NAME	CLASS	INDEX NO.

Parent's / Guardian's Signature: _____ Date: _____

ST. PATRICK'S SCHOOL
END-OF-YEAR EXAMINATIONS 2014

SUBJECT : GENERAL SCIENCE **DATE : 8 October 2014**

LEVEL : SECONDARY 2 EXPRESS **DURATION: 2 HOURS**

INSTRUCTIONS TO CANDIDATES

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

1. Write your name, class and index number on the **Question Paper** and the **Optical Answer Sheet** in the spaces provided. **It is also required that you WRITE and SHADE your index number on the Optical Answer Sheet**.
2. This paper consists of **Three (3) Sections** : **Section A**, **Section B** and **Section C**.
3. Answer **ALL** questions in **Section A** on the **Optical Answer Sheet** provided.
4. Answer **ALL** questions in **Section B** in the spaces provided.
5. Answer **ANY THREE FULL** questions out of 4 in **Section C** on the **writing paper** provided. Start each question on a new sheet of paper.
6. Calculators may be used where necessary. **Give answers to Three (3) significant figures**.
7. **DO NOT DETACH** any sections from this paper.
8. At the end of the examination, arrange your answers to **Section C in order** and tie with the string provided.
9. Submit the **Optical Answer Sheet**, **this paper and answers to Section C SEPARATELY**.

INFORMATION FOR CANDIDATES:
The number of marks is given in brackets [ ] at the end of each question.

For Examiner's Use Only

Section	A (30 m)	B (40 m)	C (30 m)	Total (100 m)	Grade	Target Grade
Score						

This question paper consists of **26** printed pages.
A copy of the Periodic Table is printed on page 26.

SECTION A: [30 marks]

*Each question is provided with **four** possible answers (**A**, **B**, **C** and **D**). Select the most appropriate answer and **shade** your choice on the **Optical Answer Sheet** provided.*

1 The diagram shows the third period of the Periodic Table.

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

Moving from left to right across the period, the elements _____.

A become more acidic
B become more dense
C change from metal to non-metal
D change from gas to liquid to solid

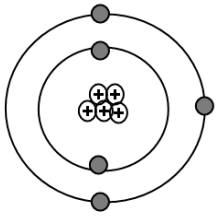
2 The table shows the number and the type of atoms in one molecule of different substance.

	Chemical formula	**Number of atoms**	**Type of atoms**
I	CF_4	5	2
II	HBr	2	2
III	H_2SO_4	7	3
IV	S_8	1	8

Which of the following is **NOT** correct?

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

3 The diagram shows only the protons and electrons in an atom of Boron. The neutrons are not shown.



Key

Electron

Proton

With the help of the Periodic Table, how many neutrons are there in the nucleus of this atom?

A 5
B 6
C 10
D 11

4 Which of the following can interact with matter to bring about a chemical change?

I	energy
II	magnetism
III	matter

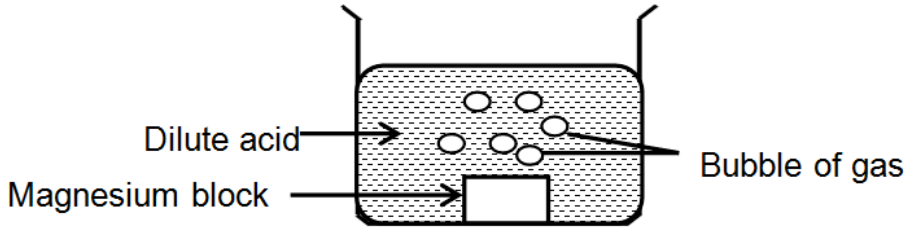
A **I** only
B **II** only
C **I** and **III** only
D **I**, **II** and **III**

5 Indigestion tablets are used to neutralize the gastric juice in our stomach if we have indigestion.

Which one of the following is a possible ingredient found in indigestion tablets?

A Hydrochloric acid
B Magnesium hydroxide
C Nitric acid
D Sodium chloride

6 The diagram shows a magnesium block added into dilute acid.

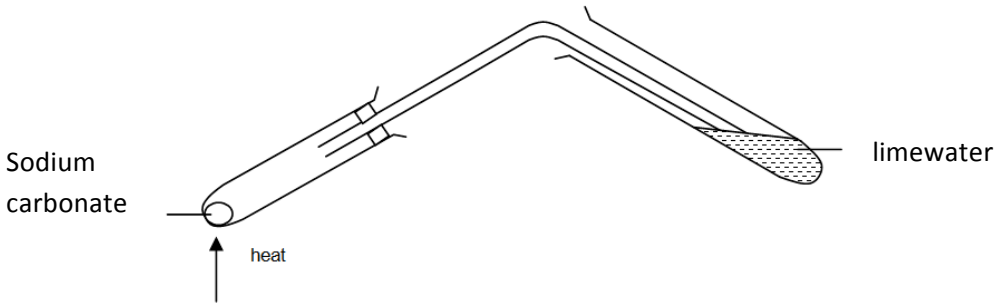


Which of the following statement(s) about this diagram is/are correct?

I	If hydrochloric acid is used, one of the compounds in the solution is magnesium sulfate.
II	The bubbles of gas would produce a 'pop' sound when a lighted splint is used to test its presence.
III	The mixing of substances leads to formation of new substances.
IV	When excess magnesium block remains in the solution, the pH value of the solution will be 7.

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

7 The diagram shows white sodium carbonate being heated until no more change is seen. The solid left in the test tube is black and the gas released turns limewater chalky.

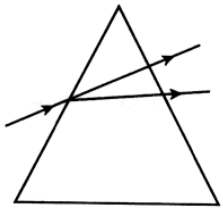


Which one of the following statements is true about this experiment?

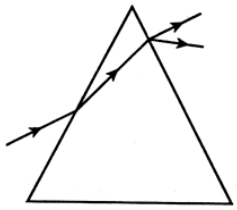
A The experiment shows a combustion reaction.
B The experiment shows a combination reaction.
C The experiment shows the electrolysis of a substance.
D The experiment shows a thermal decomposition reaction.

8 Which one of the following occurs when white light passes through a prism?

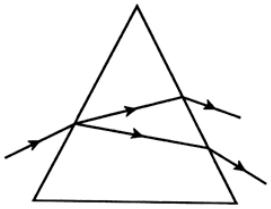
A



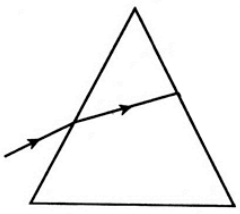
B



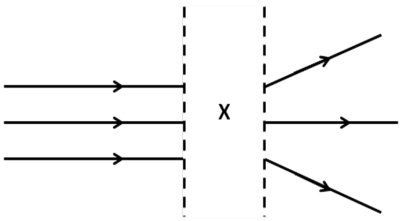
C



D

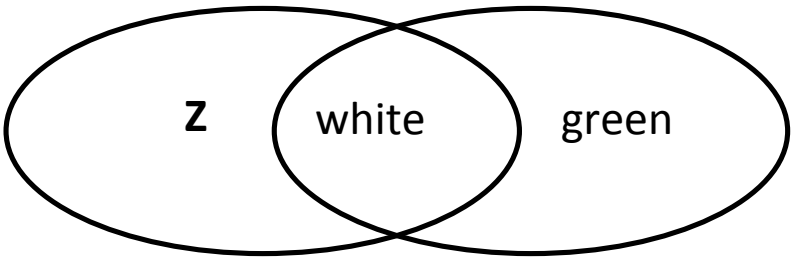


9 The diagram shows rays of light passing through an object **X**. What could be **X**?



A A diverging lens
B A converging lens
C A glass block
D A plane mirror

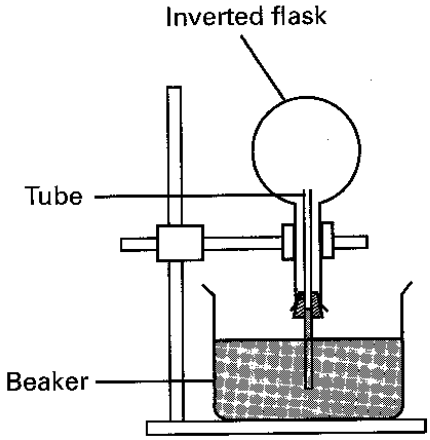
10 Two beams of coloured light, Z and green were mixed as shown.



What could the coloured light **Z** be?

A blue
B red
C magenta
D yellow

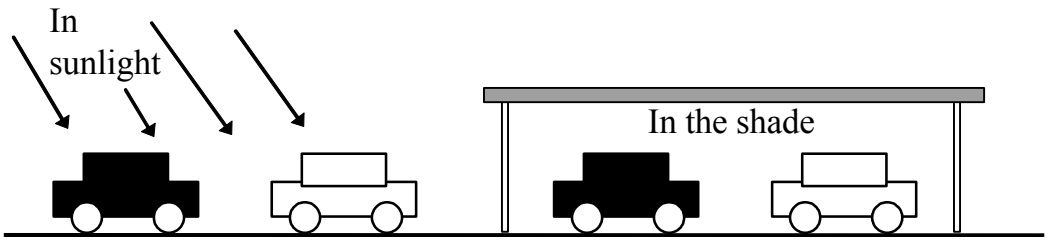
11 The diagram shows an inverted flask containing air. A tube is placed into the flask and then placed in a beaker of water as shown.



What will be observed if ice is placed in contact with the bottom of the inverted flask?

A Bubbles will be formed in the water.
B Nothing will be observed.
C The water level in the tube will drop.
D The water level in the tube will rise.

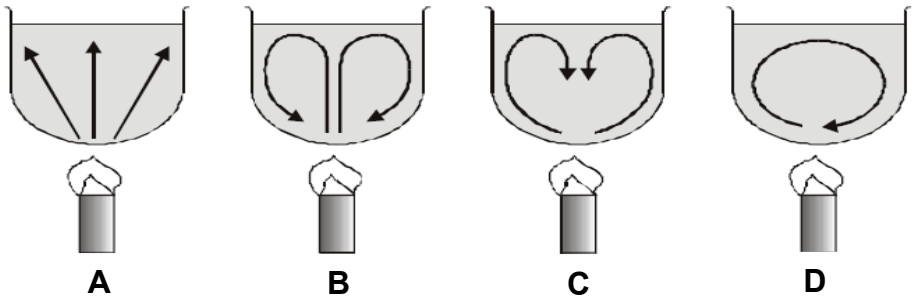
12 Two cars, one painted dull black and the other a shiny white, were left in the sun. When the two cars had reached the same temperature they were driven into the shade.



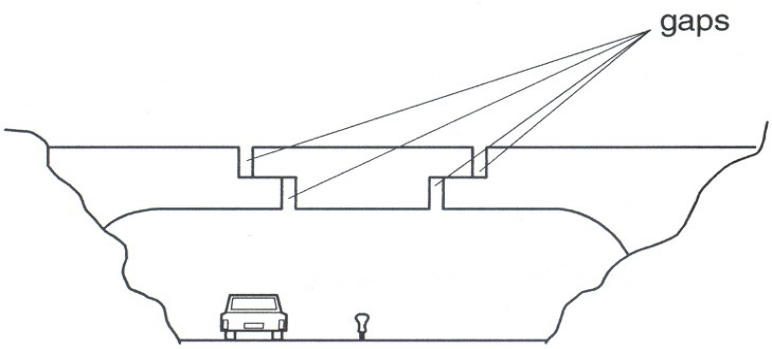
When in the sun, which car was heated up faster? And when in the shade, which car would cool down faster?

	In the sun	In the shade
A	White car heated up faster.	White car cooled down faster.
B	White car heated up faster.	Black car cooled down faster.
C	Black car heated up faster.	White car cooled down faster.
D	Black car heated up faster.	Black car cooled down faster.

13 Which one of the following best represents the convection currents formed when a liquid in a container is being heated?



14 A bridge above a road is made up of three concrete sections. The middle section rests on two supporting sections but gaps are left on both sides.



What is the main reason for leaving gaps between each concrete section?

A to make the bridge wider
B to allow room for expansion
C to let rain water seep through
D to slow down traffic on the bridge

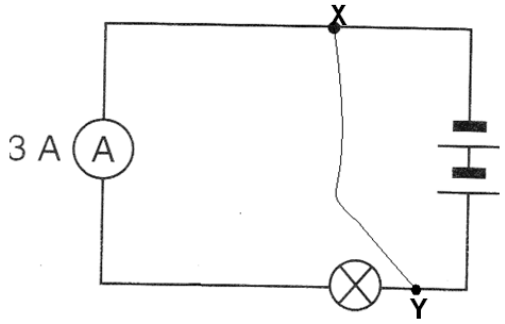
15 Which one of the following statement is **incorrect**?

A Loudness of sound is measured in decibel.
B Sound waves cannot travel through a solid.
C Sound is characterized by properties of a wave.
D Sound requires a medium to be transmitted.

16 What is the approximate range of audible frequencies for a young person?

A 1 Hz to 2 kHz
B 20 Hz to 20 kHz
C 20 kHz to 200 kHz
D 1000 kHz to 20 000 kHz

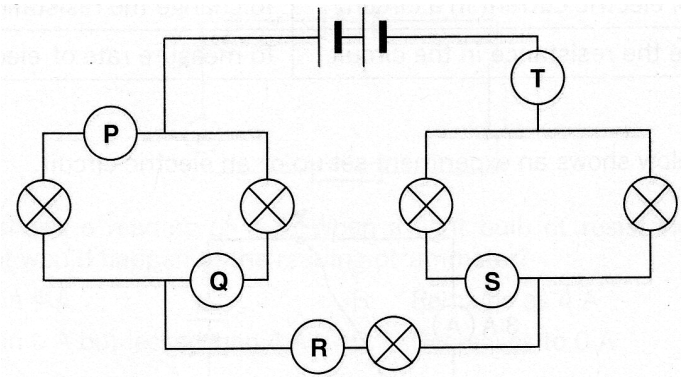
17 The diagram shows an experimental set-up of an electric circuit.



What would happen to the electric circuit when a conducting wire is connected between points **X** and **Y**?

A The brightness of the bulb and the reading of the ammeter remain the same.
B The brightness of the bulb decreases but the reading of the ammeter is lesser than 3 A but greater than 0A.
C The brightness of the bulb decreases but the reading of the ammeter is more than 3A.
D There is no brightness for the bulb and the reading of the ammeter becomes zero.

18 The diagram shows the arrangement of five ammeters, **P** to **T** in an electric circuit. The circuit contains five identical light bulbs.

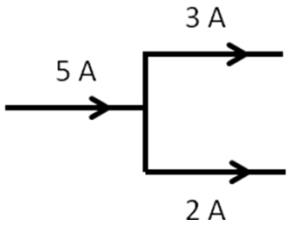


Which of the following ammeters show the same ammeter readings?

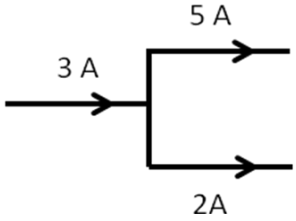
A **Q** and **T**
B **P** and **R**
C **R** and **S**
D **P** and **S**

19 Which diagram shows possible currents at a junction in an electrical circuit?

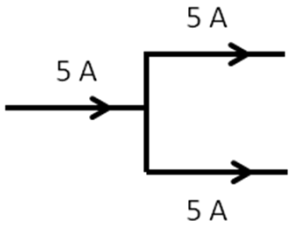
A



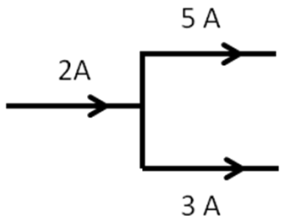
B



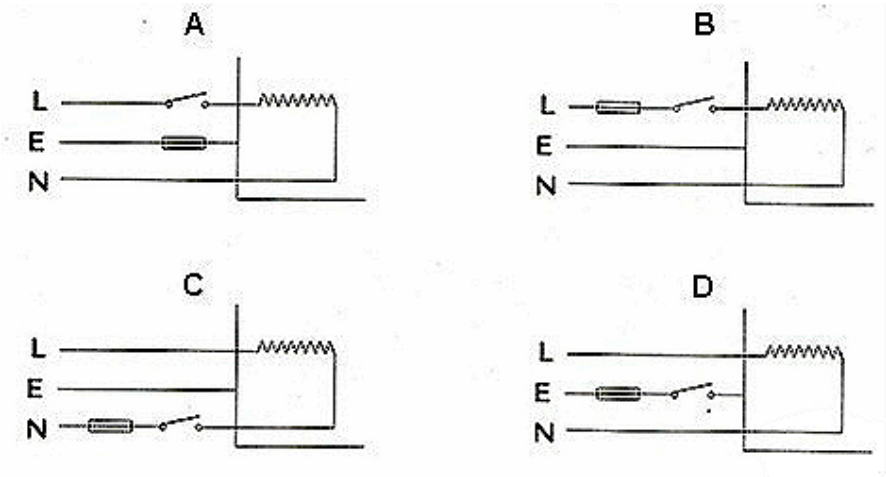
C



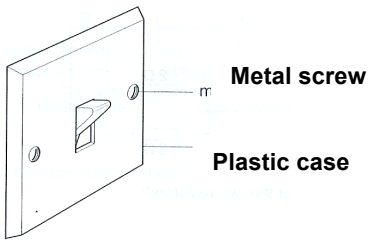
D



20 Which circuit shows the correct positions for the fuse and switch in the electric heater?

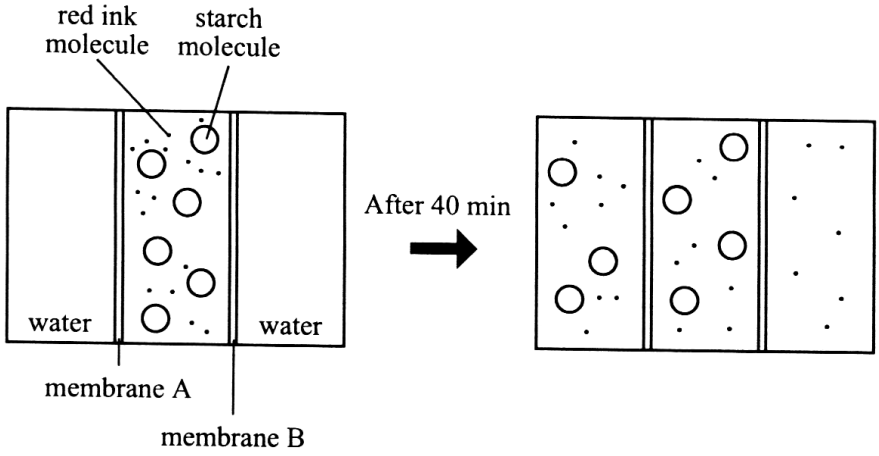


21 The diagram shows an electric switch. This type of switch should not be used in a washroom where there is a lot of moisture on the hand. What is the main reason for this?



A The metal parts might rust.
B The moisture might stop the switch working.
C Soapy water might make the plastic slippery.
D The switch might give an electric shock when used.

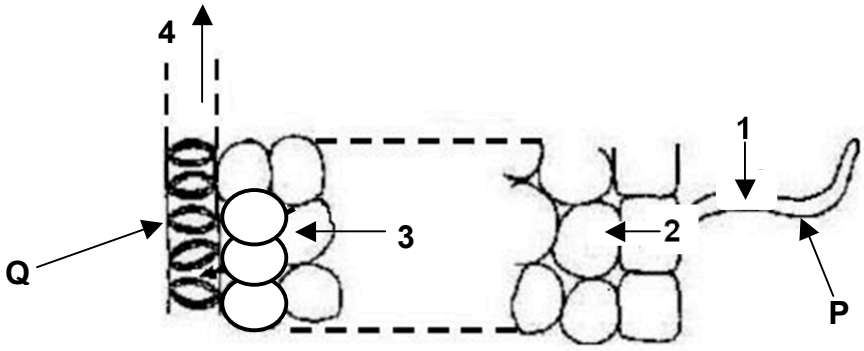
22 Look at the experimental set-up.



Which membrane(s) is/are partially permeable?

A	Membrane **A** only	**B**	Membrane **B** only
C	Membranes **A** and **B**	**D**	None of the membranes

Refer to diagram for question **23** and **24**.



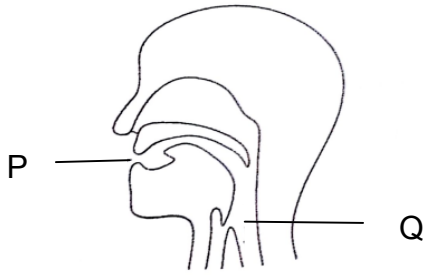
23 Which is the structure shown in **Q** and **P**?

	Q	**P**
A	Phloem	Xylem
B	Root hair cell	Phloem
C	Phloem	Root hair cell
D	Xylem	Root hair cell

24 The diagram shows the pathway of water movement from the soil to the leaves of a plant. Osmosis occurs in

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

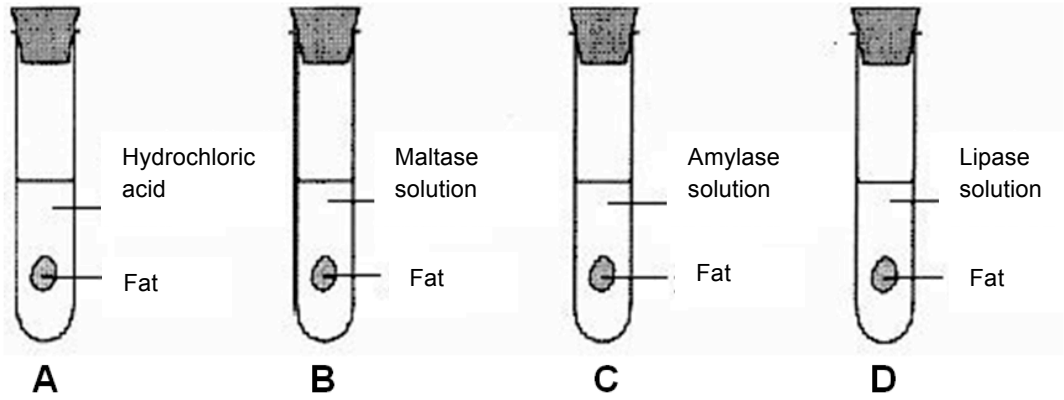
25 Solid food is chewed at **P** and enters the oesophagus at **Q**.



How does the food at **Q** differ from the food at **P**?

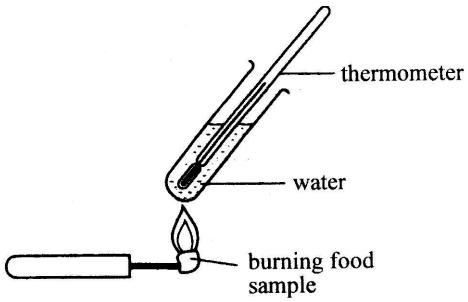
A It contains less protein.
B It contains more starch.
C It has larger surface area.
D It has larger particles.

26 The diagrams show apparatus used to investigate enzyme action.



The tubes were kept at 37 ˚C. Which tube contained the least fat after 2 hours?

27 Four equal masses of different food were burned as shown.



The temperature of the water was measured before and after each experiment and recorded as shown.

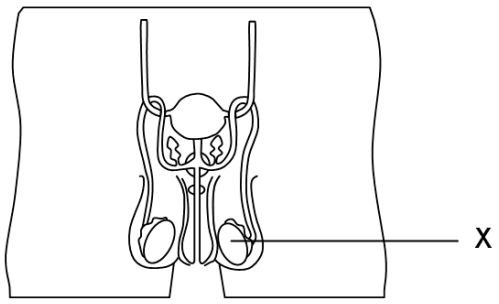
Food sample	Water temperature/ ˚C	
	at start	at end
P	18	50
Q	16	97
R	19	35
S	18	80

Which food sample probably contains:

(i) the most amount of fat?
(ii) the least amount of fat?

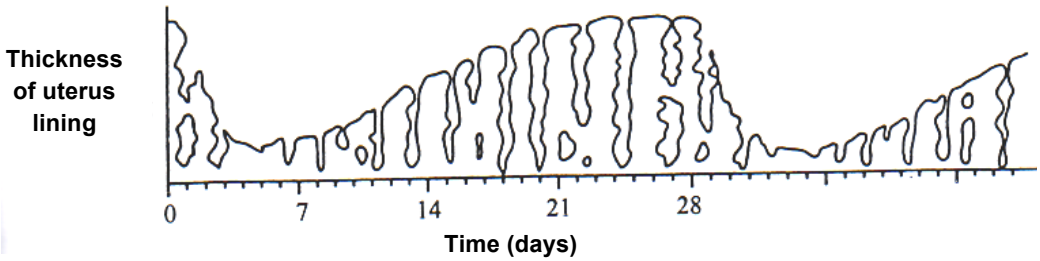
	(i)	**(ii)**
A	***Q***	***R***
B	***R***	***S***
C	***Q***	***P***
D	***S***	***R***

28 The diagram shows part of the male reproductive system. What is the function of **X**?



A to store sperms
B to produce fluids
C to produce sex hormones
D to transport sperms to the urethra

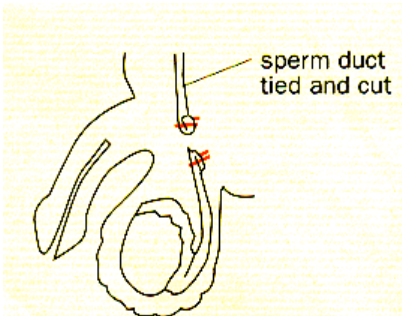
29 The diagram shows the changes in lining of the uterus during the menstrual cycle.



On which day would intercourse likely to result in pregnancy?

A Day 7
B Day 14
C Day 21
D Day 28

30 Name the contraception method used in the following diagram.

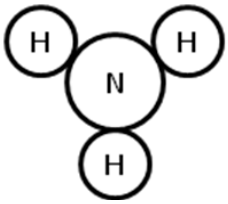
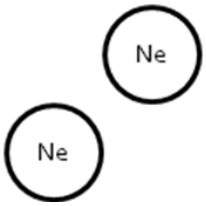


A Vasectomy
B Spermicides
C Tubal ligation
D Intrauterine contraceptive device

SECTION B: [40 marks]

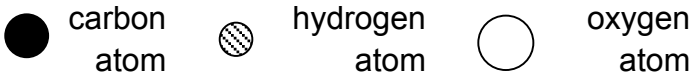
*Answer **ALL** the questions in the spaces provided.*

1 (a) Write the chemical formula for the following diagrams.

	Diagram	Formula
(i)		
(ii)		

[2]

(b) Using the following symbols,



Draw the diagrams of the molecules to represent the following chemical formula.

	Formula	Diagram
(i)	CO	
(ii)	CH_4	
(iii)	C_2H_4	

[3]

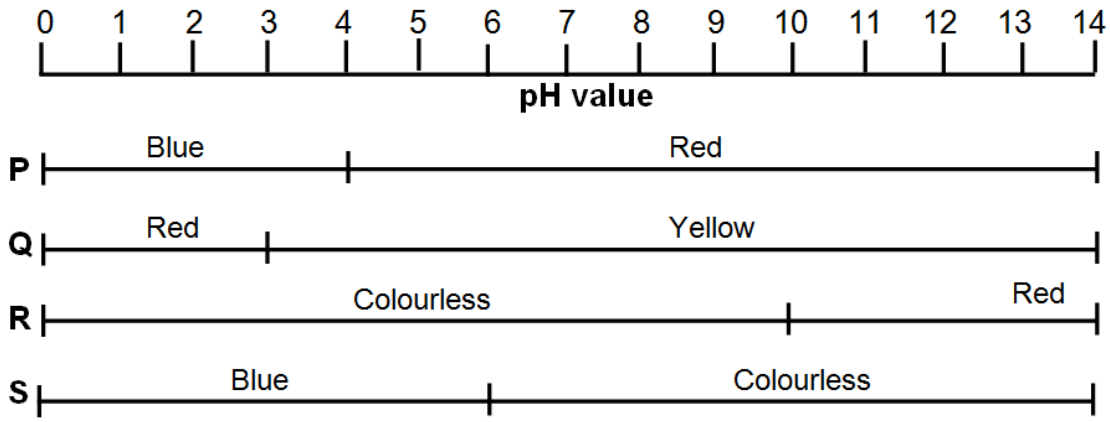
2 Balance the following chemical equations by putting the correct values in the blanks.

(a) ____ N_2O + ____H_2 → ____NH_3 + ____H_2O **[1]**

(b) ____CH_4 +____O_2 → ____ CO_2 + ____ H_2O **[1]**

(c) ____ $MgCO_3$ + ____ HNO_3 → ____ $Mg(NO_3)_2$ + ____ CO_2 + ____ H_2O **[1]**

3 The figure shows four different types of indicators, **P** to **S**, with their corresponding colour changes.



The pH values of some common substances is shown in the following table.

Substance	Detergent solution	Lime juice	Sulfuric acid	Distilled water
pH	11	5	2	7

By writing the code letters of the indicators, answer the following questions.

(a) Which indicator(s) would give the same colour in detergent solution?

_____ **[1]**

(b) Which indicator (s) would become colourless in distilled water?

_____ **[1]**

(c) Which substance(s) would cause indicators **P** and **S** to turn blue?

_____ **[1]**

(c) Using indicator **P**, William wants to test if lemons are acidic.

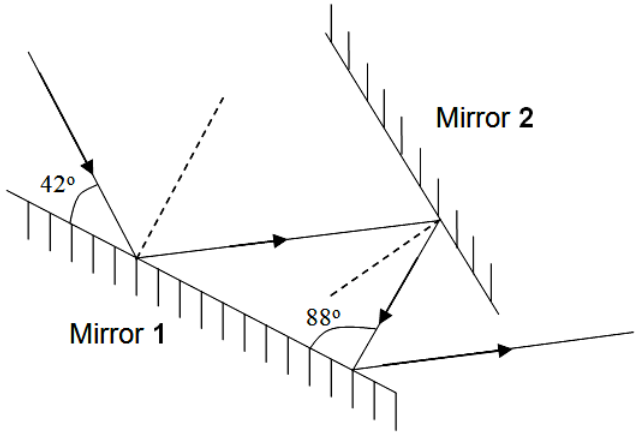
State whether **P** is a suitable indicator for the test. Explain your answer.

_____

_____ **[2]**

4 (a) The diagram shows a light ray reflected by two mirrors, **1** and **2** in an experiment.

Diagram is not drawn to scale.



(i) Find the angle of incidence when the light ray first falls on mirror **1**.

_____ **[1]**

(ii) Showing your working clearly, find the angle of reflection on mirror **2**.

_____

_____ **[2]**

(b) The diagram shows a pebble placed at the bottom of an empty tank as shown in Figure **I**.

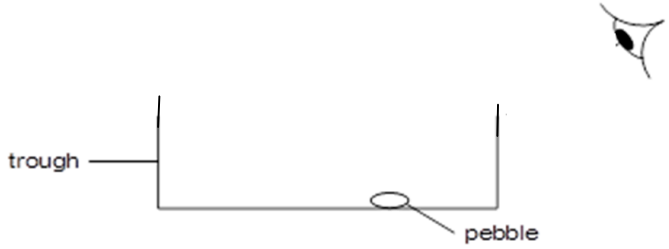


Figure **I**

(i) Explain why the observer is unable to see the pebble.

_____ **[1]**

(ii) Water is now added into the trough, as shown in Figure **II**. The observer is now able to see the pebble.

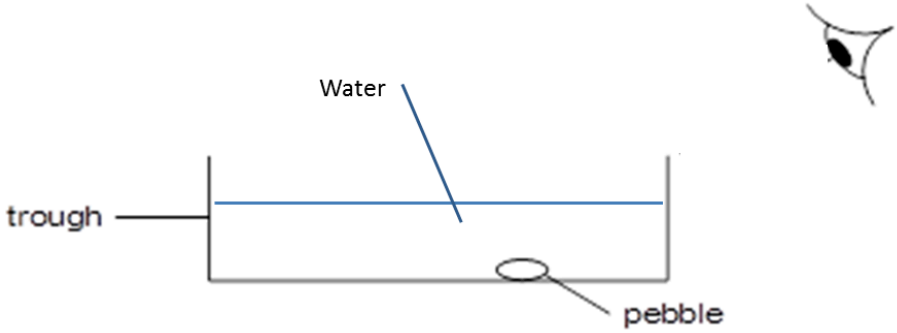
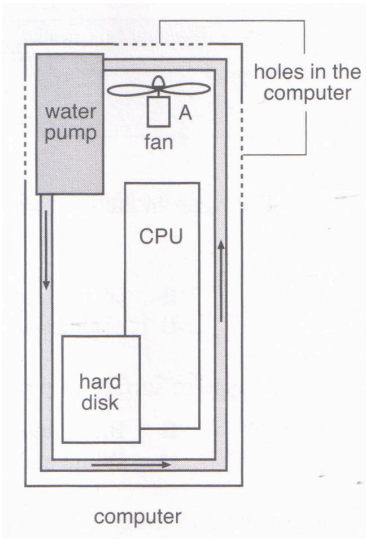


Figure **II**

On Figure **II**, draw the ray diagram to show how the observer is able to see the pebble. **[3]**

5 The diagram shows how water is used to cool the inside of a gaming computer.

Water is pumped through a pipe in the computer. When the computer is in use, the CPU becomes hot. It loses its thermal energy to the water flowing in the pipe placed near it.



(a) How is the heat transferred from the CPU to the water in the pipe?

_____ **[1]**

(b) State a suitable metal for the pipe and briefly explain your answer.

_____

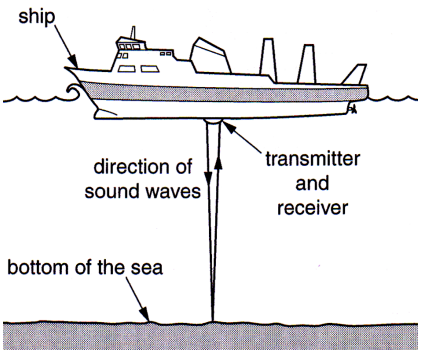
_____ **[2]**

(c) The metal pipes are painted black. Explain why.

_____

_____ **[1]**

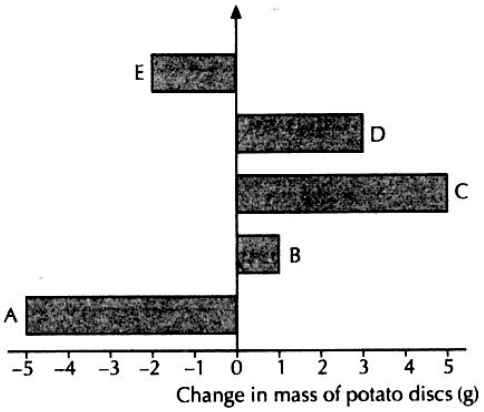
6 The figure shows a device that is used to measure the depth of the sea beneath a ship. The speed of sound in water is 1500 m/s and the time between the sound being transmitted to the bottom of the sea and being detected by the receiver is 1.6 s.



Calculate the distance between the ship and the bottom of the sea.

[3]

7 Five freshly cut potato discs (**A** to **E**) each weighing 10 g were immersed in sucrose solutions of different concentrations for 2 hours. They were then removed from the solutions, dried and weighed again. The change in mass of each disc was recorded in a bar chart as shown.



(a) Which potato disc was immersed in sucrose solution of

(i) the highest concentration: _____

(ii) the lowest concentration: _____ **[2]**

(b) Explain how you arrived at the answers in **(a)**.

_____

_____

_____

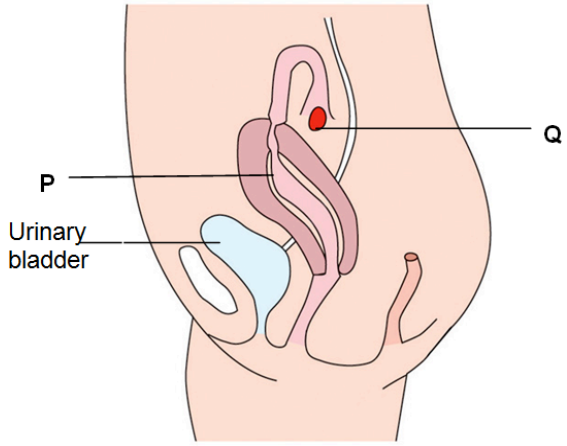
_____ **[4]**

(c) What would happen to the mass of the potato disc if it was immersed in sucrose solution of equal concentration to its cells?

_____

_____ **[1]**

8 The following shows a diagram of the female reproductive system.



(a) Name structures **P** and **Q**.

(i) **P:**_____

(ii) **Q:** _____ **[2]**

(b) Study the diagram and explain why a woman has a greater tendency to feel the urge to urinate when she is pregnant.

_____

_____ **[1]**

(c) Using the letter "**R**", label clearly on the diagram the part where an intra-uterine device (IUD) is placed. **[1]**

(d) Based on your understanding of development in human body, explain why a 5 year old girl is theoretically unable to be pregnant.

_____

_____ **[2]**

SECTION C: [30 marks]

*Answer any **THREE** questions in this section on the writing paper provided.*

1 (a) In an experiment, calcium carbonate is added into dilute hydrochloric acid solution, and a gas is given off.

(i) State two physical properties of an acid. **[2]**

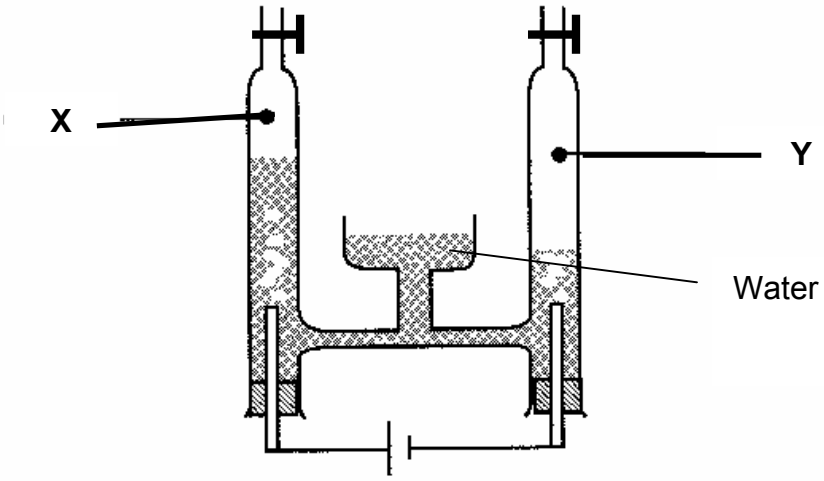
(ii) Write the word equation for the reaction. **[1]**

(iii) Describe a chemical test for the gas produced. **[2]**

(iv) State the chemical formula of calcium carbonate and hydrochloric acid. **[2]**

(b) The diagram shows another experimental setup. The apparatus is filled with water, and an hour later, two different gases, **X** and **Y** were produced.

The volume of gas **Y** produced was *twice* that of gas **X**.

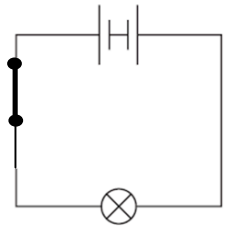


(i) There is a chemical change taking place inside the apparatus. What causes the change to take place? **[1]**

(ii) Identify gases **X** and **Y**. Explain your answer. **[2]**

2 **(a)** A doctor wants to use a small torch to look down the student's throat. When he switches the torch on, it does not work.

The figure shows the circuit diagram for the torch.



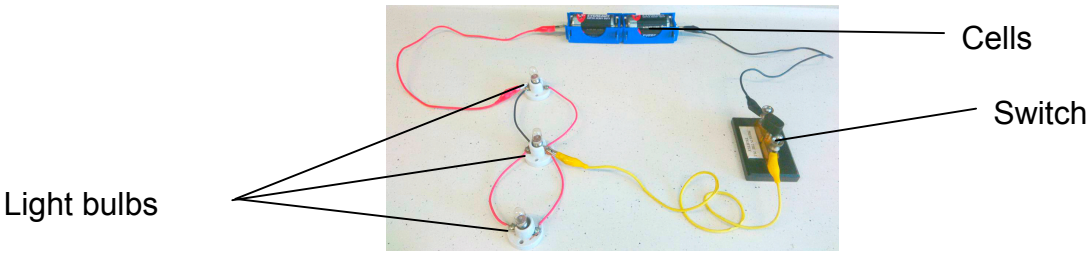
(i) State why the torch does not work, even though all electrical components are working. **[1]**

(ii) By correcting the fault stated in **(i)**, draw the correct circuit diagram. Include in your diagram, the electrical components to measure

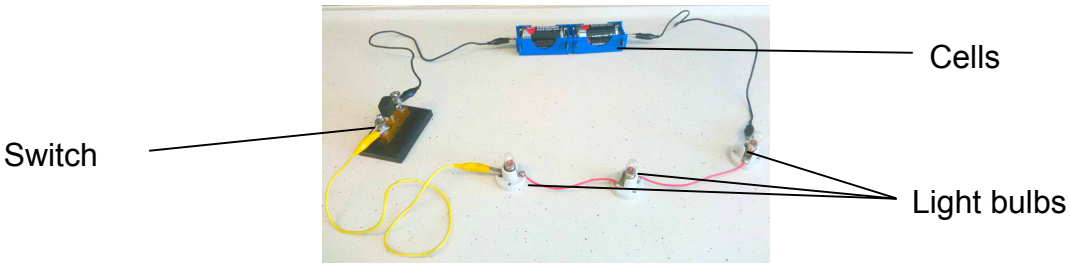
- the current through the bulb
- the potential difference across the bulb

[3]

(b) The figure shows three identical light bulbs connected in two different ways as shown in circuits **A** and **B**.



Circuit **A**



Circuit **B**

(i) Compare the brightness of the light bulbs in both circuits and state which circuit will have brighter light bulbs. Explain your answer. **[3]**

(ii) State one advantage of connecting the light bulbs as shown in circuit **A**. **[1]**

(iii) If each light bulb has a resistance of 2 Ω, and the voltage of the cell is 2 V, calculate the current drawn from the cells in circuit **A**. **[2]**

3 The diagram shows the heart and the arrows show the flow of blood in the heart. **A**, **B**, **C** and **D** are blood vessels.

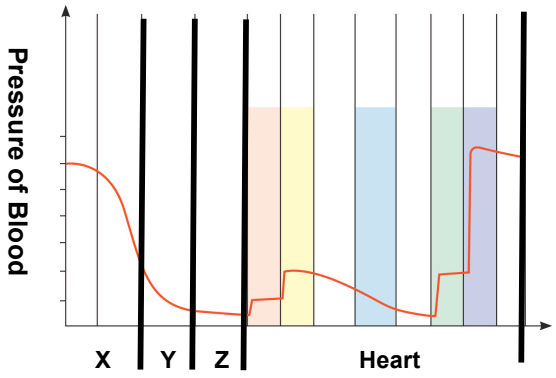
(a) **(i)** State which of the above blood vessels are arteries and which are veins. **[2]**

(ii) Explain your answer in **(a)(i)**. **[2]**

(b) The diagram shows a short length of a blood capillary.

Explain how the wall is suited to the functions of this blood vessel. **[2]**

(c) The figure shows the pressure of the blood as it passes through the blood vessels and heart.



(i) Copy the table below onto your writing paper and state which labelled section (**X**, **Y** and **Z**) of the graph shows the correct pressure of the blood as it passes through the different blood vessels:

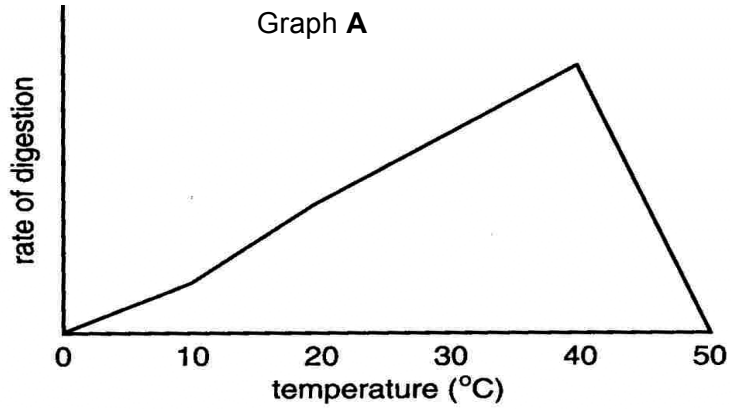
Part	X, Y or Z
Arteries	
Capillaries	
Veins	

[2]

(ii) Explain how blood pressure might be affected by eating foods rich in animal fats and cholesterol. **[2]**

4 **(a)** Enzymes are affected by temperature.

Graph **A**



Graph **A** shows the effect of temperature on the rate of digestion.

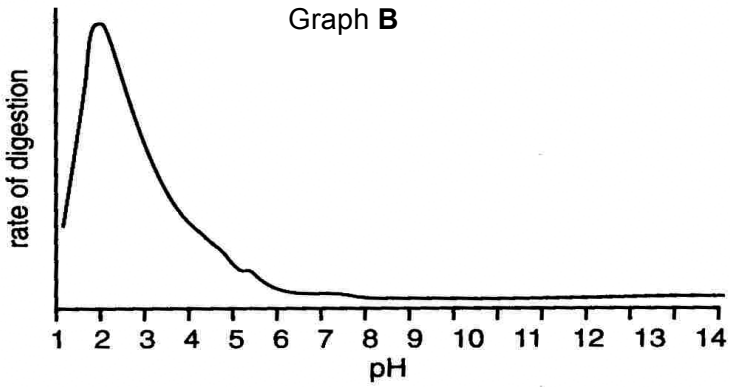
(i) At what temperature is the enzyme most active? **[1]**

(ii) State the range of temperature where the rate of digestion falls sharply. **[1]**

(iii) Briefly explain why the rate of digestion falls sharply stated in **(a)(ii)**. **[1]**

(b) Enzymes are also affected by pH.

Graph **B**



Graph **B** shows the effect of pH on the rate of digestion.

(i) State the pH at which the enzymes are most active. **[1]**

(ii) What is secreted in the stomach to give the pH value in **(b)(i)** so that the enzymes can perform optimally? **[1]**

(c) The table shows how the amount of nutrients in food changes as the food gets digested in the alimentary canal. The initial amount of each nutrient is 10 g.

Initial Amount of Nutrient	Mouth	Organ **X**	Small Intestine
Protein (10 g)	Remains at 10 g	10 g drops to 7 g	7 g drops to 0 g
Fats (10 g)	Remains at 10 g	Remains at 10 g	10 g drops to 0 g
Starch (10 g)			

(i) Using the information given in the table, identify organ **X** and explain your answer. **[2]**

(ii) Study the table and predict the amount of starch present in

- mouth
- Organ **X**
- small intestine **[2]**

(iii) Copy and complete the following equation which shows the digestion of fats in the small intestine.

Fats → 3 molecules of _____ + 1 molecule of _____ **[1]**

~ End of Paper ~

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 Tλ 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

†90-103 Actinoid series

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
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

Key

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

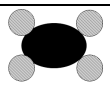
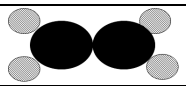
The volume of one mole of any gas is 24 dm^3 at room temperature and

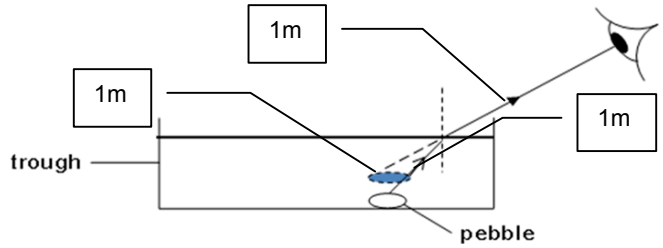
St Patrick's School General Science : **Sec 2 Express**
End-of-year paper 2014 ANSWERS

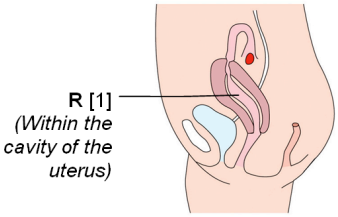
SECTION A [30 marks]

1	2	3	4	5	6	7	8	9	10
C	A	B	C	B	C	D	C	A	C
11	12	13	14	15	16	17	18	19	20
D	D	B	B	B	B	B	D	A	B
21	22	23	24	25	26	27	28	29	30
D	B	D	C	C	D	A	C	B	A

SECTION B [40 marks]

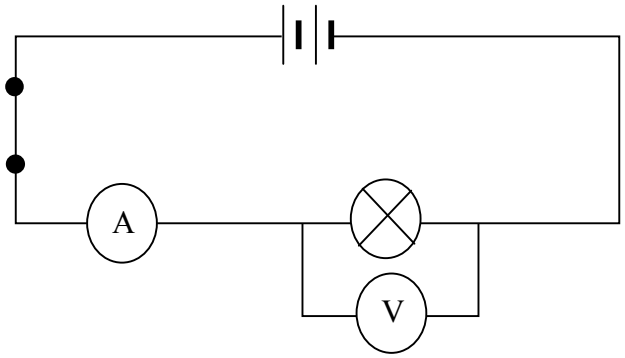
1	(a)(i)	H_3N OR NH_3	[1]
	(ii)	Ne OR 2 NE	[1]
	- for (a), do inform the class the correct arrangement of atoms for ammonia, and all formulas should be in the simplest ratio		
	(b)(i)		[1]
	(ii)		[1]
	(iii)		[1]
	- for (b), ignore the incorrect size; no marks awarded if the patterns drawn are incorrect		
2	**(a)**	N_2O + **4** H_2 → **2** NH_3 + H_2O	[1]
	(b)	CH_4 +**2** O_2 → CO_2 + **2** H_2O	[1]
	(c)	$MgCO_3$ + **2** HNO_3 → $Mg(NO_3)_2$ + CO_2 + H_2O	[1]
	- accept answers as long as they are balanced, but inform class it must always be in simplest ratio		
3	(a)	P and R	[1]
	(b)	R and S	[1]
	(c)	Sulfuric acid	[1]
	(d)	No [1] Indicator P change at pH 4, but the pH of lime juice is at 5 OR pH 5 is still acidic [1]	[2]
	- for (d), if answer is yes, no marks awarded for entire part - candidate must state the range where the indicator does not cover for pH, to be awarded the 1m		
4	(a)(i)	48 ^{o}	[1]

	(ii)	Working [1] Answer [1] Answer = **25 °**	[2]
	(b)(i)	The side of trough blocking light [1/2m] Light travels in straight lines [1/2m]	[1]
	- for b (i), accept also the side of trough is opaque		
	(ii)	 - no OR wrong direction arrows: -1/2 m - image not clearly above: -1m - if image drawn wrongly, NO marks awarded	[3]
5	(a)	Conduction [1/2m] Radiation [1/2m]	[1]
	(b)	Aluminium [1] The material is a good heat conductor [1] - wrong type of metal stated, NO marks awarded for entire part	[2]
	(c)	Black is a good radiator/emitter of heat [1] - if state only black is good absorber [1/2] only	[1]
6		d = 1500 × 1.6[1] = 2400 / 2 [1] = 1200 m [1]	[3]
7	(a)(i)	A	[1]
	(ii)	C	[1]
	(b)	Potato disc A showed the **most decrease** in **mass** compared to the other potato discs. This means that Potato disc A had **lost the most water due to osmosis**.[1] Therefore the solution that Potato disc A was immersed in must have had the **lowest water potential / potato has higher water potential than sucrose solution**. [1] Potato disc C showed the **most increase** in **mass** compared to the other potato discs. This means that Potato disc C had the **most number of water molecules entering into its cells** by **osmosis**. [1] Therefore the solution that Potato disc C was immersed in must have had the **highest water potential / potato has lower water potential than sucrose solution.** [1]	[4]

		• Note that "water concentration" is accepted.	
	(c)	The **mass** of the potato disc will **remain unchanged / nothing will happen to the mass**	[1]
8	(a)(i)	P: Uterine lining / Lining of the uterus	[1]
	(ii)	Q: Ovary (*Must be singular*) Ovaries: ½ M	[1]
	(b)	Weight of foetus is acting on the (urinary) bladder Reject: • Bladder shrinks • Bladder enlarges	[1]
	(c)		[1]
	(d)	She has not undergone puberty [1], hence has yet to produce female sex hormones [1] and gametes/ ova [1]. *Max: [2]*	[2]

Section C [30 marks]

1	(a)(i)	[Any 2 acceptable answers.] § Sour § Good conductor of electricity § Turns blue litmus red. § Corrosive. - pH less than 7 NOT accepted	[2]
	(ii)	Calcium carbonate + hydrochloric acid → carbon dioxide + water + calcium chloride - reactants correct – 1/2 m - products correct – 1/2 m	[1]
	(iii)	Bubble into limewater [1] White precipitate is seen in limewater [1] - accept chalky NOT milky	[2]
	(iv)	$CaCO_3$ [1] HCl [1] - if chemical reaction is given, just mark the reactants	[2]
	(b)(i)	Electricity - Electrolysis not allowed	[1]
	(ii)	Y = Hydrogen gas, X = Oxygen gas [1] There is 2 atoms of hydrogen to 1 oxygen atom in each water molecule [1] - ECF; if first part wrong, NO marks awarded for entire (bii)	[2]

2	(a)(i)	the negative ends of the batteries are facing each other - not fixed OR fitted properly is not accepted	[1]
	(a)(ii)	 • correct batteries connection [1] • correct ammeter connection [1] • correct voltmeter connection [1] • no batteries or light bulb NO marks awarded • No switch or wrong number of batteries = -1/2 m • Each component drawn incorrectly = -1/2 m • Broken circuit = -1/2 m	[3]
	(b)(i)	Circuit A (parallel circuit) [1] as it total resistance is low [1] has high current [1] - Dependent marking; first part incorrect, NO marks awarded - for second part, each component marked separately	[3]
	(b)(ii)	When one of the bulbs is not working the other bulbs are still be able to light up. - only above answer accepted	[1]
	(b)(iii)	Circuit A, 1/R = ½ + ½ + ½ = 3/2 [1/2 m] Total resistance, R = **2/3 Ω** [1/2 m] Current = 4 x 3/2 = 6 A [1/2 m] [1/2 m] - Wrong units: -1/2 m - also accept 2 x 3/2 = 3 A	[2]

3	(a)(i)	• **B C** – artery [1] • **A D** – veins [1] - no half marks awarded	[2]
	(ii)	• In B and C, blood is flowing out [1] • In A and D, blood is flowing into the heart [1]	[2]

	(b)	The <u>one-cell</u> thick walls **[1]** allow <u>diffusion of substances easily</u> **[1].** - diffusion and easily/efficiently/faster must be present to be awarded 1m for second part - independent marking	[2]
	(c)(i)	Artery – **<u>X</u>** Capillary – **<u>Y</u>** Vein – **<u>Z</u>** - all correct: 2 m - 1 wrong: 1 m - 2 wrong: 0 m	[2]
	(ii)	increase accumulation of fats in the blood vessels [1], causing blood vessels to constrict / causing blockage [1]	[2]
4	(a)(i)	40^{o}C. - +/- 1 ^{o}C	[1]
	(ii)	Between 40^{o}C to 50^{o}C - +/- 1 ^{o}C	[1]
	Wrong or missing units = -1/2 m each		
	(iii)	The enzymes becomes denatured after pH 2.	[1]
	(b)(i)	pH 2 - range is 1.9 to 2.1 accepted	[1]
	(ii)	hydrochloric acid	[1]
	(c)(i)	Stomach [1] No lipase present, but protease is present in stomach [1]	[2]
	(ii)	<table><tr><td>Starch (10 g)</td><td>10 g to 5 g</td><td>Remain at 5 g</td><td>5 g to 0 g</td></tr></table> - Entire row : 2 m - 1 mistake: 1 m - 2 mistakes: 0 m - the last component must be 0 to be marked correct	[2]
	(iii)	Fats → 3 molecules of Fatty Acids + 1 molecule of Glycerol - no 1/2 marks awarded	[1]