



SINGAPORE – CAMBRIDGE  
General Certificate of Education Normal (Technical) Level

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## SCIENCE SYLLABUS T

**5148/01**

Paper 1

**For examination from 2024**

SPECIMEN PAPER

**1 hour 15 minutes**

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### INSTRUCTIONS TO CANDIDATES

This paper consists of two sections – Section A and Section B. Answer all questions in both sections.

Read each question carefully before answering.

Please wait for the invigilator's signal before you click 'START TEST'.

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



Singapore Examinations and Assessment Board

## SECTION A [40 marks]

1 The statements describe Joe's daily diet and lifestyle.

- 1 He eats too little fibre.
- 2 He eats too much carbohydrates.
- 3 He does not drink enough water.
- 4 He does not exercise regularly.

Which statements identify the factors that increase the risk of developing diabetes?

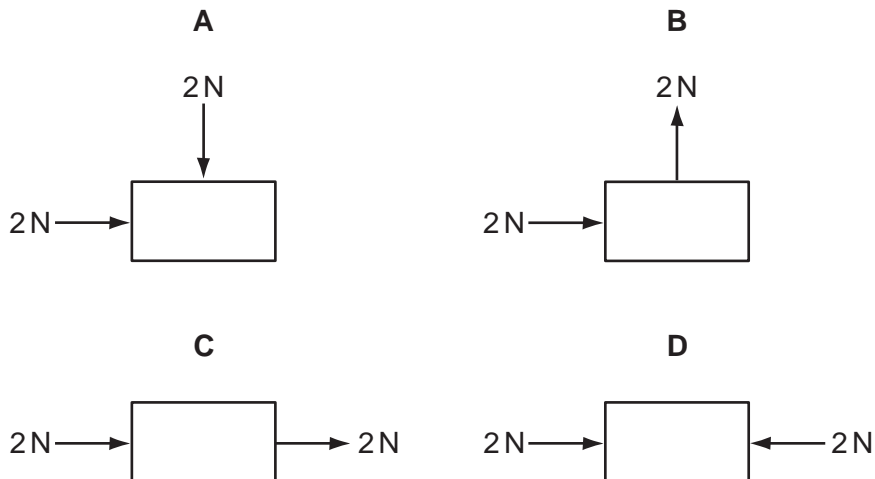
- A** 1 and 2      **B** 1 and 3      **C** 2 and 4      **D** 3 and 4

2 Which effect is caused by removing large areas of tropical rain forest using slash-and-burn?

- A** decreases soil fertility  
**B** decreases carbon dioxide levels in air  
**C** increases soil erosion  
**D** increases nitrogen levels in air

3 The diagram shows four bricks at rest viewed from above. Two forces are applied to each brick.

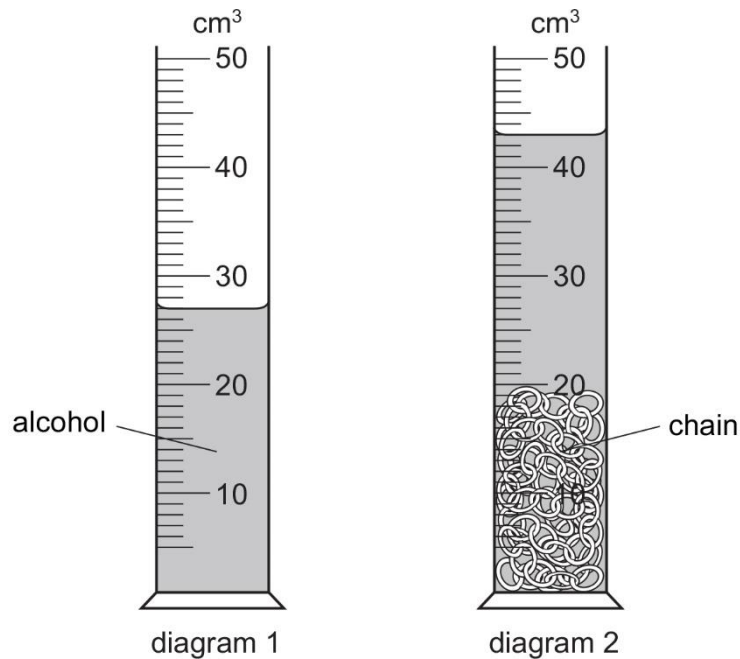
Which brick does **not** move?



- 4 Which health risk is **not** linked to the inhalation of cigarette smoke?
- A bronchitis
- B heart disease
- C lung cancer
- D thalassaemia
- 5 Many rivers are becoming clogged up by rapidly growing plants due to high levels of dissolved nitrates.

Which is the main source of these nitrates?

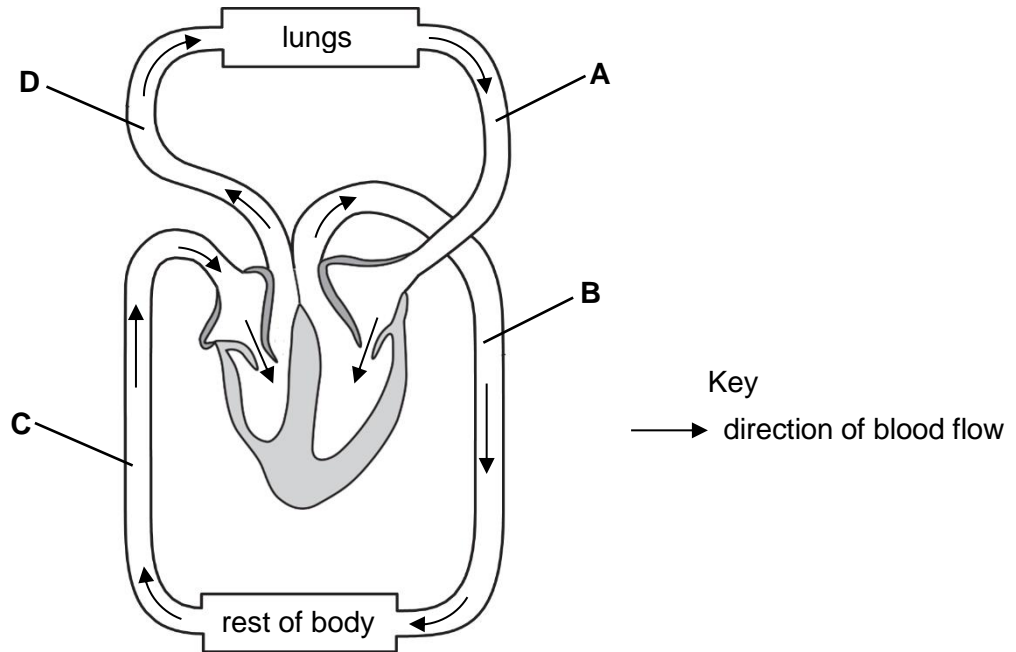
- A decay of animals
- B drainage of fertilisers
- C drainage of weedkillers
- D pollution from the atmosphere
- 6 Diagram 1 shows a measuring cylinder which contains alcohol. A chain is totally immersed in the alcohol. This is shown in diagram 2.



What is the volume of the chain?

- A  $16 \text{ cm}^3$       B  $27 \text{ cm}^3$       C  $43 \text{ cm}^3$       D  $70 \text{ cm}^3$

7 Which part of the circulatory system has the highest level of carbon dioxide?



8 What are the main functions of carbohydrates, proteins and fats in the human body?

	carbohydrates	proteins	fats
<b>A</b>	growth and repair	store energy	provide energy
<b>B</b>	store energy	provide energy	growth and repair
<b>C</b>	provide energy	growth and repair	store energy
<b>D</b>	growth and repair	provide energy	store energy

9 A man undergoes medical treatment in a hospital. In his hospital room, he uses a remote control to switch the television on and off.

Which row correctly identifies the waves used in his medical treatment and by the remote control?

	wave used in medical treatment	wave used by the remote control
<b>A</b>	gamma rays	ultraviolet
<b>B</b>	ultraviolet	microwaves
<b>C</b>	gamma rays	infrared
<b>D</b>	radio waves	ultraviolet

- 10 A filament lamp is rated at 50W. The equivalent LED lamp is rated at 10W. Electricity costs \$0.20 per unit (1 kWh).

How much money is saved if the LED lamp is used instead of the filament lamp for 1000 hours of use?

- A \$2                      B \$8                      C \$10                      D \$12

- 11 What happens to the muscles and the movement of the diaphragm when breathing in (inhaling)?

	diaphragm muscles	diaphragm movement
<b>A</b>	contract	downward
<b>B</b>	contract	upward
<b>C</b>	relax	upward
<b>D</b>	relax	downward

- 12 In a garden, small insects are attacking and eating the plants. The gardener introduces some organism X into the garden as a form of biological control.

Which of the following describes how biological control work?

- A Organism X eats the plants only.  
 B Organism X eats the small insects only.  
 C The small insects eat organism X only.  
 D The small insects eat organism X and the plants.

- 13 Cans for storing food are made of iron. Iron rusts if it is not protected.

Which metal is used to plate the food cans?

- A chromium  
 B copper  
 C tin  
 D zinc

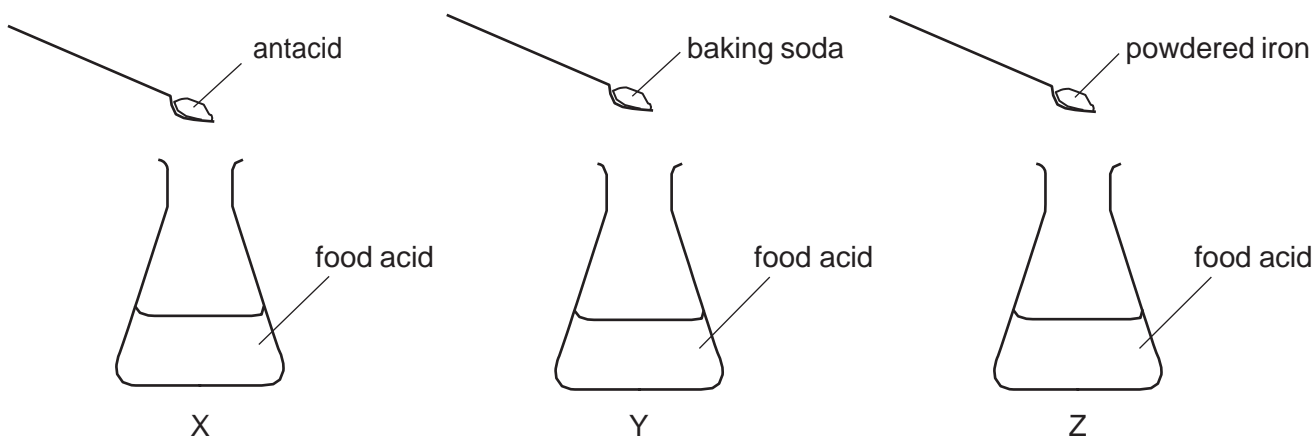
- 14 A hair dryer operates on 230V and a current of 10 A.  
The hair dryer is used for one minute.



What is the power of the hair dryer and the energy used?

	power/W	energy used/J
<b>A</b>	23	230
<b>B</b>	23	1 380
<b>C</b>	2 300	2 300
<b>D</b>	2 300	138 000

- 15 Three flasks contain equal amounts of an acid found in some foods. Three solids are added to the flasks.

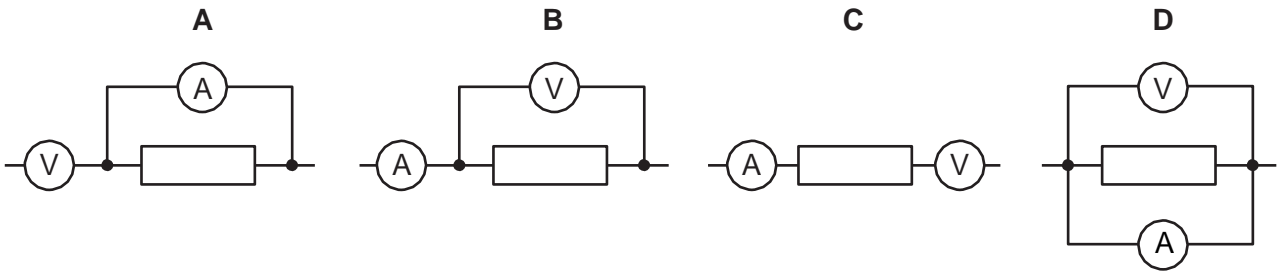


In which flasks do the chemical reactions produce bubbles of gas?

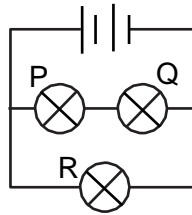
	X	Y	Z
<b>A</b>	✓	✓	✓
<b>B</b>	x	✓	✓
<b>C</b>	✓	x	✓
<b>D</b>	✓	✓	x

- 16 Two multimeters are used to measure the voltage across, and the current through, a resistor. One multimeter is used as a voltmeter and the other one as an ammeter.

Which is the correct arrangement of the two multimeters?



- 17 The circuit below is used in a household appliance.



After some time, bulb P blows.

What will happen to bulbs Q and R?

	Q	R
<b>A</b>	remains lighted	remains lighted
<b>B</b>	does not light	remains lighted
<b>C</b>	remains lighted	does not light
<b>D</b>	does not light	does not light

- 18 A cook mixes butter, eggs, flour, sugar and water together in a bowl. The cook then transfers the mixture to a cake tin and bakes it in an oven. The cake is turned out onto a tray and allowed to cool. The cake is then cut into slices.

During which stage in the process does a chemical reaction take place?

- A** mixing
- B** baking
- C** cooling
- D** slicing

19 Which component is used to vary the current in a circuit?



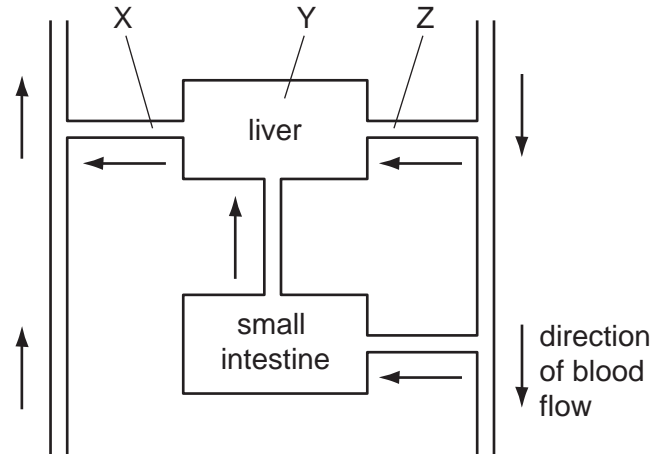
20 Digested food absorbed into human cells undergo process X to release energy.

What is process X?

- A breathing
  - B constipation
  - C nutrition
  - D respiration
- 21 Which of the following is **not** an example of microbial action on food?
- A banana ripening
  - B bread turning mouldy
  - C making cheese
  - D milk turning sour



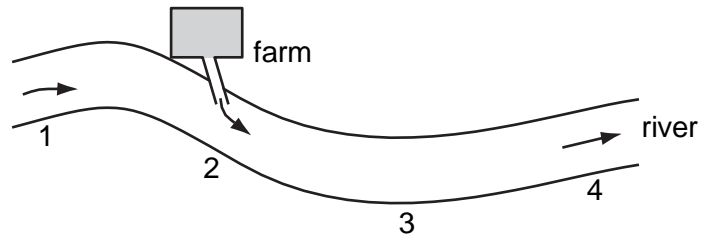
22 The diagram shows the path of blood through the liver and small intestine.



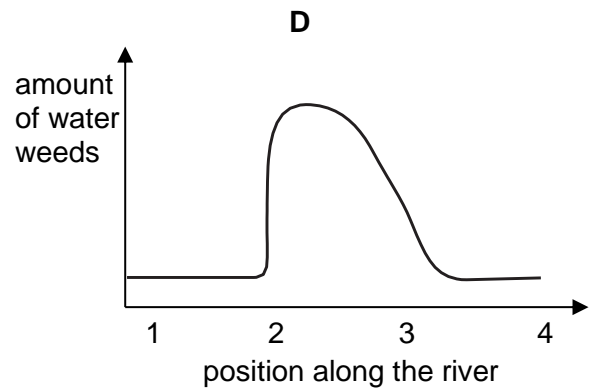
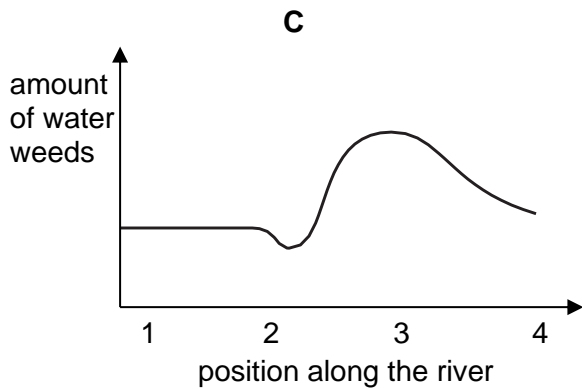
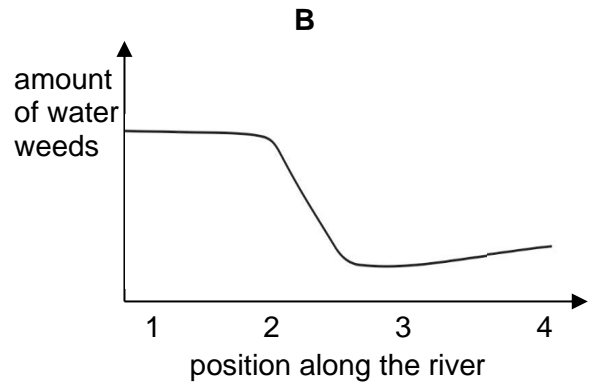
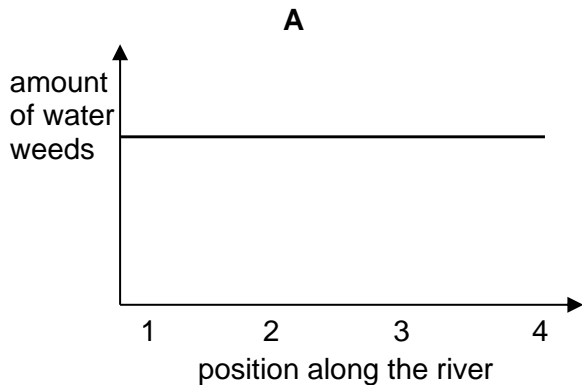
Where are an artery, capillaries and a vein?

	artery	capillaries	vein
<b>A</b>	X	Y	Z
<b>B</b>	Y	Z	X
<b>C</b>	Z	X	Y
<b>D</b>	Z	Y	X

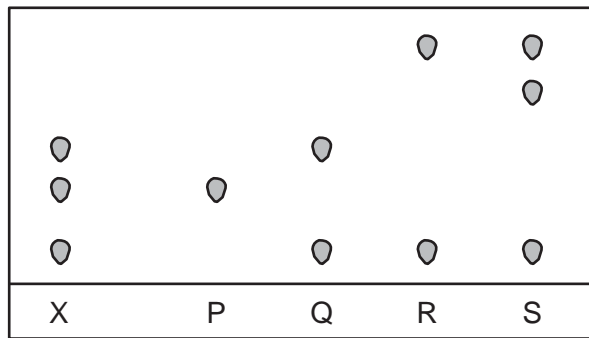
- 23 The diagram shows the location of a farm that used herbicides and part of a river where water from the farm flows into.



Which graph represents the amount of water weeds in the river at the different locations?

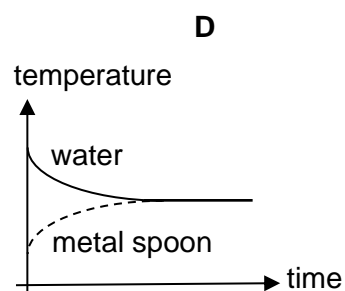
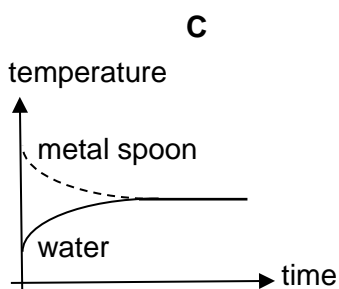
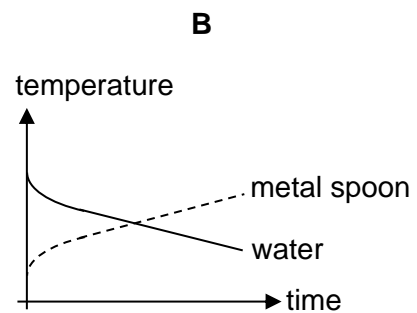
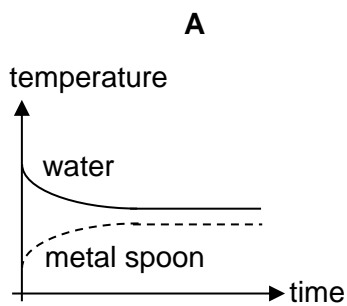


- 24 Paper chromatography can be used to separate the colours in dyes. A teacher gives her students a new dye labelled X.



Which colours has she mixed to make X?

- A P and Q      B Q and R      C Q and S      D P and R
- 25 A metal spoon at a temperature of  $25^{\circ}\text{C}$  was dropped into a cup of water at  $78^{\circ}\text{C}$ .
- Which graph shows how the temperatures of the metal spoon and water would change?



- 26 The amount of oxygen carried by human blood depends on the
- A amount of plasma.  
 B number of platelets.  
 C number of red blood cells.  
 D number of white blood cells.

27 Which part of the body is affected by arthritis?

- A heart
- B joint
- C kidney
- D lung

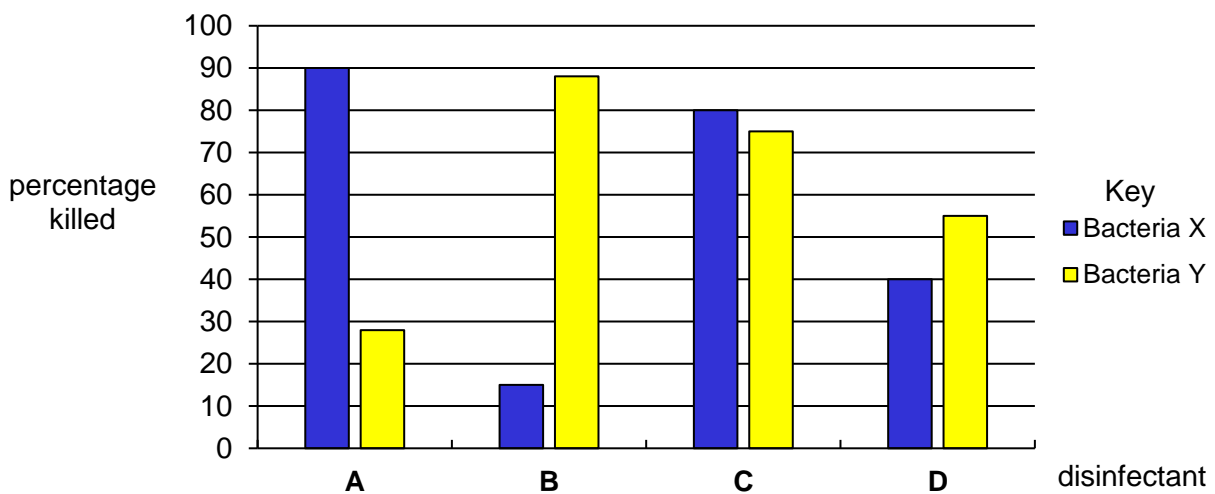
28 Which of the following is a way of preventing diseases caused by viruses?

- A kidney dialysis
- B organ transplant
- C use of antibiotics
- D vaccination

Questions 29 and 30 are based on the following information.

Disinfectants can kill different bacteria.

The graph shows the percentages of bacteria, X and Y, killed by four disinfectants.



29 Which disinfectant, (A, B, C or D) killed less than 30% of bacteria X?

30 Which disinfectant, (A, B, C or D) is most effective at killing bacteria X **and** bacteria Y?

31 The following sentences are about energy. Drag and drop the correct word into each box.

reaction	conservation	created	converted	increased	decreased	preservation
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Energy is never , it is  from one form to another.

This is called the principle of  of energy.

[3]

32 Join each method of separation with the description that best describes the use of the method of separation. Each description should be joined only once.

**Method of Separation**

**Description**

distillation

separates a salt from a salt solution by heating to remove water

dissolving

separates a liquid from a solution

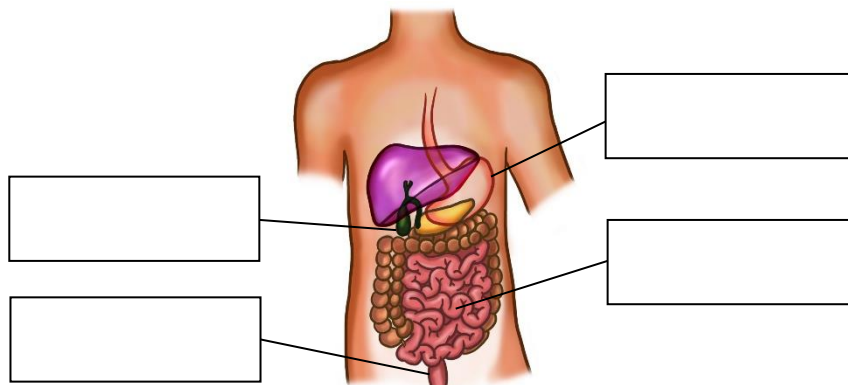
evaporation

separates a soluble salt from a mixture of salts by adding a solvent such as water

[2]

33 The diagram shows some organs of the human digestive system. Drag and drop the correct label of the organ into each box.

pancreas	gall bladder	stomach	rectum	small intestine	large intestine
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[2]

34 The following describe the functions and structures of two human blood vessels, A and B.

**carry blood to heart**

**carry blood from heart**

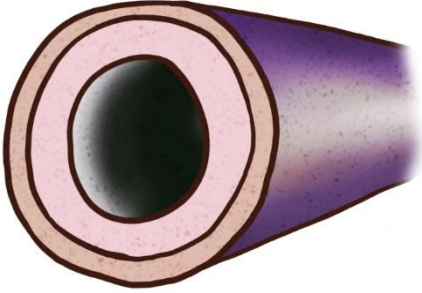
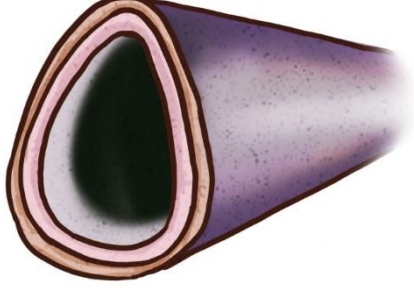
**blood flowing at high pressure**

**blood flowing at low pressure**

**have valves**

**no valves**

Drag and drop each description into the box of the correct blood vessel shown below.

 <p>Blood vessel A</p> <div style="border: 1px solid black; height: 160px; width: 303px;"></div>	 <p>Blood vessel B</p> <div style="border: 1px solid black; height: 160px; width: 307px;"></div>
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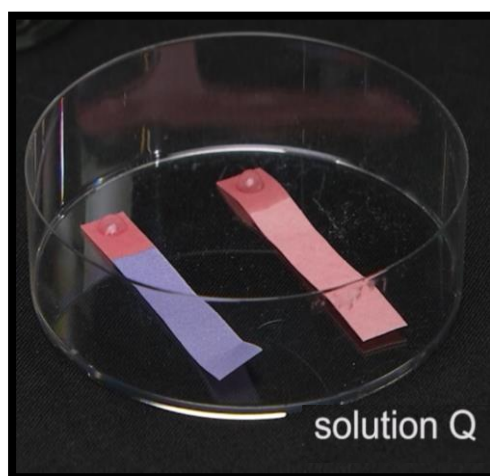
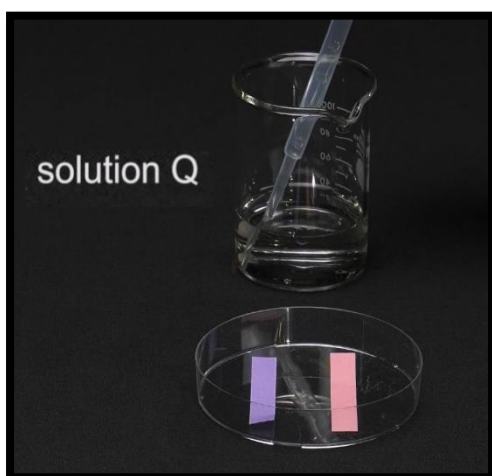
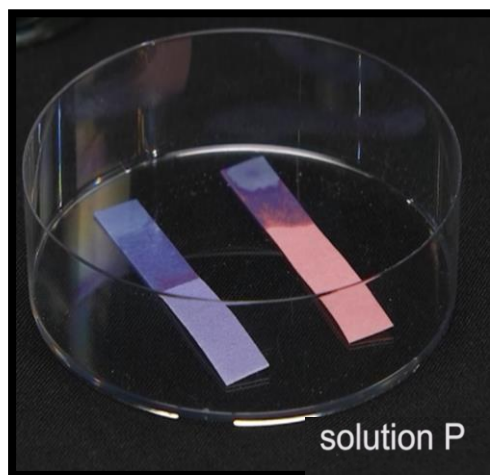
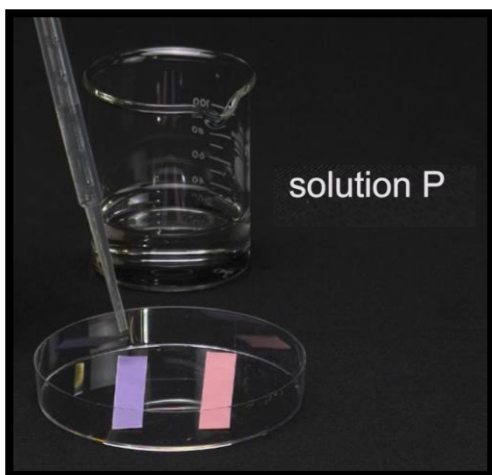
[3]

## SECTION B [10 marks]

- 35 A student conducted an experiment on two unknown solutions, **P** and **Q**, using litmus papers to determine which is a base and which is an acid.

Watch the video and answer the questions in the spaces provided.

Screenshots of the video are shown below.



- (a) From the results in the video, select the solution (**P** or **Q**) that is an acid.

Solution .....

[1]

- (b) Name the reaction that took place when solutions **P** and **Q** are mixed.

..... [1]

- (c) Equal volumes of solutions **P** and **Q** were mixed together. The solutions contain the same amount of **P** and **Q** before mixing. Predict the final colours of the red **and** blue litmus papers when tested with the resulting solution (**P+Q**).

Final colour of red litmus paper .....

Final colour of blue litmus paper .....

[1]

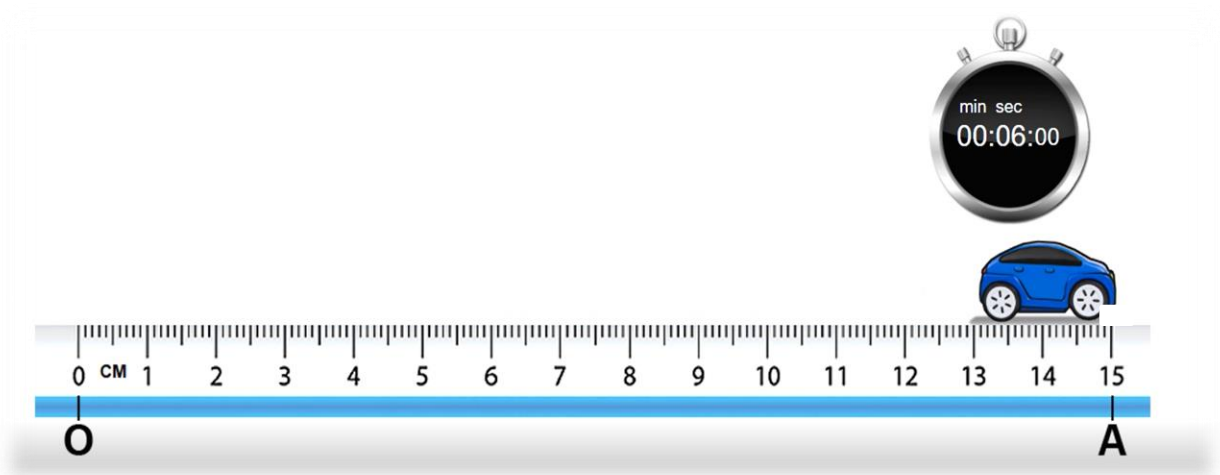
- 36 In the animation, the toy car moves forward in a straight line and passes by point O and point A.

The stopwatch in the animation starts timing the moment the car moves. You can click on the “pause” button to stop or resume the animation.

Use the animation to answer the questions in the spaces provided.

The ruler in the animation is not drawn to scale.

A screenshot of the animation is shown below.



- (a) Record the time taken by the toy car to travel from point O to point A.

Time taken = .....s

[1]

- (b) Record the distance travelled by the toy car from point O to point A.

Distance travelled = .....cm

[1]

- (c) Determine the average speed of the car from point O to point A.

Average speed = ..... cm/s

[1]



37 (a) State one health risk of drinking excessive alcohol over a long period of time.

..... [1]

Beer contains alcohol. When a person drinks beer, the concentration of alcohol in the blood depends on four factors:

- number of glasses of beer drank
- number of hours after drinking
- mass of the person
- gender of the person (female or male)

The tool uses the above four factors to estimate a person's Blood Alcohol Concentration (BAC).

Use the tool by moving the sliders and select the gender to get the BAC estimates.  
Answer the questions in the spaces provided.

Screenshots of the tool are shown below.

This screenshot shows the tool's interface with the following settings:

- Number of glasses of beer:** Slider set to 4.
- Number of hours after drinking:** Slider set to 2.
- Mass of person (kg):** Slider set to 70.
- Gender:** Male  and Female .
- Blood Alcohol Concentration (BAC):** 0.080 %

This screenshot shows the tool's interface with the following settings:

- Number of glasses of beer:** Slider set to 4.
- Number of hours after drinking:** Slider set to 2.
- Mass of person (kg):** Slider set to 70.
- Gender:** Male  and Female .
- Blood Alcohol Concentration (BAC):** 0.091 %

(b) Estimate the Blood Alcohol Concentration (BAC) in the following people.

(i) 2 hours after a male of mass 70 kg drank 4 glasses of beer.

BAC = .....% [1]

(ii) 2 hours after a female of mass 70 kg drank 4 glasses of beer

BAC = .....% [1]

(c) Tommy said the gender affects how fast alcohol is removed from the blood. Is he correct? Explain your answer using the BAC estimates from (b)(i) and (b)(ii).

.....  
..... [1]

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*Copyright Acknowledgements:*

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