red litmus paper is commonly used to test for gases such as ammonia gas.

(a) State the observation to confirm the identity of ammonia gas.

..... [1]

(b) Explain why the litmus paper must be moistened when testing for ammonia gas.

.....
.....
..... [2]

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B3 Citric acid is a weak acid and hydrochloric acid is a strong acid.

(a) Define '*acid*'.

.....

..... [1]

(b) Describe a test that can be carried out in the school laboratory to differentiate the strength between hydrochloric acid and citric acid.

.....

.....

.....

.....

..... [2]

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Section C: Data-based Question [10 marks]
*Answer **all** questions in the spaces provided.*

C1 Calcium hydroxide, traditionally know as slaked lime, is an inorganic compound which is alkaline. It is obtained when calcium oxide is mixed with water. Calcium hydroxide is relatively soluble in water and it is generally used in sewage treatment and fresh water treatment. It is also commonly used in food industry to manufacture food such as century eggs, corn tortillas and it can also be used as a substitute for baking soda. This is due to its low toxicity and *mildness* of its basic properties.



Farmers also commonly use calcium hydroxide in aiding the conditions of soil. However, it is advised by experts that calcium hydroxide should not be added to soil containing ammonium fertilisers as the reaction as shown will take place.

calcium hydroxide + ammonium nitrate → calcium nitrate + ammonia gas + water

(a) **(i)** **Name** the ion that is found in all alkalis.

.....[1]

(ii) State two properties of calcium hydroxide.

.....

.....[2]

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(b) **(i)** State how calcium hydroxide can help in aiding the condition of soil.

.....

.....

[1]

(ii) Using the reaction stated, explain why calcium hydroxide should not be added to the soil containing ammonium salts.

.....

.....

.....

[1]

(iii) Name the salt that is formed when calcium hydroxide reacts with sulfuric acid.

.....

.....

[1]

(c) **(i)** State an example of alkali that is not advisable to be added to soil.

.....

.....

[1]

(ii) Briefly explain why the alkali should not be added.

.....

.....

.....

.....

[2]

(iii) State the colour change when phenolphthalein is added to the alkali named in **c(i)**.

.....

.....

[1]

End of Paper

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SA1 Jurong Secondary School

DATA SHEET
The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H Hydrogen 1										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
Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89 †															

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

140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60
232 Th Thorium 90	Pa Protactinium 91	238 U Uranium 92

Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63
Np Neptunium 93	Pu Plutonium 94	Am Americium 95

157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66
Cm Curium 96	Bk Berkelium 97	Cf Californium 98

165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69
Es Einsteinium 99	Fm Fermium 100	Md Mendelevium 101

173 Yb Ytterbium 70	175 Lu Lutetium 71
No Nobelium 102	Lr Lawrencium 103

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

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

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Jurong Secondary School
2E Science (Chemistry)
2016 Mid-Year Examination
Marking Scheme

Section A: Multiple-choice Questions [10 marks]

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

MCQs are generally well done.

Section B: Structured Questions [13 marks]

Qn	Answer	Remarks
B1a)	T: **sodium carbonate [1]** U: **carbon dioxide [1]** V: **water [1]** W: **calcium hydroxide [1]** OR **limewater [1]** Question is generally well done except some students write limewater as two words.	For T, U, V and W, spelling must be correct to be awarded [1]. Accept either or of W.
B1b)	Methyl orange turns from **orange to yellow [1].** **Common error: Students cannot see that sodium nitrate is a neutral salt of pH 7. Most of the students took it as acid.**	Colour change must be stated to award [1].
B1ci)	**sodium hydroxide [1]**	spelling must be correct to be awarded [1].
B1cii)	**sodium hydroxide + nitric acid → sodium nitrate + water [1]**	Accept ecf from 1c(i)
B2a)	Moist red litmus paper **turns blue [1].**	
B2b)	MP1: When the litmus paper is dry, **ammonia gas** is **not able** to **produce hydroxide ions [1]** that will react with the red litmus paper to turn blue. MP2: When the litmus paper is **moistened**, the ammonia gas can **dissolve and produce hydroxide ions** that will **display the property of alkali**, **enabling the colour change [1]** of litmus paper from red to blue. **Common error: Question badly attempted. Students cannot relate that ammonia gas is dry and cannot display alkali properties.**	MP1: mentioning that dry gas no hydroxide ions or ammonia can display its property in aqueous form MP2: dissolved ammonia produces hydroxide ions, display property of alkali, causing colour change
B3a)	A substance which **dissolves in water** to produce **hydrogen ions** as the **only positive ion [1]**	

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B3b)	Method 1: Use of universal indicator Hydrochloric acid – U.I. changes from **green to red** [1] Ethanoic acid – U.I. changes from **green to orange / yellow** [1] Method 2: Reaction of acid with reactive metal / metal carbonate Hydrochloric acid – reaction produces a **large** amount of **effervescence** [1] Ethanoic acid – reaction produces a **small** amount of **effervescence** [1] **Common error: Some students did not mention the original colour of Universal Indicator.**	MP: If the initial colour of UI is not indicated but the final colour of the UI is correct after adding to both acids, award 1 mark.

Section C: Data-Based Question [10 marks]

Qn	Answer	Remarks
C1ai)	**hydroxide [1]**	spelling must be correct to be awarded [1].
C1aii)	**conducts electricity** **soluble in water** **pH>7** **bitter taste** **slippery/soapy** **caustic** **turns red litmus paper blue**	any 1 point award **[1]** award **maximum of 2 marks**
C1bi)	It can help to **reduce the acidity of the soil** [1] OR It helps to **neutralise the acidic soil [1]**.	
C1bii)	There will be a **loss of hydroxide ions** as calcium hydroxide **reacts with ammonium nitrate to produce calcium nitrate**, which is a **salt [1]**. **Common error: Students unable to relate the use of calcium hydroxide to the equation and see that the reaction cause the loss of hydroxide ions.**	MP: must mention that the hydroxide ions are lost as salt is produced.
C1biii)	**calcium sulfate [1]**	spelling must be correct to be awarded [1].
C1ci)	any **strong alkali [1]**, such as sodium hydroxide, potassium hydroxide, lithium hydroxide	spelling must be correct to be awarded [1].
C1cii)	The alkali is extremely **caustic [1]** and it can **destroy the cells** found in plants and the plants may **wither and die [1]**.	
C1ciii)	turns from **colourless to pink [1].**	

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Name	Index Number	Class

JURONG SECONDARY SCHOOL
2016 MID-YEAR EXAMINATION
Secondary 2 Express

Science

10 May 2016

Biology Module

Total Duration for Science: 2 hours

Candidates answer on the question paper.
Additional materials: Nil

Read these instructions first

Write your name and index number on the cover page in the spaces provided.

Do not open the booklet until told to do so.

Section A: Multiple-choice questions [10 marks]
Answers to Section A **must** be written in the table provided on page 2.

Section B: Structure questions [13 marks]
Answer **all** questions in the spaces provided in the question paper.

Section C: Data-based question [10 marks]
Answer **all** parts in the spaces provided in the question paper.

Section	Marks
A	
B	
C	
Total	33

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Section A: Multiple-choice Questions [10 marks]

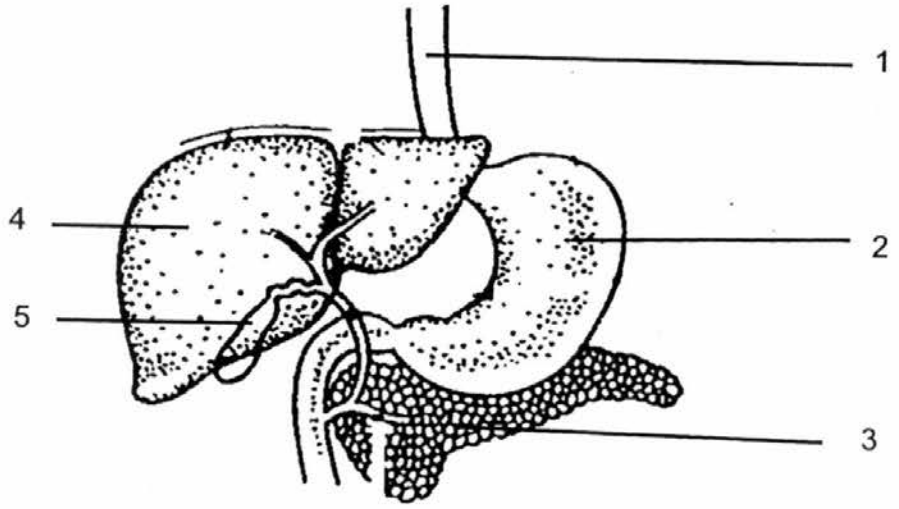
Choose the correct answer for each question and write its letter in the table below.

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10

A1 Which part of the alimentary canal is most acidic?

A oesophagus
B stomach
C small intestine
D large intestine

A2 Which two structures produce substances involved in the digestion of fats?



A 1 and 4
B 3 and 4
C 3 and 5
D 4 and 5

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A3 What are the functions of the large intestine?

	absorption of water	production of enzymes
A	no	no
B	no	yes
C	yes	no
D	yes	yes

A4 Why does chewing food help digestion?

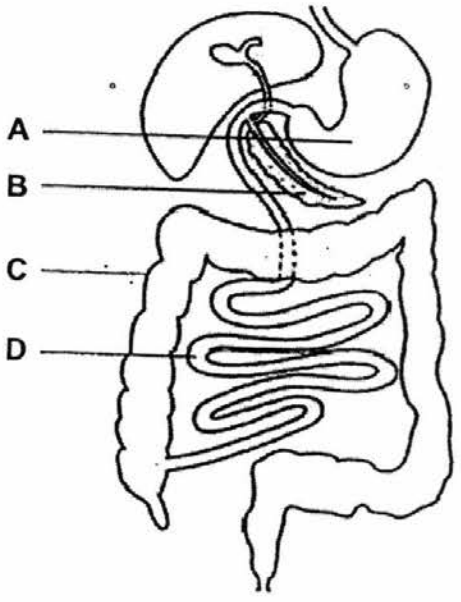
A the food becomes easier to swallow

B the food has a better taste

C the food has a greater surface area for enzymes to work on

D the food becomes softer

A5 Which structure is not part of the alimentary canal?



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A6 Four different tests were carried out on some food and the results are recorded in the table below. Which food contained both starch and protein?

food	Benedict's test	biuret test	ethanol emulsion test	iodine test
A	+	+	-	-
B	+	-	+	-
C	-	-	+	+
D	-	+	-	+

A7 Runners often eat bananas during long races. Which nutrient in a banana is important during the race?

A carbohydrates

B fibre

C vitamins

D minerals

A8 Two tests were carried out on a food sample. The results of the tests are listed in the table below:

test	result of test on food sample
1	mixture turned violet
2	cloudy emulsion formed

What is the food sample most likely to be?

A pasta

B cucumber

C cheese

D pineapple

A9 Which of the following is not a function of the liver?

A produce lipase

B produce bile

C convert excess amino acids to urea

D convert excess glucose to glycogen

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A10 The table shows the nutrient contents in a bowl of chicken rice.

food	protein / g	carbohydrate /g	fat /g
rice	0.2	8.9	0.0
chicken	2.1	0.0	0.5

What would be the main end-products of digestion of the above meal?

A simple sugars and glycerol

B fatty acids and glucose

C amino acids and simple sugars

D glycerol and amino acids

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Section B: Structured Questions [13 marks]

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

B1 **Fig. 1.1** below shows the human digestive system.

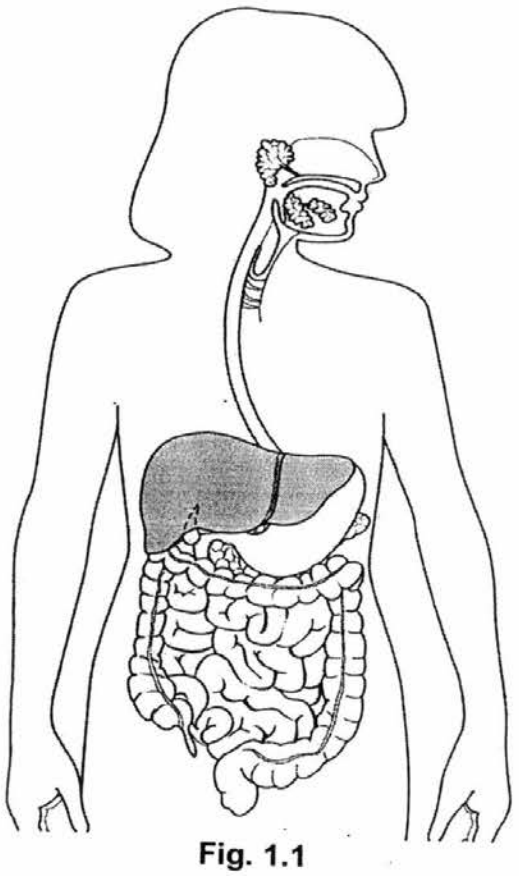


Fig. 1.1

(a) Label and name the part where

(i) digestion of protein begins;
(ii) digestion of food is completed. [2]

(b) Explain why protein needs to be digested. [3]

.....

.....

.....

.....

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B2 **Fig. 2.1** shows a pill designed to cure an intestinal infection.

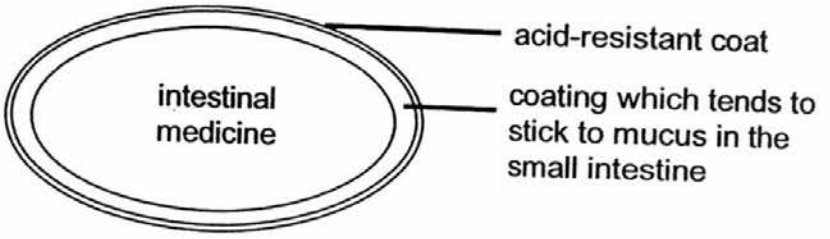


Fig. 2.1

(a) Explain the role of the "acid-resistant coat". [3]

.....

.....

.....

.....

(b) Explain the advantage of the "permeable coat that tends to stick to mucus in the small intestine". [3]

.....

.....

.....

.....

B3 Define malnutrition and give an example of malnutrition in the world today. [2]

.....

.....

.....

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Section C: Data-based Questions [10 marks]

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

C1 **Table 1.1** shows the calories and food group requirements for 3 different groups of people.

Table 1.1

food group	older adults	pregnant women	active teen boys
daily calories	1600 calories	2200 calories	2800 calories
grains group	6	9	11
vegetable group	5	4	4
fruit group	3	3	3
milk group	4	5	4
meat and beans group	2	2	4

(a) Based on the data provided in Table 1, explain the following: [6]

(i) *older adults*

Calories requirement: .....

Why is the calories requirement for older adults the lowest among 3 groups?

.....

.....

.....

(ii) *pregnant women*

Explain why a pregnant women requires the high amount of milk group products in her diet.

.....

.....

.....

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(ii) *active teen boys*

Explain the data for the requirement in grains group and meat/beans group.

.....

.....

.....

(b) Describe how you would test a sample of milk for presence of lipids. [4]

.....

.....

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.....

End of Biology Paper

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JURONG SECONDARY SCHOOL
MID-YEAR EXAMINATION 2016
Secondary 2 (Express)

Science (Biology)

10 May 2016

Section A: Multiple-choice Questions [10 marks]

A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
B	B	C	C	B	D	A	C	A	C

Section B: Structured Questions [13 marks]

Qn.	Answers	Mark allocation	Markers Annotations
B1i ii	label 'stomach' correctly; label 'small intestine(s)' correctly;	1 1	R: Mouth (in this context, we are only referring to chemical digestion)
b	MP1 idea that protein are large molecules and needs to be digested into smaller/simpler molecules; MP2 ref to protein digested to amino acids after digestion; MP3 idea that amino acids are small + thus able to be absorbed into bloodstream;	1 1 1	
B2a	MP1 ref to presence of acid in stomach; MP2 AW pill has to pass through stomach before reaching small intestines; MP3 acid resistant coat prevents the pill from being destroy/broken down/corroded by the acid in the stomach; AW: prevents medicine from bring released in stomach (thus not reaching small intestines)	3	the main idea of this answer is - there is HCl in the stomach - HCl will corrode the coating of the pill if it is not acid resistant - we need to ensure the medicine is able to reach the small intestines and be released there MP3 R:digested because HCl cannot "digest"
b	MP1 ref to small intestines has mucus; MP2 AW if pill stick to mucus in small intestines, it stays there longer; MP3 ref to the drug has more time to be released into the small intestines to cure the infection;	3	
B3	MP1 AW taking in excess + insufficient quality of a certain type of food/nutrients; MP2 obesity/starvation/alcoholism, or any other appropriate answer;	2	MP2: must name the condition R: spelling mistakes
Cai	1600 calories (no marks awarded) MP1 not so active/stopped growing; MP2 do not require too much energy;	1 1	R: they do not need so much "calories"

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ii	MP1 ref milk high in calcium; MP2 ref growing foetus needs calcium;	1 1	R: protein Also, there is a common misconception that foetus "feed on the milk that the mother drinks"
iii	MP1 ref to grain is carbohydrates + provide most energy/calories; MP2 ref to meat/beans is protein + muscle growth and repair; accept other appropriate answers	1 1	must link the function to the food category
b	MP1: pour 1cm^3 milk sample into test tube + add 1cm^3/equal amount of ethanol into the test tube MP2: shake well; MP3: pour the mixture into 2cm^3 of distilled water + in another test tube; MP4: if a white/cloudy emulsion is formed, lipids is present + if it remains clear, lipids is absent	4	R: white precipitate R: colourless

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