

PRELIMINARY EXAMINATION

SPECIMEN 2

SCIENCE (BOOKLET B)

Total Time (for Booklets A and B): **1 hour 45 minutes**

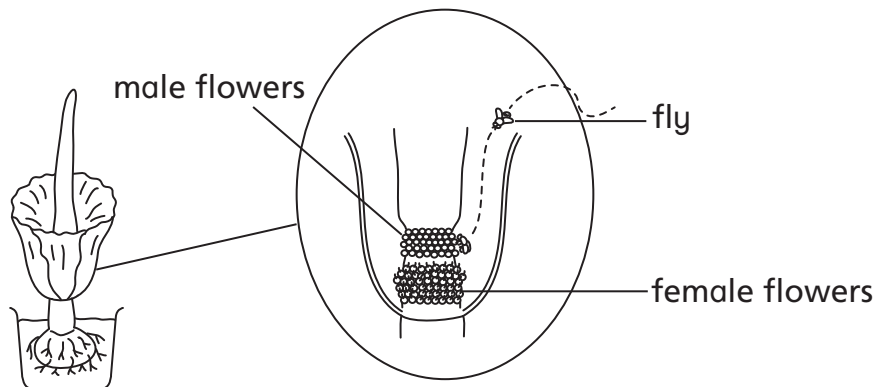
INSTRUCTIONS TO CANDIDATES

- Follow ALL instructions carefully.
- Answer ALL questions.

For questions 29 to 40, write your answers in this booklet. The number of marks available is shown in brackets [] at the end of each question or part question.

[44 marks]

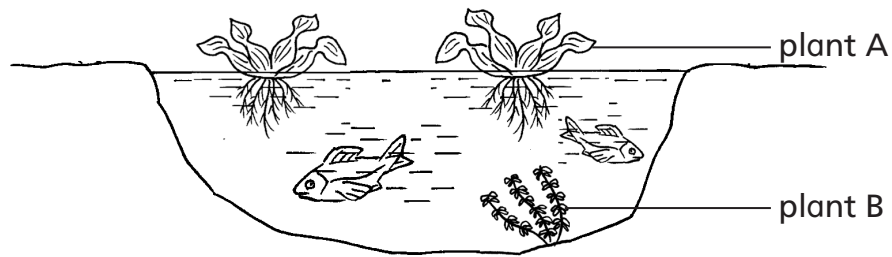
29. Plant C shown below consists of a row of small male flowers and a row of small female flowers. The female flowers open first for two days and then die before the male flowers open and die.



- (a) Explain how a fly can help plant C to produce fruits. [1]

- (b) Explain whether pollination can occur within the same plant. [1]

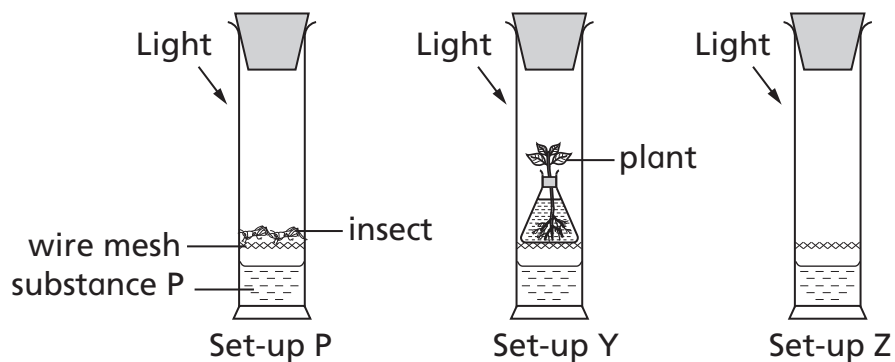
30. The diagram shows a pond.



- (a) Fertiliser from a nearby farm is washed into the pond. This causes the population of plant A to increase and the population of plant B to decrease. Explain why the population of plant B decreases. [1]

- (b) When a lot of plant B die and start to rot, the population of fish will decrease. Explain why. [1]

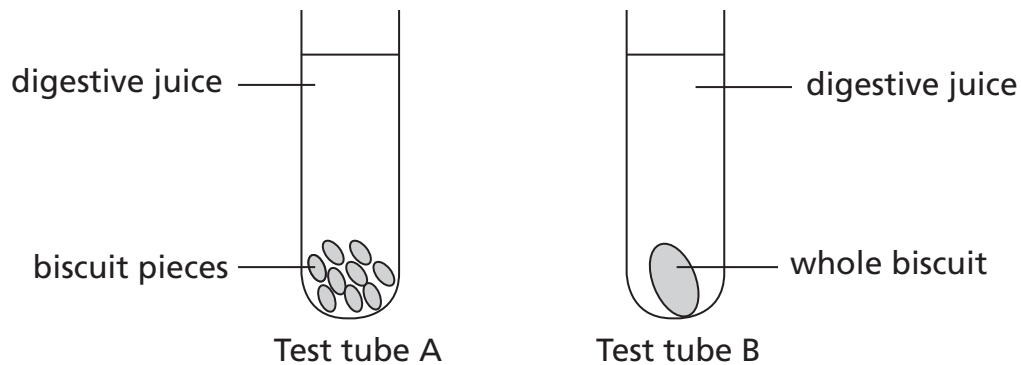
31. Jacky sets up the following experiment. Substance P changes colour when the amount of carbon dioxide is high.



- (a) What is the purpose of set-up Z? [1]

- (b) In which set-up will substance P change colour? Explain. [1]

32. (a) Sarah placed two biscuits of the same mass into two test tubes containing the same amount and type of digestive juice.



Test tube	Time taken to completely digest biscuit (h)
A	3
B	5

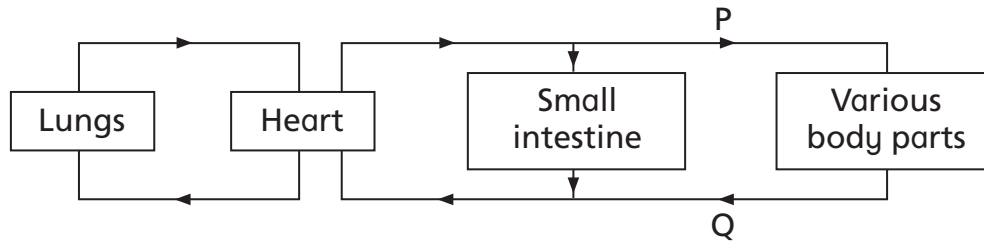
State the relationship between the surface area of the biscuit and rate of digestion. [1]

- (b) The diagram shows the inside surface of the small intestine.



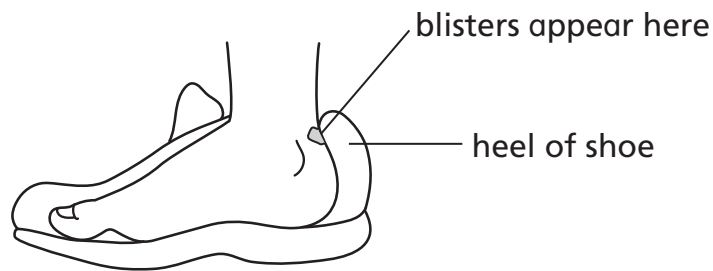
Explain how the finger-like structures help in the absorption of digested food. [1]

(c) The diagram shows the movement of blood.



Compare the amount of digested food and oxygen in blood P and in blood Q. Explain your answer. [2]

33. Brian has bought a new pair of covered shoes. After wearing them for the first time, he has blisters on the back of his heels.



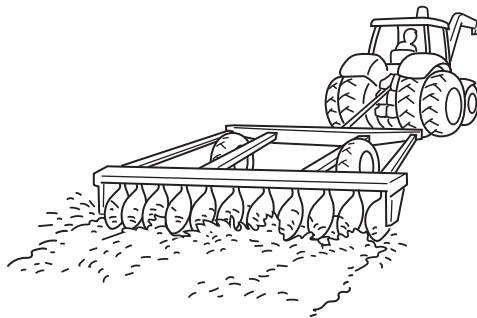
- (a) Brian's mother suggests applying oil on the heels of the shoes. How does the oil help to prevent blisters from forming? [1]

- (b) As Brian runs, both his breathing rate and heart rate increase. How do the increased breathing rate and increased heart rate help to supply more oxygen to his legs? [1]

- (c) As Brian runs, his body produces heat and his skin produces sweat. How does the sweat help to cool down his body? [1]

- (d) When Brian wears the shoes for long periods of time, fungi grow on his feet. His friend suggests adding powder that absorbs water into his shoes. How does the powder reduce the growth of fungi? [1]

34. Before planting new crop K, Farmer John uses a truck to stir the soil so as to kill unwanted plants.



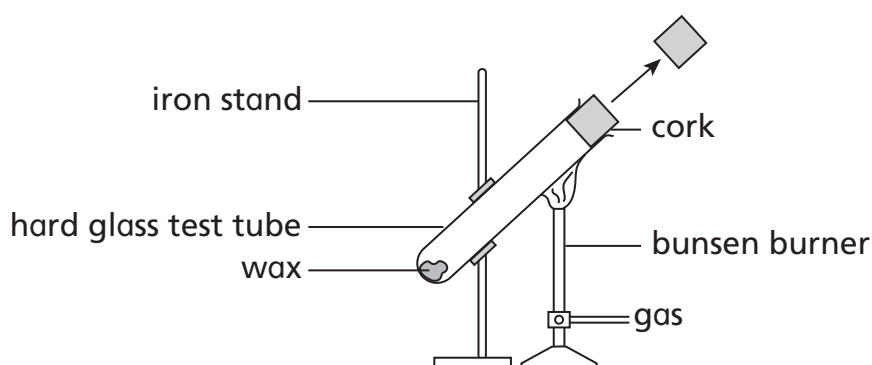
- (a) Why does farmer John remove the unwanted plants? [1]

- (b) When stirring the soil, dead plant and animal matter which were buried in soil becomes exposed to the air. How does this increase the amount of carbon dioxide in the atmosphere? [1]

- (c) Due to excessive stirring of the soil by machinery, Farmer John realises that the soil becomes less fertile. In the following year, he stops stirring the soil and uses substance H to kill the unwanted plants instead.
Suggest one effect of the excessive use of substance H on the environment. [1]
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- (d) Scientists develop a new type of crop K which is unaffected by substance H. How does this new development help to reduce global warming? [2]
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35. Hussein heats the top of the test tube covered with a cork. The test tube contains a piece of solid wax.



After some time, Hussein observes that the cork pops out but the wax does not melt.

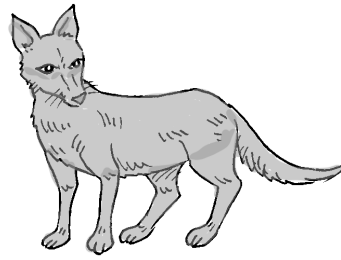
- (a) Why does the cork pop out? [1]
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- (b) Explain why the wax does not melt. [1]
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- (c) Animal F grows thicker fur during cold snowy months and shorter fur during hot months. Also, its fur is white during cold months and brown during hot months.



During cold months

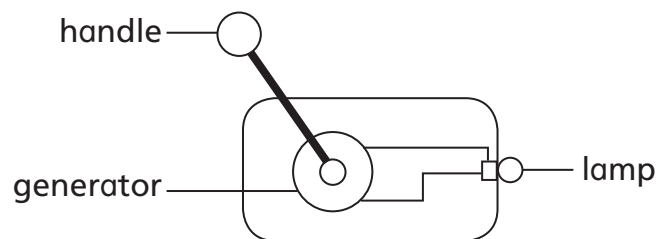


During hot months

- (i) Based on your answer in (b), explain how growing thick fur help animal F to survive in cold months. [1]

- (ii) What is the advantage of changing colour of fur during cold months? [1]

36. Hui Ping has a torch that does not use batteries as a source of energy. When the handle is turned, the generator produces electricity.



- (a) Complete the energy conversions that occur when the handle is turned. [1]

_____ energy of turning handle → _____ energy
in generator → heat energy + _____ energy by lamp

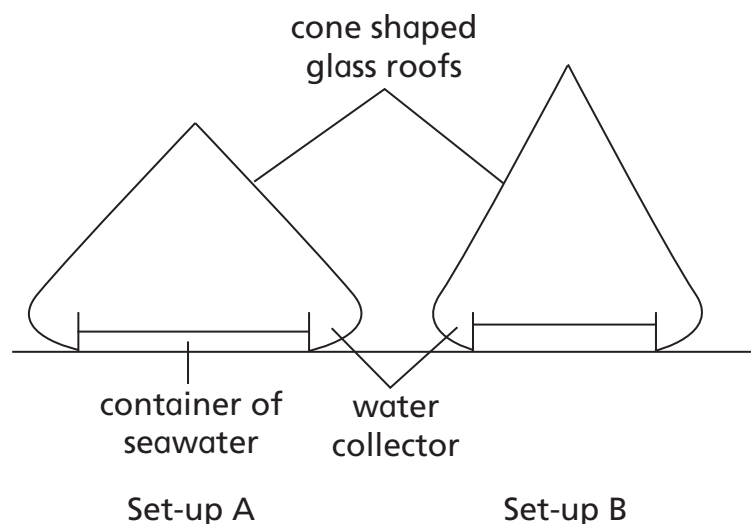
- (b) Hui Ping uses the torch to carry out an experiment and obtains the following results.

Number of turns of the handle in 20 seconds	Brightness of lamp (units)
4	10
8	20
12	30
16	40
20	0

- (i) State the relationship between the speed of rotation of the handle and amount of electric current. [1]

- (ii) Suggest why the brightness of the lamp is zero when the number of turns in 20 seconds is 20. [1]

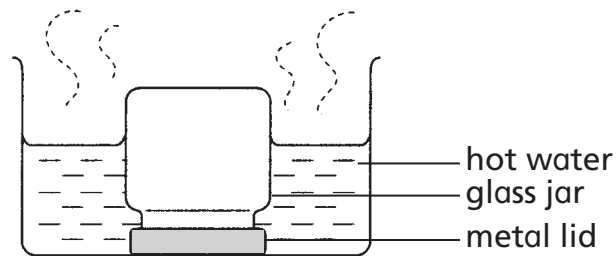
37. Sally places the following set-ups, A and B, under the Sun to collect clean water from sea water. Both set-ups contain the same amount of seawater at first.



- (a) Explain how clean water collects in the water collector. [2]

- (b) Explain which set-up collects more clean water in the same time period. [1]
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38. Leewen wishes to remove the lid that is stuck to a jar. She places the whole jar in hot water as shown.

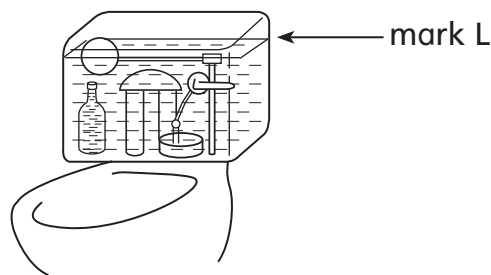


- (a) What type of force prevents Leewen to remove the lid from the jar? [1]
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- (b) She finds that she is still unable to remove the lid after putting the whole jar in the hot water. Explain why. [1]
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- (c) Guoming advises that she puts the jar in the refrigerator for some time before placing only the metal lid in hot water. How does this help? [1]
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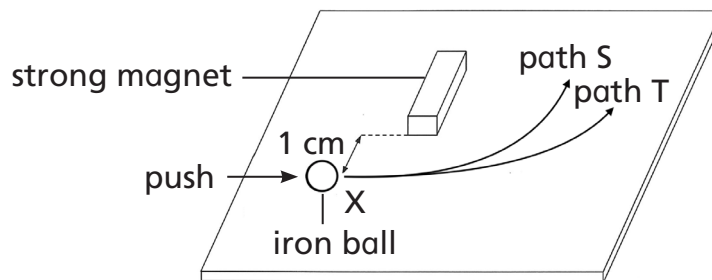
39. Mrs Jackson places a bottle in the toilet flush system in order to save water.



- (a) Explain how the bottle in the toilet flush system saves water. [1]

- (b) Why does Mrs Jackson fill the bottle completely with water? [1]

40. Qiqi applies a pushing force on an iron ball which moves in path S.

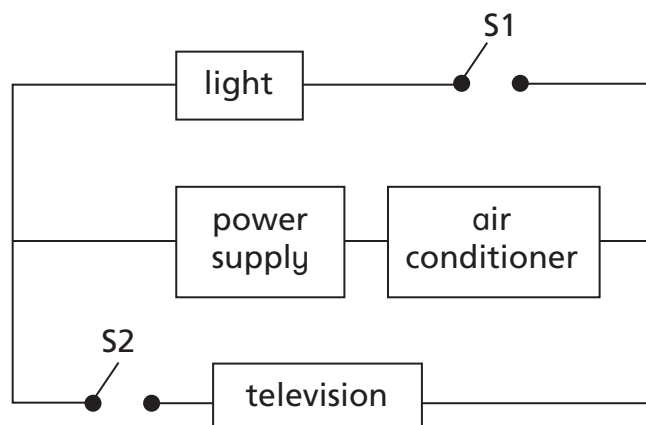


- (a) Explain why the iron ball moves in path S instead of a straight path. [1]

- (b) Qiqi heats the magnet with a Bunsen flame for some time and then repeats the experiment with the same amount of pushing force. She observes that the iron ball moves in path T. Explain why. [1]

- (c) How would the path of the iron ball be if Qiqi applies the same amount of pushing force on an iron ball with a smaller mass? [1]
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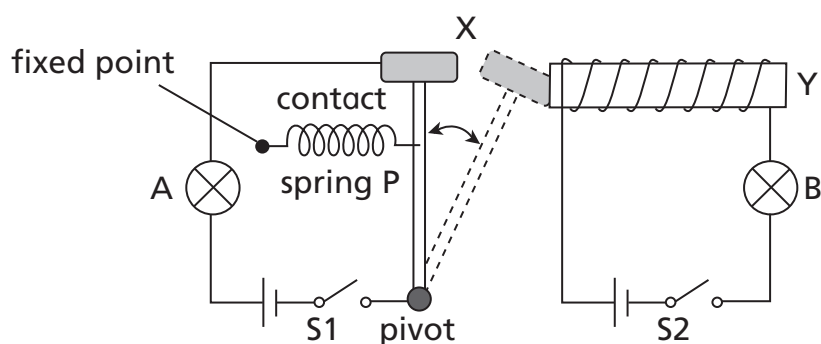
41. The diagram shows an electric circuit at home.



- (a) Explain why the circuit does not help in saving electricity. [1]
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- (b) Draw a circuit that can be used to control the three electrical appliances individually. You may add more switches. [2]

42. Gloria sets up the following. X and Y are made of the same material.



- (a) When Gloria closes only S1, bulb A lights up. Explain why bulb A does not light up when she closes both S1 and S2. [2]

- (b) Gloria replaces spring P with spring Q that is stiffer. Explain why bulb A remains lighted up when she closes both S1 and S2. [2]
