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1 Which statement about the effect of a force is correct?

- A It can change the mass of an object.
- B It can make a stationary object move.
- C It cannot change the direction of a moving object.
- D It cannot stop a moving object.

2 What is the diameter of the coin?



- | | |
|---------|---------|
| A 24 mm | B 25 mm |
| C 49 mm | D 74 mm |

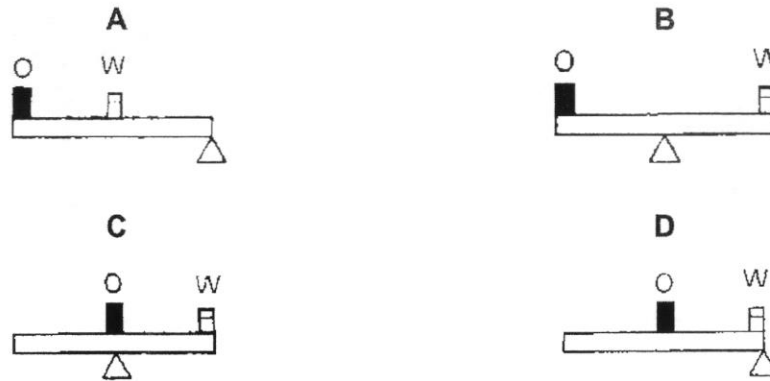
3 Which equation is used to calculate the acceleration of an object?

- A $\frac{\text{change in speed}}{\text{time taken}}$
- B change in speed x time taken
- C distance travelled x time taken
- D $\frac{\text{distance travelled}}{\text{time taken}}$

- 4 A student would like to find the weight of an object O, using a set of known weights W, a metre ruler and a pivot.

The diagram shows four different methods that the student tries.

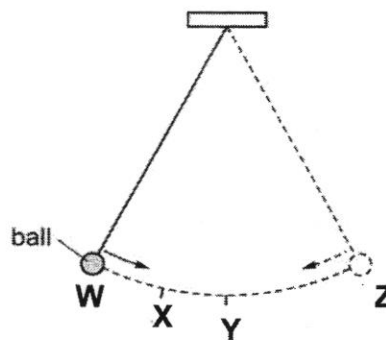
If O weighs the same as W, which method balances the ruler?



- 5 An ice cube is dropped into a cup filled with hot tea.

Which statement is correct?

- A Cold energy flows from the ice cube into the hot tea.
 - B There is no net flow of thermal energy.
 - C Thermal energy flows from the hot tea into the ice cube.
 - D Thermal energy flows from the ice cube into the hot tea.
- 6 The diagram shows a ball hanging on a string. The ball swings from point W to point Z and back to point W.

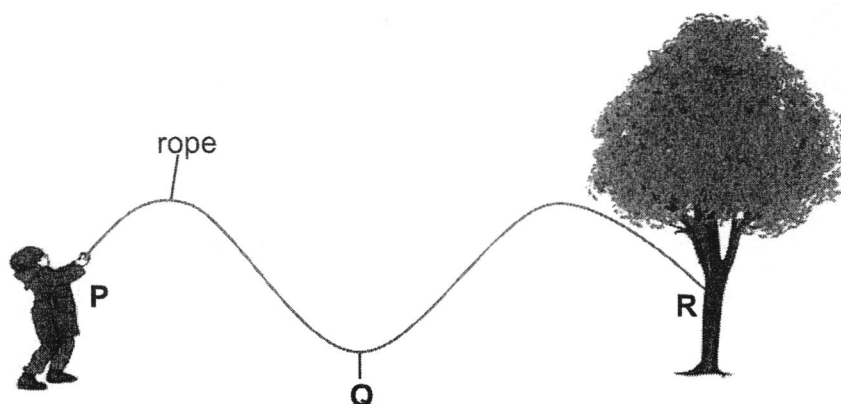


Which statement about the ball is correct?

- A The kinetic energy of the ball is greatest at point W.
- B The kinetic energy of the ball is greatest at point X.
- C The kinetic energy of the ball is greatest at point Y.
- D The kinetic energy of the ball is the same at all points of the swing.

- 7 A rope is tied to a tree at **R**.

A boy moves his hand vertically to make a wave travel along the rope.



Which row is correct?

	the wave travels from	point Q moves
A	P to R	left to right
B	P to R	up and down
C	R to P	left to right
D	R to P	up and down

- 8 Five complete waves pass a point in two seconds.

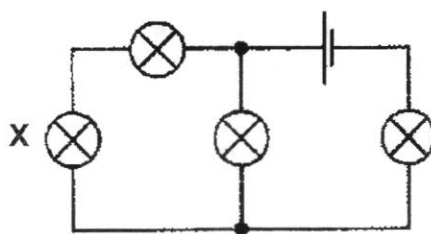
What is the frequency of the wave?

- A** 0.4 Hz **B** 2.5 Hz
C 5 Hz **D** 10 Hz

- 9 Which is the correct use for the following waves?

	electromagnetic wave	use
A	infra-red	tv broadcasting
B	microwave	sterilise medical equipment
C	visible light	detect forgery
D	X-ray	scan luggage

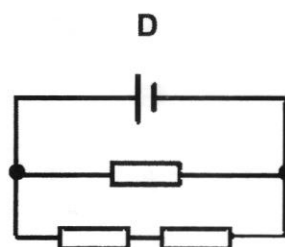
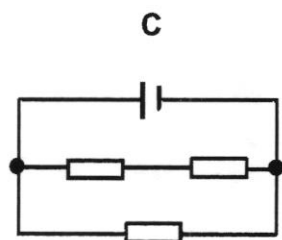
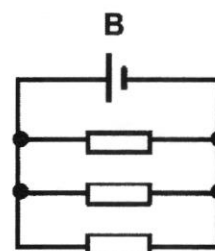
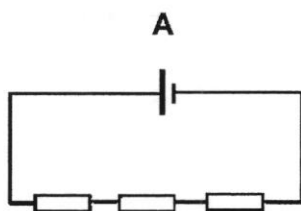
- 10 The diagram shows a circuit in which all bulbs are lit.



Bulb **X** blows and breaks part of the circuit.

How many of the bulbs will remain lit?

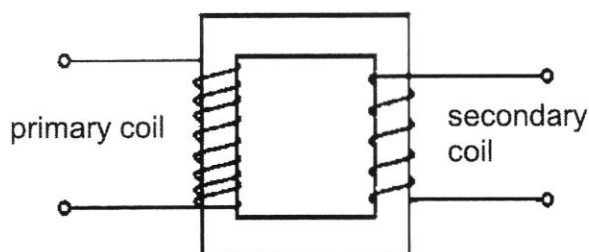
- | | | | |
|----------|---|----------|---|
| A | 0 | B | 1 |
| C | 2 | D | 3 |
- 11 Why is it important to earth the metal casing of an electric kettle?
- A** to control the temperature
 - B** to prevent the fuse from blowing
 - C** to prevent the heating element from burning out
 - D** to protect people from electric shocks
- 12 The diagram shows four circuits using resistors of the same value.
- Which circuit has the greatest effective resistance?



13 Which energy conversion does **not** occur in fossil fuel power stations?

- A chemical potential energy $\rightarrow$ heat energy
- B heat energy $\rightarrow$ chemical potential energy
- C heat energy $\rightarrow$ kinetic energy
- D kinetic energy $\rightarrow$ electrical energy

14 The diagram shows a transformer.

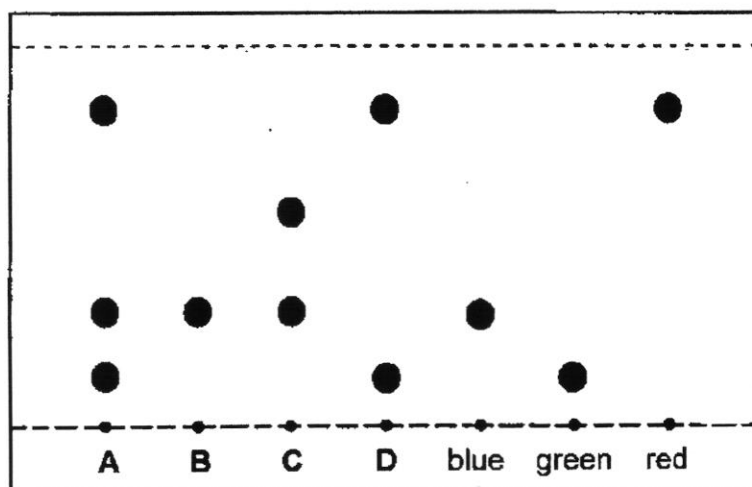


The above transformer is a

- A step-down transformer which decreases the current.
- B step-down transformer which decreases the voltage.
- C step-up transformer which increases the current.
- D step-up transformer which increases the voltage.

15 The diagram shows a chromatogram obtained using four food samples, **A**, **B**, **C** and **D** and three approved food dyes (blue, green and red).

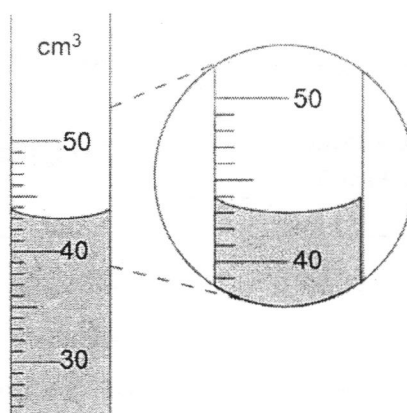
Which food sample contains a food dye which is **not** approved?



16 Which equation shows neutralisation?

- A acid + base $\rightarrow$ salt + water
- B acid + water $\rightarrow$ base + salt
- C base + water $\rightarrow$ salt + acid
- D salt + acid $\rightarrow$ base + water

17 The diagram shows a liquid in a measuring cylinder.



What is the volume of the liquid?

- | | |
|----------------------|----------------------|
| A 43 cm ³ | B 44 cm ³ |
| C 56 cm ³ | D 57 cm ³ |

18 Which process involves the formation of a new product?

- A boiling of water
- B dissolving of sugar
- C melting of wax
- D rusting of iron nails

19 Vitamin C tablets consist of an acid and a carbonate.

When dissolved in water, bubbles of gas are observed.

Which statement about the gas is correct?

- A It extinguishes a lighted splint with a 'pop' sound.
- B It relights a glowing splint.
- C It turns limewater chalky.
- D It turns moist red litmus blue.

20 Which method of preservation works by reducing the water content?

- A bottling
- B dehydration
- C pickling
- D sterilisation

21 Food additives are often used by food manufacturers for different purposes.

Which row correctly shows the purpose of the food additives?

	appearance modifiers	preservatives	nutrient supplements
A	food colouring	salt	vitamins
B	food colouring	vitamins	salt
C	salt	vitamins	food colouring
D	vitamins	food colouring	salt

22 Which statement about bile is **incorrect**?

- A Bile helps to break up fats into smaller fat droplets.
- B Bile helps to digest carbohydrates into simpler sugars.
- C Bile is produced by the liver.
- D Bile is stored in the gall bladder.

23 In which part of the human digestive system is the digested food absorbed into the bloodstream and carried to all parts of the body?

- A large intestine
- B liver
- C small intestine
- D stomach

- 24** Enzymes for the digestion of certain food molecules can be produced by more than one organ.

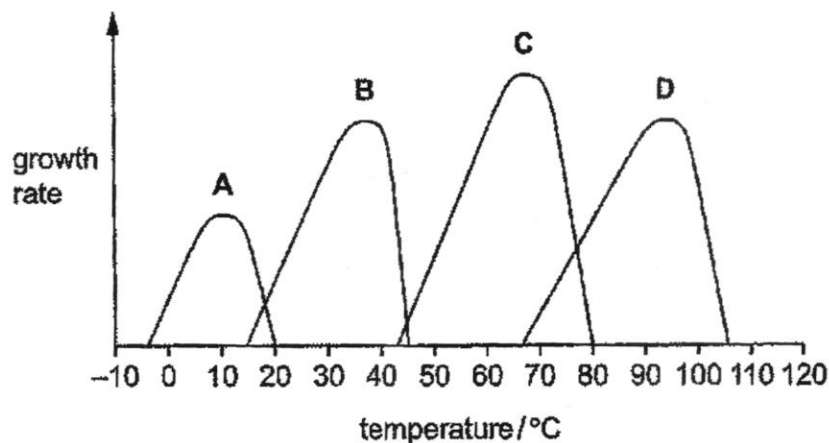
Which pairs of organs produce enzymes that can digest the same types of food molecules?

- 1 salivary glands and pancreas
- 2 stomach and pancreas
- 3 stomach and salivary glands

- A** 1, 2 and 3
B 1 and 2 only
C 1 and 3 only
D 2 and 3 only
- 25** The growth rate of microbes can increase if they are given the right conditions to grow.

The graph shows the growth rate of four different types of microbes at different temperatures.

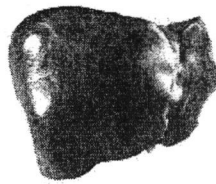
Which type of microbes could still grow rapidly on food left in a fridge?



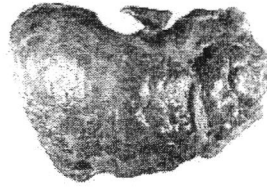
- 26** What is an important function of proteins in the diet?

- A** for growth and repair of cells
- B** to help prevent a stroke
- C** to help prevent constipation
- D** to provide energy for the body

- 27** The diagram shows a healthy and a hardened liver.



healthy liver



hardened liver

What causes the liver to harden?

- A** alcohol
 - B** salt intake
 - C** smoking
 - D** sugar intake
- 28** What must be included in our diet to prevent osteoporosis?
- A** calcium and vitamin C
 - B** calcium and vitamin D
 - C** iron and vitamin C
 - D** iron and vitamin D
- 29** Which statement about veins is correct?
- A** They carry blood away from the heart.
 - B** They all carry oxygenated blood.
 - C** They contain valves to prevent backflow of blood.
 - D** They have thick muscular walls to withstand high blood pressure.
- 30** Which of these cause blood to clot?
- A** plasma
 - B** platelets
 - C** red blood cells
 - D** white blood cells

31 Which problem is caused by the joints being inflamed and swollen due to the cartilage being worn out?

- A arthritis
- B dislocation
- C fracture
- D sprain

32 Which activity is **not** a health risk?

- A eating convenience food daily
- B listening to loud music using an earpiece
- C moderate daily exercise
- D sleeping for only four hours a day

33 Which row correctly shows the classification of the different types of diseases?

	disease caused by bacteria or viruses	hereditary disease
A	AIDS	chicken pox
B	colour blindness	tuberculosis
C	sore throat	sickle-cell anaemia
D	thalassemia	bronchitis

34 Which statement explains why people breathe?

- A It brings carbon dioxide into the lungs and removes waste oxygen from the cells.
- B It brings carbon dioxide into the lungs to be used by the body cells.
- C It brings oxygen into the lungs to be used to build up energy in food molecules.
- D It brings oxygen into the lungs and removes waste carbon dioxide from the body cells.

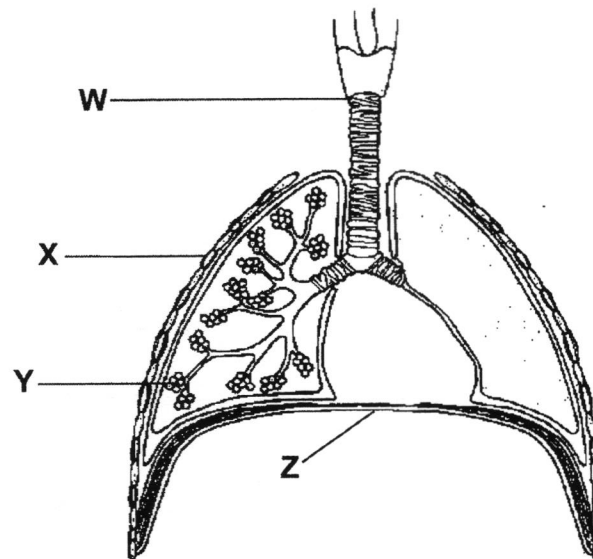
35 What is needed and given out during respiration?

	needed	given out
A	carbon dioxide and digested food	energy and oxygen
B	carbon dioxide and energy	digested food and oxygen
C	oxygen and digested food	energy and carbon dioxide
D	oxygen and energy	digested food and carbon dioxide

36 Which substance in exhaled air turns dry blue cobalt chloride paper pink?

- A** carbon dioxide
- B** nitrogen
- C** oxygen
- D** water vapour

37 The diagram shows part of the respiratory system.



Which two parts move to cause inhalation?

- A** W and X
- B** W and Y
- C** X and Z
- D** Y and Z

- 38 Which substance in cigarette smoke causes addiction?
- A carbon monoxide
 - B irritants
 - C nicotine
 - D tar
- 39 Why do farmers often use fertilisers on their crops?
- A to kill pests living on the crops
 - B to kill weeds growing with the crops
 - C to make the crops grow faster
 - D to reduce the acidity of the soil
- 40 Some farmers use predators to reduce the number of pests on their crops.
- Which type of pest control is this?
- A biological
 - B hormone
 - C intensive
 - D pesticide

- END OF PAPER -

- 1 A boy investigates how fast his two friends, **A** and **B**, can complete a 100 m race.

(a) The boy has four different instruments for measuring length.

Tick (✓) **one** box for the instrument the boy should use to measure the 100 m distance.

1 m ruler

30 cm ruler

50 m tape

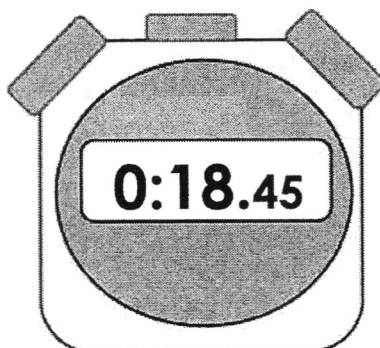
100 mm ruler

☐☐☐☐

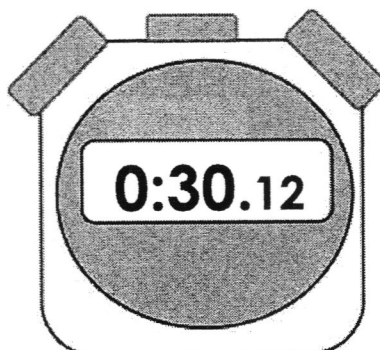
[1]

(b) The boy uses a stopwatch to measure the time taken for his friends to complete the 100 m race.

The diagram shows 18.45 seconds recorded for **A**.



The diagram shows the time recorded for **B**.



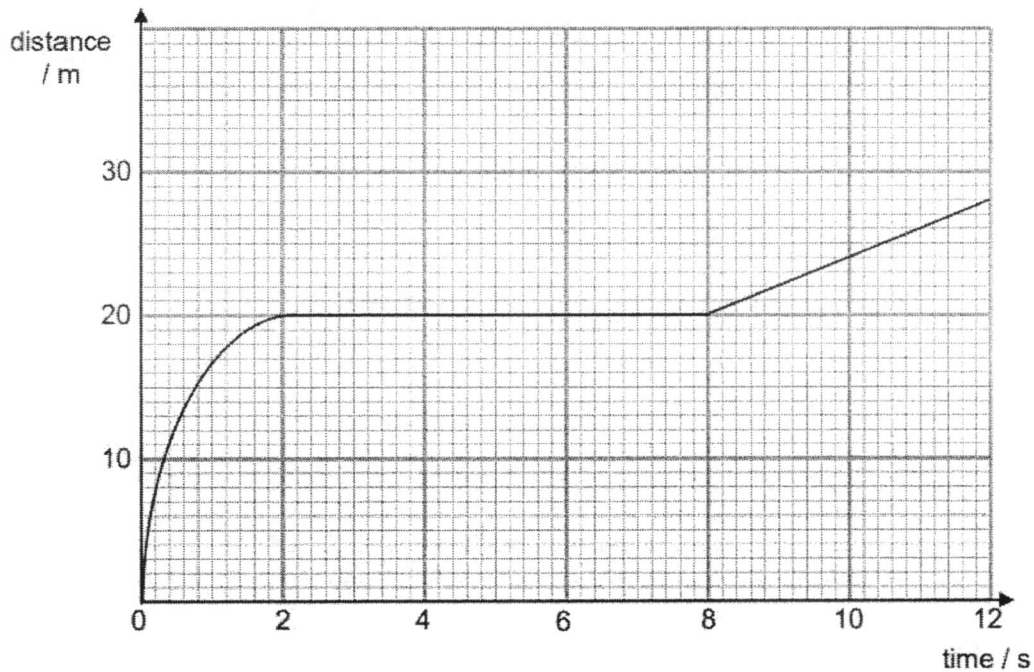
(i) Record the time taken for **B**, in seconds, shown on the stopwatch.

_____ [1]

(ii) Calculate the time difference between **A** and **B**.

_____ s [1]

2 The diagram shows a distance-time graph of a cyclist.



(a) Describe the motion of the cyclist between

(i) 0 s and 2 s

_____ [1]

(ii) 2 s and 8 s

_____ [1]

(b) Calculate the average speed of the cyclist between 8 s and 12 s in m/s.

Show your working.

_____ m/s [2]

3 A television is switched on.

(a) Only 20% of the electrical energy is converted into light.

State what happens to the other 80% of this electrical energy.

_____ [1]

(b) The diagram shows the label on the television.

1200 W at 230 V

(i) Calculate the energy consumption in kWh for using the television for 5 hours.

Show your working.

_____ kWh [2]

(ii) The cost of electricity is \$0.20 per kWh.

Calculate the cost of using the television for 5 hours.

Show your working.

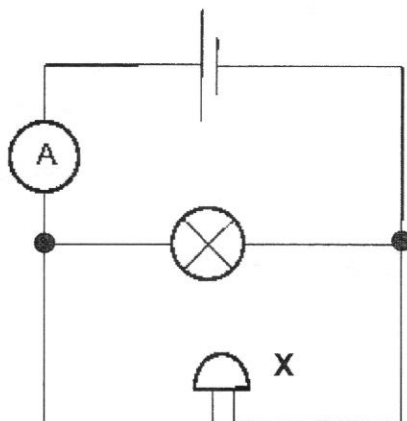
\$ _____ [1]

(c) The television is fitted with electrical safety devices.

State **one** of these safety devices.

_____ [1]

- 4 The diagram shows a circuit with a dry cell, an ammeter, a light bulb and component **X**.



- (a) State the name of component **X**.

_____ [1]

- (b) The total current passing through the ammeter is 8 A.

The current through the light bulb is 3 A.

Deduce the current through component **X**.

_____ A [1]

- (c) A student measures the voltage across component **X**.

Use the circuit symbol for a voltmeter to show where the voltmeter should be placed in the circuit.

Draw your answer on the diagram.

[1]

5 Complete the sentences about waves using the words below.

You may use each word once, more than once or not at all.

amplitude

crest

energy

force

frequency

power

trough

wavelength

Waves are vibrations that transfer _____.

The lowest point of a wave is called the _____.

The distance between a point on one wave and the same point on the next wave is called the _____.

[3]

- 6 (a) The table shows examples of one serving for different food types.

food type	example of one serving
fruit	1 small apple / orange or 1 medium banana or 10 grapes
meat and its alternatives	1 palm-sized piece (90 g) meat / fish / chicken or 2 small squares (170 g) beancurd or 2 glasses (500 ml) milk
rice and its alternatives	1 large potato or 2 slices of bread or half a bowl (100 g) rice / noodles
vegetables	100 g cooked vegetables

In one day a student eats:

- 2 slices of bread
- 2 glasses of milk
- 2 large potatoes
- 135 g chicken
- 300 g rice
- 1 small orange

Determine the number of servings the student eats for each of the food types.

fruit _____

meat and its alternatives _____

rice and its alternatives _____

vegetables _____

[2]

- (b) The Health Promotion Board recommends that people should not over-eat any particular type of food.

The number of recommended daily servings of four food types is shown in the table.

food type	number of recommended servings per day	student has more than the recommended number of servings per day	
		tick (✓) for yes	cross (X) for no
fruit	2		
meat and its alternatives	2		
rice and its alternatives	5		
vegetables	2		

- (i) Use your answers in (a) to complete the table to show whether the student has more than the recommended number of servings per day for each food type.

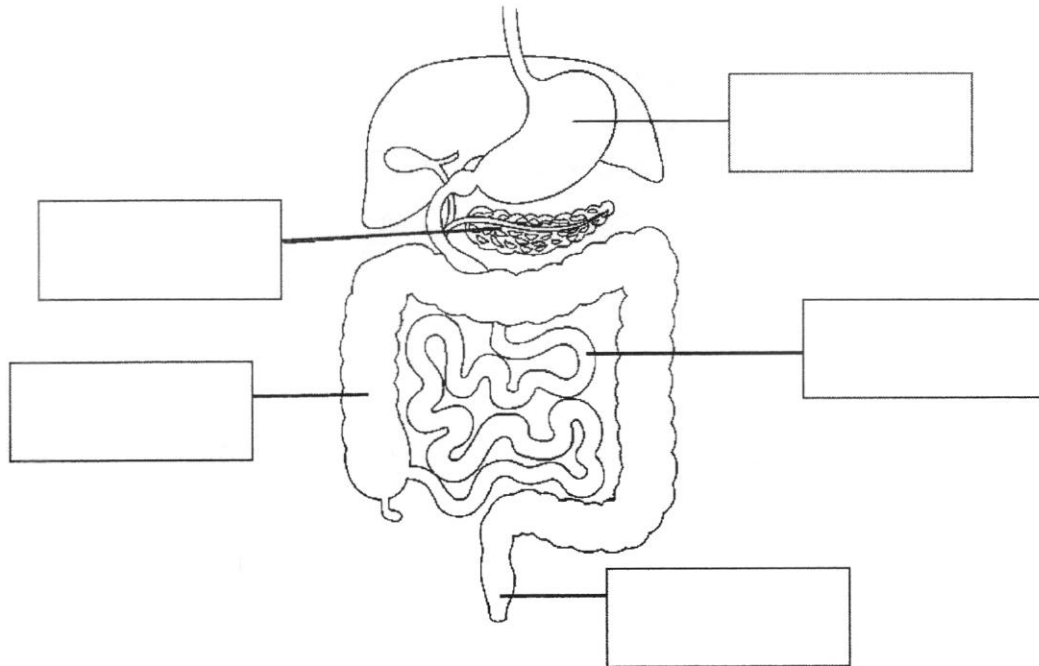
In the table, tick (✓) for yes or cross (X) for no.

[1]

- (ii) Suggest **one** reason why the Health Promotion Board recommends that people eat food from different food types.

[1]

7 The diagram shows the human digestive system.



(a) Label the diagram using the words listed.

large intestine

pancreas

rectum

small intestine

stomach

[3]

(b) (i) Name the part of the digestive system where digestion of starch first takes place.

_____ [1]

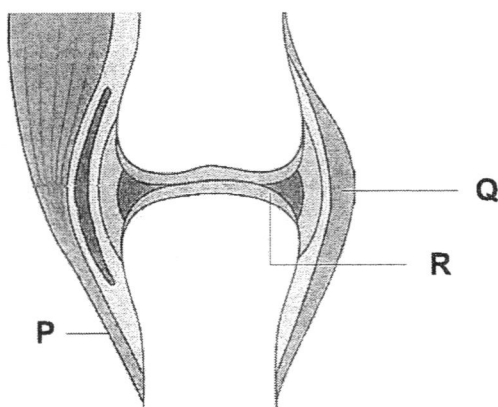
(ii) State the name of the test for starch and any colour change that shows that starch is present.

test _____

colour change from _____ to _____

[3]

8 The diagram shows a joint.



(a) Draw a straight line to match each part of the joint to its correct function.

part		function
P	•	• absorbs shock and reduces friction between bones
Q	•	• joins one bone to another bone
R	•	• joins the muscle to the bone

[2]

(b) A man weighs 80 kg and has a height of 167 cm.

(i) Calculate the Body Mass Index (BMI) of the man using the formula shown. Show your working.

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height (m)} \times \text{height (m)}}$$

BMI = _____ kg/m² [2]

- (ii) Table 8.1 shows the different weight groups based on BMI.

Table 8.1

BMI range	weight group
27.5 and above	obese
23.0 – 27.4	overweight
18.5 – 22.9	healthy weight
below 18.5	underweight

Which weight group does the man belong to?

_____ [1]

- (iii) Explain why obese people have knee joint problems.

_____ [2]

- 9 A boy stopped taking the course of antibiotics prescribed by a doctor because he felt better.

- (a) Explain why he should have completed the course of antibiotics even though he felt better.

[2]

- (b) The boy had a cold caused by a virus a week later. He took the remaining antibiotics to treat himself but did not get better.

- (i) Explain why antibiotics are **not** effective against the cold.

[2]

- (ii) The boy went to the doctor and asked for a vaccination to make his cold better.

Give **one** reason why the doctor did **not** give the boy a vaccination.

[1]

- 10 (a) A child starts choking while sucking a large sweet.

Explain how this could lead to death.

[2]

- (b) A child's parents smoke cigarettes in the car while driving the child to school everyday.

Suggest why this means the child is at risk of developing a respiratory disease even though he does not smoke.

[1]

- 11 (a) Plants need nutrients from the soil for growth.

State **three** other things that are required for plants to grow.

1. _____

2. _____

3. _____

[3]

- (b) 'Slash and burn' is used in agriculture.

State **one** benefit and **one** problem for the soil of using 'slash and burn' methods of agriculture.

benefit _____

problem _____

[2]

- (c) Give **one** reason why intensive farming methods for food production are needed.

[1]

12 The pH of a substance can be measured using an indicator or a pH meter.

A student makes an indicator from red cabbage using the method shown.

- Chop the red cabbage into small pieces and add to a large beaker.
- Add boiling water to cover the red cabbage and leave for 10 minutes until the liquid changes to a purple colour.
- Separate the cabbage from the purple liquid.

(a) (i) Draw the apparatus the student should use to separate the cabbage from the purple liquid.

Label your diagram.

[2]

(ii) State the name of this type of separation technique.

[1]

- (b) The student tests different household substances with the purple indicator.

The student writes the results in a notebook.

the colour for lemon juice was red
vinegar went red
purple = water
for washing soda it was green

Draw a suitable table and record the student's results in the table.

[2]

- (c) The student uses a chart to determine whether the household substances in (b) are acidic, alkaline or neutral.

colour of red cabbage indicator in		
acid	alkali	neutral
red	green	purple

Determine which of the household substances in (b) are acidic.

[1]

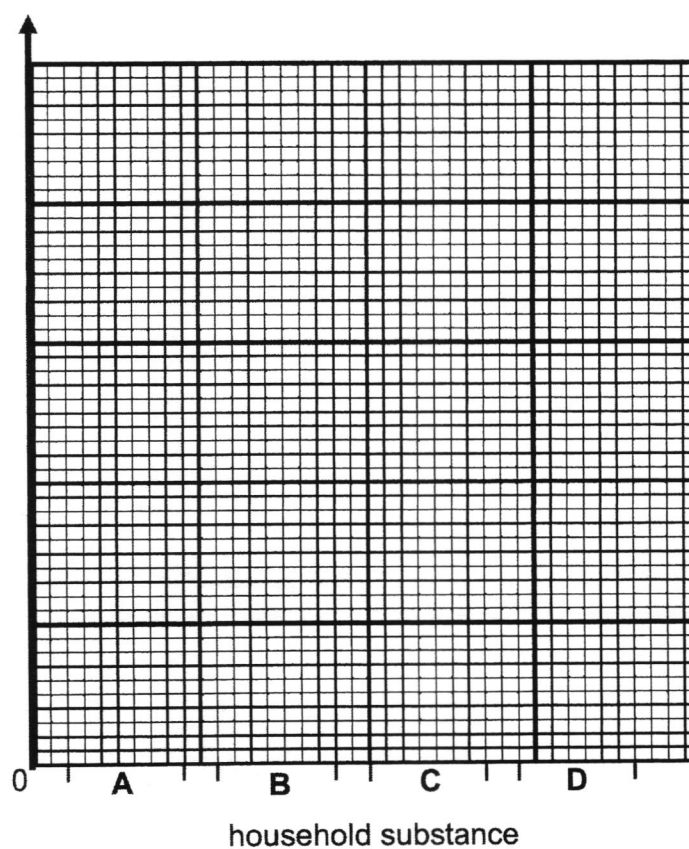
- (d) The student is given four unknown household substances, **A**, **B**, **C** and **D**. The student is told to test these substances with a pH meter.

The results are shown below.

household substance	pH value
A	3.6
B	5.2
C	7.0
D	8.8

- (i) Plot a bar graph to present the student's results.

Label the y-axis.



[3]

- (ii) State which **one** of the household substances, **A, B, C** or **D**, is neutral.

_____ [1]

- END OF PAPER -

Paper 1 [40 marks]

1	B	2	A	3	A	4	B	5	C
6	C	7	B	8	B	9	D	10	C
11	D	12	A	13	B	14	B	15	C
16	A	17	A	18	D	19	C	20	B
21	A	22	B	23	C	24	B	25	A
26	A	27	A	28	B	29	C	30	B
31	A	32	C	33	C	34	D	35	C
36	D	37	C	38	C	39	C	40	A

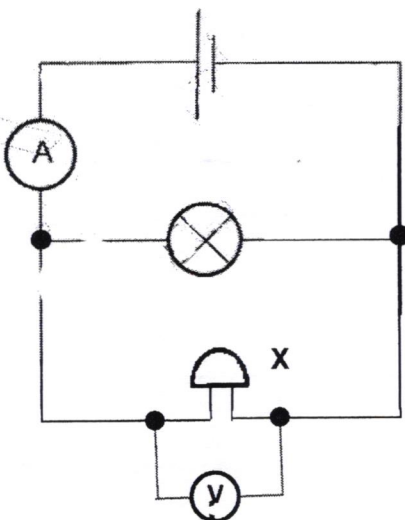
Paper 2 [60 marks]

1	a	50 m tape	[1]
	bi	30.12 s	[1]
	bii	11.67 s	[1]
Total:			[3]

2	ai	The cyclist is decelerating/ slowing down.	[1]
	a ii	The cyclist is stationary / at rest.	[1]
	b	Average speed = $\frac{28-20}{12-8} = \frac{8}{4} = \underline{2 \text{ m/s}}$ (1) for working, (1) for answer	[2]
Total:			[4]

3	a	The 80% of the electrical energy has been converted into heat and sound energy.	[1]
	bi	Energy = $P \times t$ $= \frac{1200}{1000} \times 5$	[2]

		$= 1.2 \times 5$ $= \underline{6 \text{ kWh}}$ (1) for working, (1) for answer	
	bii	Cost = $6 \times \$0.20$ $= \underline{\$1.20}$ Allow: ecf from bi	[1]
	c	Fuse / earth wire / double insulating wire Not: Circuit breaker	[1]
Total: [5]			

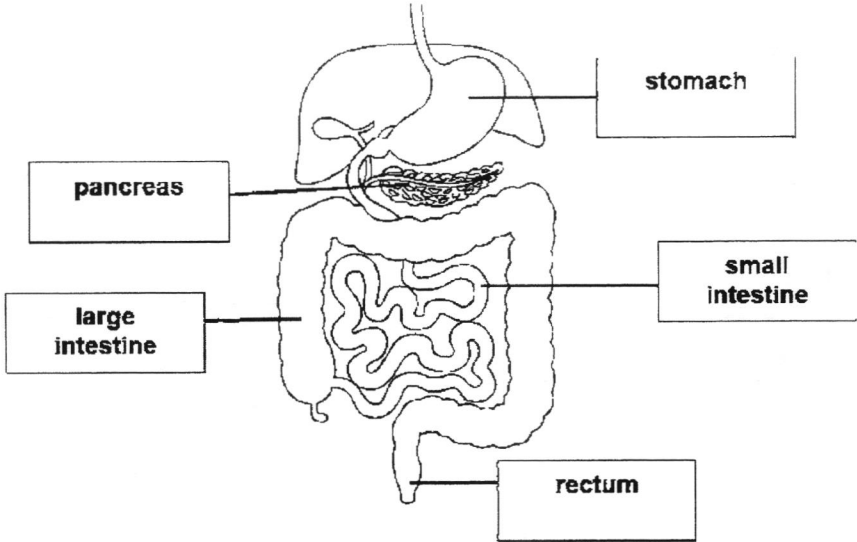
4	a	bell	[1]
	b	5 A	[1]
	c		[1]
Total: [3]			

5	energy (1)	[3]
---	------------	-----

	trough (1)	
	wavelength (1)	
		Total: [3]

6	a	fruit: 1 meat and its alternatives: 2.5 rice and its alternatives: 6 vegetables: 0 All 4 correct (2) 3/2 correct (1) 1 correct (0)	[2]																						
	bi	<table border="1"> <thead> <tr> <th rowspan="2">food type</th><th rowspan="2">number of recommended servings per day</th><th colspan="2">The student has more than the recommended number of servings per day.</th></tr> <tr> <th>tick (☐) for yes</th><th>cross (X) for no</th></tr> </thead> <tbody> <tr> <td>fruit</td><td>2</td><td></td><td>X</td></tr> <tr> <td>meat and its alternatives</td><td>2</td><td></td><td>☐</td></tr> <tr> <td>rice and its alternatives</td><td>5</td><td></td><td>☐</td></tr> <tr> <td>vegetables</td><td>2</td><td></td><td>X</td></tr> </tbody> </table>	food type	number of recommended servings per day	The student has more than the recommended number of servings per day.		tick (☐) for yes	cross (X) for no	fruit	2		X	meat and its alternatives	2		☐	rice and its alternatives	5		☐	vegetables	2		X	[1]
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rice and its alternatives	5		☐																						
vegetables	2		X																						

		Allow ecf from (a)	
	bii	Eating food from different food types will ensure that the person has a <u>balanced diet</u> where there is a sufficient quantity of all nutrients.	[1]
Total: [4]			

7	a	 All 5 correct (3) 4 correct (2) 3/2 correct (1) 1 correct (0)	[3]
	bi	Mouth	[1]
	bii	Test: Iodine test (1) colour change from yellow-brown (1) to blue-black (1)	[3]
Total: [7]			

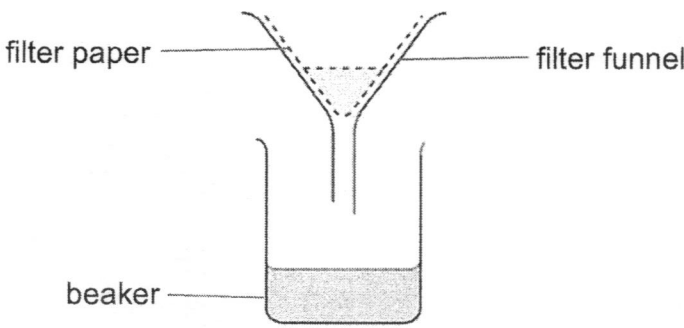
8	a	<table><tr><td>part</td><td>function</td></tr></table>	part	function	[2]
part	function				

		<table border="1"> <tr> <td>P</td> <td rowspan="3"> </td> <td>absorbs shock and reduces friction between bones</td> </tr> <tr> <td>Q</td> <td>joins one bone to another bone</td> </tr> <tr> <td>R</td> <td>joins the muscle to the bone</td> </tr> </table> □□□ (2), □□X (1), □XX (0)	P		absorbs shock and reduces friction between bones	Q	joins one bone to another bone	R	joins the muscle to the bone	
P		absorbs shock and reduces friction between bones								
Q		joins one bone to another bone								
R		joins the muscle to the bone								
	bi	$\text{BMI} = \frac{80}{1.67 \times 1.67}$ $= \frac{80}{2.79}$ $= \underline{28.7}$ (1) for working, (1) for answer	[2]							
	bii	Obese	[1]							
	biii	The joints at the knees need to <u>support the heavier weight</u> of the body. (1) This may cause <u>injury</u> to the knee joints. (1)	[2]							
Total: [7]										

9	a	Some bacteria may survive in their body and may multiply or become stronger. (1) When that happens, the boy may fall sick again and need a stronger antibiotics. (1)	[2]
	bi	The cold is caused by a virus and not a bacteria. (1) Antibiotics are only effective on diseases caused by bacteria. (1)	[2]
	bii	Vaccinations can only be used to prevent diseases caused by viruses but not to cure the disease.	[1]
Total: [5]			

10	a	Choking prevents air from entering the lungs. (1) Oxygen cannot enter bloodstream and be transported to cells. (1)	[2]
	b	The child is a <u>passive smoker</u> who also breathes in the cigarette smoke containing harmful substances.	[1]
Total: [3]			

11	a	1. Sunlight /light energy 2. Water 3. Carbon dioxide / air 4. Suitable soil pH (Not: pH) Any 3 answers, (1) each	[3]
	b	benefit: soil is fertile /removes pests and bacteria in soil (1) problem: soil erosion (1)	[2]
	c	• Increase in world population • Limitations in space to grow food • Harsh weather conditions and climate changes Any 1 answer	[1]
Total: [6]			

12	ai	 Drawing (1), labelling (1)	[2]										
	aii	Filtration	[1]										
	b	<table border="1"><thead><tr><th>household substance</th><th>colour of indicator</th></tr></thead><tbody><tr><td>lemon juice</td><td>red</td></tr><tr><td>vinegar</td><td>red</td></tr><tr><td>water</td><td>purple</td></tr><tr><td>washing soda</td><td>green</td></tr></tbody></table> Correct headings (1), correct classification (1)	household substance	colour of indicator	lemon juice	red	vinegar	red	water	purple	washing soda	green	[2]
household substance	colour of indicator												
lemon juice	red												
vinegar	red												
water	purple												
washing soda	green												
	c	Lemon juice and vinegar	[1]										

	di	Labelling of y-axis (1) Appropriate scaling of y-axis (1) Correct plots of values + drawing of bar chart (1)	[3]
	dii	C	[1]
Total: [10]			