



Pasir Ris Secondary School

Name:	Class:	Register Number:
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SECONDARY 2 EXPRESS END OF YEAR EXAMINATION 2024

LOWER SECONDARY SCIENCE

Paper 1 Multiple Choice
Thursday 0800 – 1000

03 October 2024
Papers 1 and 2: 2 hours

Additional Materials:
Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number in the spaces provided at the top of this page.
Do not use staples, paper clips, highlighters, glue, correction fluid or tape.

There are **thirty** questions in 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.

Read the instructions on the Answer Sheet very carefully.

Answers to Paper 1 and Paper 2 must be handed in separately.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

You may proceed to answer Paper 2 as soon as you have completed Paper 1.

Any rough working should be done in this booklet.

A copy of the Periodic Table is printed on page 12.

The use of an approved scientific calculator is expected, where appropriate.

This document consists of **12** printed pages, including the cover page.

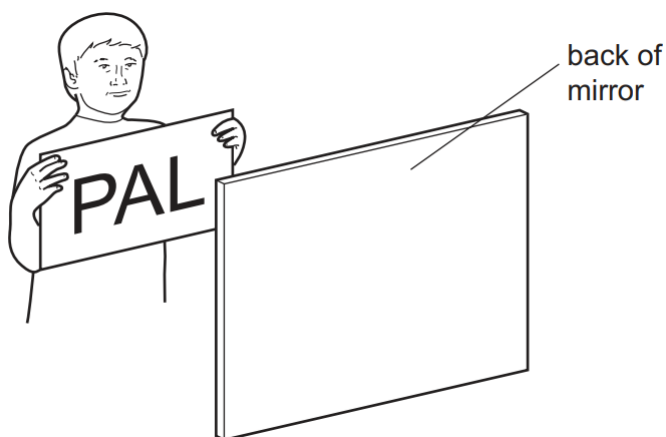
Section A
Answer **all** the questions.

- 1** Blue copper sulfate dissolves in water to form a blue solution. Excess copper sulfate is mixed with water. The mixture is filtered and the filtrate is distilled.

What are the colours of the solid left in the filter paper and the liquid collected after distillation?

	solid	liquid collected after distillation
A	blue	blue
B	blue	colourless
C	colourless	blue
D	colourless	colourless

- 2** A piece of paper has 'PAL' written on it. A student holds the paper in front of a plane mirror.



Which image does the student see?

A



B



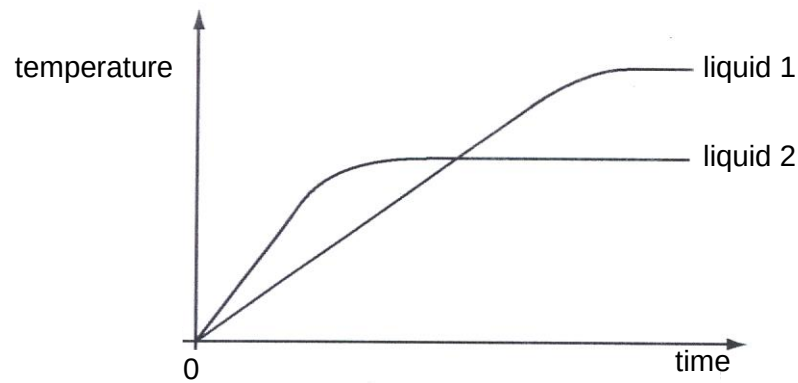
C



D

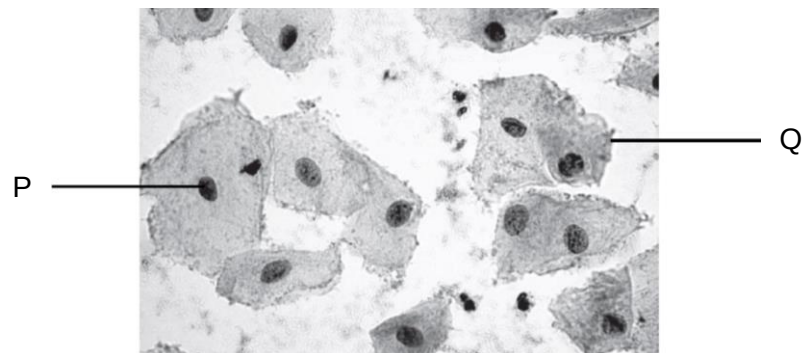


- 3 Equal masses of two different liquids are heated using the same heater. The graph shows how the temperature of each liquid changes with time.



What does the graph tell us about the liquids?

- A Liquid 1 has a higher boiling point than liquid 2.
 - B Liquid 1 has a higher melting point than liquid 2.
 - C Liquid 1 starts to boil sooner than liquid 2.
 - D Liquid 1 starts to melt sooner than liquid 2.
- 4 The diagram shows some human cells observed under the microscope.



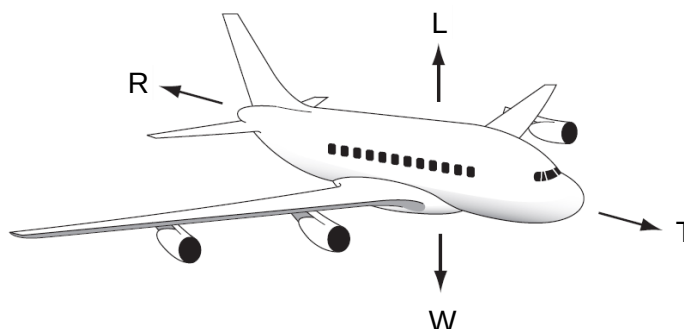
Which row shows the correct identity of structures P and Q?

	P	Q
A	cytoplasm	cell membrane
B	cytoplasm	cell wall
C	nucleus	cell membrane
D	nucleus	cell wall

- 5 An aircraft, flying at a constant height, is gaining speed.

The four forces acting on the aircraft are:

L, lift due to the wings
 R, air resistance
 T, thrust due to the engines
 W, the weight



Which row correctly describes the forces acting on the aircraft?

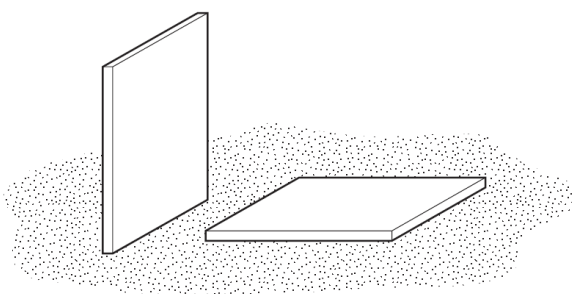
	vertical forces	horizontal forces
A	$L = W$	$T = R$
B	$L = W$	$T > R$
C	$L > W$	$T = R$
D	$L > W$	$T > R$

- 6 An object that has a mass of 15 kg on the Earth is taken to the Moon. The gravitational field strength on the Earth is 10 N/kg and on the Moon is 1.6 N/kg.

Which row correctly shows the mass and the weight of the object on the Moon?

	mass / kg	weight on moon / N
A	15	24
B	15	150
C	24	15
D	150	24

- 7 A builder leaves two identical stone tiles resting on the ground at different positions.



Which row correctly compares the forces and the pressures that the tiles exert on the earth at different positions?

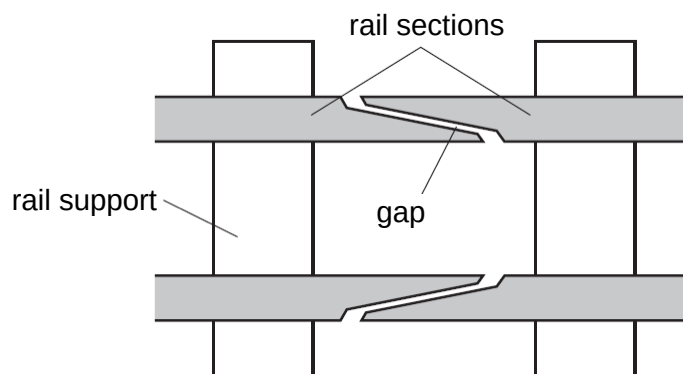
	strength of force	pressures
A	different	different
B	different	same
C	same	different
D	same	same

- 8 Jamie built a snowman during winter. The snowman is colder than the environment. She decided to cover the snowman with a wool jacket.

Which statement is correct?

- A The jacket traps air as an insulator and reduces the transfer of heat, from the environment to snowman.
- B The jacket traps air as an insulator and reduces the transfer of heat, from the snowman to environment.
- C The snowman will melt, since the jacket keeps the snowman warm by trapping heat from the sun, within the jacket.
- D The snowman will melt, since the jacket reflects heat lost from the snowman, back to the snowman.

- 9 At regular intervals along a railway line, there is a gap between the rail sections.



Which is the reason for the gap between the rail sections?

- A to allow for expansion of the rail sections during hot weather
 - B to allow for vibrations of the rail sections as the train passes over them
 - C to allow rain water to drain from the rail sections
 - D to keep the wheels of the train and carriages on the rail sections
- 10 Which process involves convection?
- A bread toasting under a grill
 - B heat passing through a copper bar
 - C heat from the Sun warming a road surface
 - D hot air rising to the top of a cool room
- 11 Which change is caused by light?
- A burning of charcoal to form ash
 - B coating silver earrings with copper metal
 - C forming glucose and oxygen in green leaves
 - D removing stains using baking soda

- 12** Flowers of a hydrangea bush are pink when grown in neutral or alkaline soil and blue when the soil is acidic. Three students made three different statements as shown below.

student 1	Adding vinegar to a pot of hydrangea bush will turn the flowers pink.
student 2	Adding distilled water to a pot of hydrangea bush will turn the flowers pink.
student 3	Adding orange juice to a pot of hydrangea bush will turn the flowers blue.

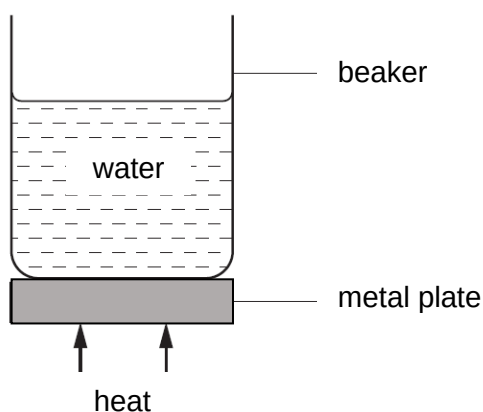
Which statement is/are correct?

- A** student 1 only
B student 3 only
C students 1 and 2 only
D students 2 and 3 only

- 13** Which two substances react to form a salt and water only?

- A** calcium carbonate and sulfuric acid
B magnesium and hydrochloric acid
C potassium chloride and nitric acid
D sodium hydroxide and ethanoic acid

- 14** Four beakers containing the same volume of water at the same temperature are placed on four hot metal plates **A**, **B**, **C** and **D**. The lower surfaces of the metal plates are kept at the same temperature. The plates are all the same size and thickness but are made from four different metals.



The time taken to produce the stated temperature rises are given in the table.

Which metal plate, **A**, **B**, **C** or **D**, is made of the poorest thermal conductor?

	temperature rise / °C	time / s
A	10	100
B	12	100
C	15	200
D	18	200

15 In the non-cyclical flow of energy in ecosystems, which process will result in energy gain?

- A** decomposition by bacteria **B** photosynthesis
C removal of faeces **D** respiration

16 The diagram shows a food chain.

mahogany tree → caterpillar → small bird → owl

Biomass is a measure of the *total mass of living material in each population*.

In this food chain, which population has the largest biomass and the largest size?

	largest biomass	largest population size
A	mahogany tree	caterpillar
B	mahogany tree	owl
C	owl	mahogany tree
D	owl	small bird

17 What is an example of a change in a physical factor in an ecosystem?

- A** decrease in hunting of fish by bears
B decrease in sleep among owls
C increase in the population of frogs
D increase in temperature of a river

18 The fuse of an electric kettle blows when it is switched on. This happens again after a new fuse is fitted. When the fuse is replaced with a nail, the kettle is able to heat its contents.

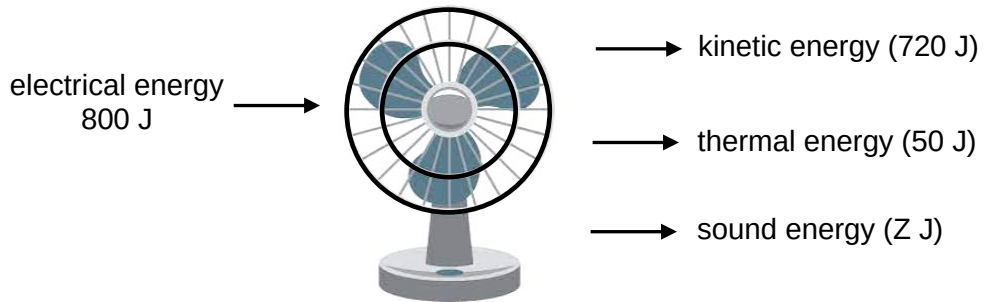
What else might happen as a result of replacing the fuse with a nail?

- A** The kettle boils the water less quickly.
B The water boils at a higher temperature.
C The wiring gets overloaded due to high current and causes a fire.
D The kettle uses more energy to boil the water due to the lack of a fuse.

19 Electrical energy costs 30 cents per kWh.
 How much does it cost to use a 2000 W oven for 3 hours?

- A** 6 cents **B** 60 cents
C 90 cents **D** 180 cents

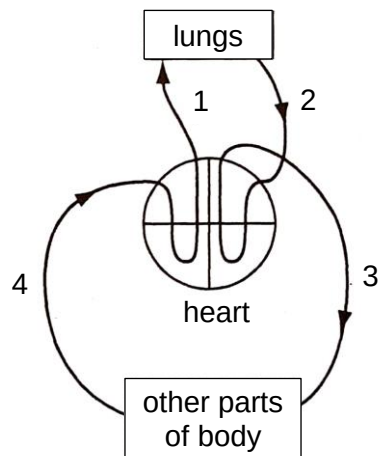
- 20** The energy conversions occurring when a fan is switched on are shown below.



What is the value of Z?

- | | | | |
|----------|-------|----------|-------|
| A | 30 J | B | 50 J |
| C | 770 J | D | 800 J |

- 21** The diagram shows a simplified representation of the human circulatory system.



Which row correctly describes the oxygen levels of the blood in the blood vessels labelled 1 to 4?

	1	2	3	4
A	high	low	high	low
B	high	low	low	high
C	low	high	high	high
D	low	high	high	low

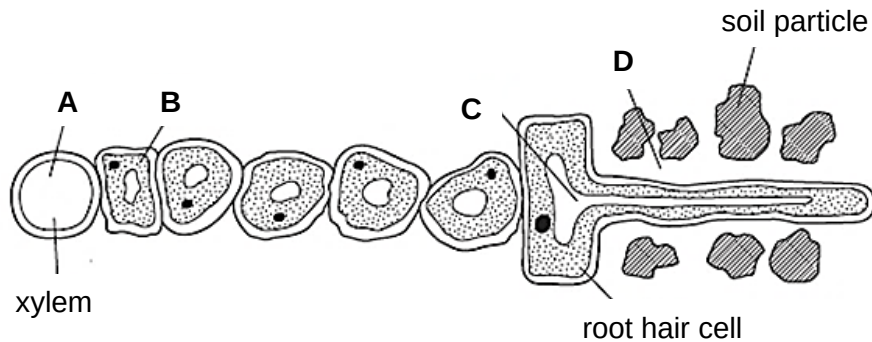
- 22** Gaseous exchange occurs between the lungs and the bloodstream.

Which row correctly shows the process and direction of movement of carbon dioxide in the lungs?

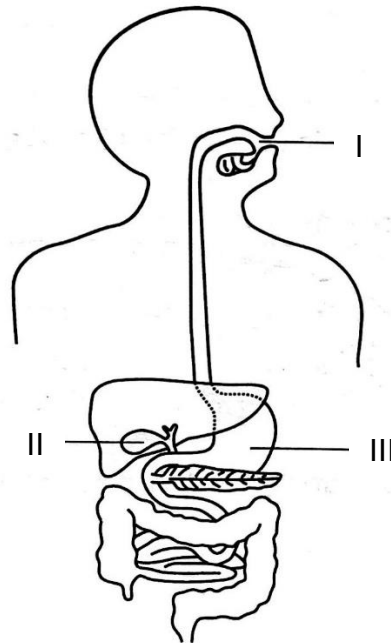
	process	direction of movement of carbon dioxide
A	diffusion	lung to bloodstream
B	diffusion	bloodstream to lung
C	osmosis	lung to bloodstream
D	osmosis	bloodstream to lung

23 The diagram shows part of a plant root in the soil.

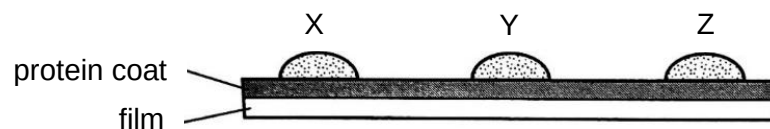
At which point, **A**, **B**, **C** or **D**, is the concentration of mineral salts the highest to ensure that salts are continuously absorbed by the roots?



24 Small samples of secretions X, Y and Z were collected from structures I, II and III respectively.



Each secretion was then placed on a strip of film coated with proteins as shown in the diagram.



Which secretion(s) would digest the protein coat on the film?

- A** X only
C Z only

- B** Y only
D X and Z only

25 Which statement explains why runners take glucose drinks before races?

- A** Glucose can be directly absorbed by the body and provides energy quickly.
- B** Glucose contains enzymes that help them run faster.
- C** Glucose reduces the production of urine.
- D** Glucose speeds up the rate of digestion of food to release more energy.

26 The bile duct is a tube which transports bile produced from the liver to the small intestine.

Which is an impact due to a blockage at the bile duct?

- A** Digestive juices produced by the stomach no longer reach the small intestine.
- B** Liver no longer produces bile.
- C** Protein digestion in the small intestine stops.
- D** Rate of fat digestion decreases.

27 Specially formulated soap powders are advertised to be able to remove oily stains completely. Such soap powders typically contain an enzyme to help them carry out their function.

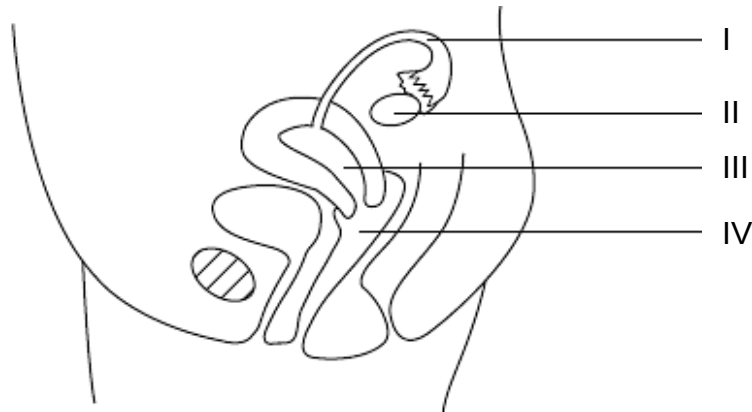
Which enzyme could be present in these specially formulated soap powders?

- | | |
|------------------|-----------------------|
| A amylase | B carbohydrase |
| C lipase | D protease |

28 Which statement about puberty is true?

- A** Boys generally experience puberty before girls.
- B** Growth spurt occurs only in boys.
- C** Pubic hair develops in both boys and girls.
- D** Urethra enlarges for both boys and girls.

29 The diagram shows the side view of the female reproductive system.



Which row correctly shows the region where sperms are deposited during sexual intercourse and the site of fertilisation?

	region where sperms are deposited	site of fertilisation
A	III	I
B	III	II
C	IV	I
D	IV	II

30 Which sexually transmitted infection(s) can be treated using antibiotics?

- 1 HIV
- 2 gonorrhea
- 3 syphilis

- | | | | |
|----------|--------------|----------|--------------|
| A | 2 only | B | 1 and 2 only |
| C | 1 and 3 only | D | 2 and 3 only |

The Periodic Table of Elements

Group																							
1	2													13	14	15	16	17	18				
		1 H hydrogen 1																					
		proton (atomic) number atomic symbol relative atomic mass																					
3 Li lithium 7	4 Be beryllium 9																	5 B boron 11	6 C carbon 12	7 N nitrogen 14	8 O oxygen 16	9 F fluorine 19	10 Ne neon 20
11 Na sodium 23	12 Mg magnesium 24																	13 Al aluminium 27	14 Si silicon 28	15 P phosphorus 31	16 S sulfur 32	17 Cl chlorine 35.5	18 Ar argon 40
19 K potassium 39	20 Ca calcium 40	21 Sc scandium 45	22 Ti titanium 48	23 V vanadium 51	24 Cr chromium 52	25 Mn manganese 55	26 Fe iron 56	27 Co cobalt 59	28 Ni nickel 59	29 Cu copper 64	30 Zn zinc 65	31 Ga gallium 70	32 Ge germanium 73	33 As arsenic 75	34 Se selenium 79	35 Br bromine 80	36 Kr krypton 84						
37 Rb rubidium 85	38 Sr strontium 88	39 Y yttrium 89	40 Zr zirconium 91	41 Nb niobium 93	42 Mo molybdenum 96	43 Tc technetium -	44 Ru ruthenium 101	45 Rh rhodium 103	46 Pd palladium 106	47 Ag silver 108	48 Cd cadmium 112	49 In indium 115	50 Sn tin 119	51 Sb antimony 122	52 Te tellurium 128	53 I iodine 127	54 Xe xenon 131						
55 Cs caesium 133	56 Ba barium 137	57-71 lanthanoids		72 Hf hafnium 178	73 Ta tantalum 181	74 W tungsten 184	75 Re rhenium 186	76 Os osmium 190	77 Ir iridium 192	78 Pt platinum 195	79 Au gold 197	80 Hg mercury 201	81 Tl thallium 204	82 Pb lead 207	83 Bi bismuth 209	84 Po polonium -	85 At astatine -	86 Rn radon -					
87 Fr francium -	88 Ra radium -	89-103 actinoids		104 Rf rutherfordium -	105 Db dubnium -	106 Sg seaborgium -	107 Bh bohrium -	108 Hs hassium -	109 Mt meitnerium -	110 Ds darmstadtium -	111 Rg roentgenium -	112 Cn copernicium -	113 Nh nihonium -	114 Fl flerovium -	115 Mc moscovium -	116 Lv livermorium -	117 Ts tennessine -	118 Og oganeson -					

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

lanthanoids

actinoids