Name: _____( ) Class: _____

WOODLANDS SECONDARY SCHOOL
END OF YEAR EXAMINATION 2017

Level:	Sec 1 Express	Marks:	50
Subject:	Science (Biology)	Day:	Wednesday
Paper:	-	Date:	11 Oct 2017
Duration:	2 hours (for both Physics and Biology papers)	Time:	0800 - 1000

READ THESE INSTRUCTIONS FIRST

Write in dark blue or black pen only.
You may use a soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

Answer **all** questions in Sections A, B and C.

At the end of the examination hand in your OTAS and exam paper separately.
The number of marks is given in brackets [ ] at the end of each question or part question.

The use of calculators is allowed in this examination.

For Examiner's Use	
Section A	/15
Section B	/20
Section C	/15
TOTAL:	/50

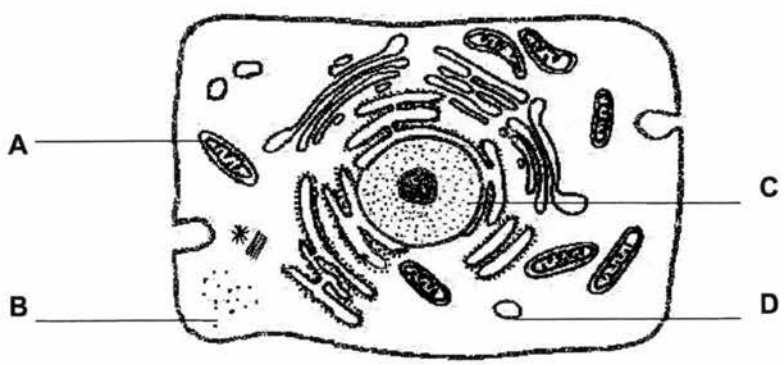
DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO.
This document consists of **18** printed pages

Section A (15 marks)
Answer all questions on the OTAS sheet provided.

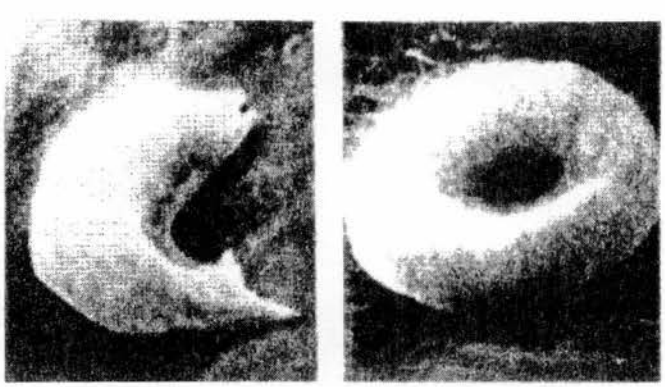
1 Which structure is found in plant cells but not in animal cells?

A cell membrane
B cell wall
C nucleus
D small vacuoles

2 The following diagram shows an electron micrograph of an animal cell. Which structure is responsible for protein synthesis?



3 The photomicrographs below show the appearance of two red blood cells viewed under the same magnification.

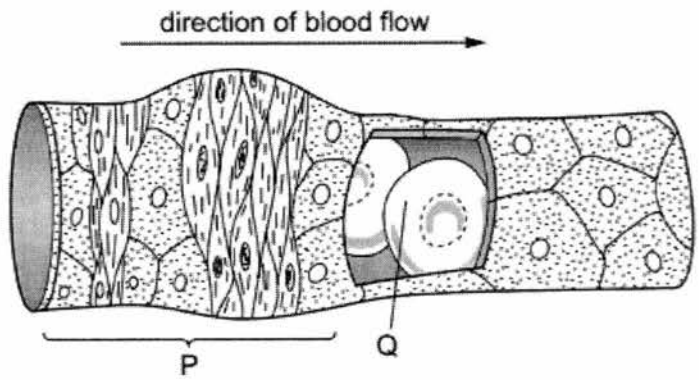


defective red blood cell normal red blood cell

Which description about the defective red blood cell is correct?

A It contains a nucleus while the normal red blood cell has lost the nucleus.
B It has the capacity to carry more oxygen than the normal red blood cell.
C It has a lower water potential than the normal red blood cell.
D It has a smaller surface area to volume ratio than the red blood cell.

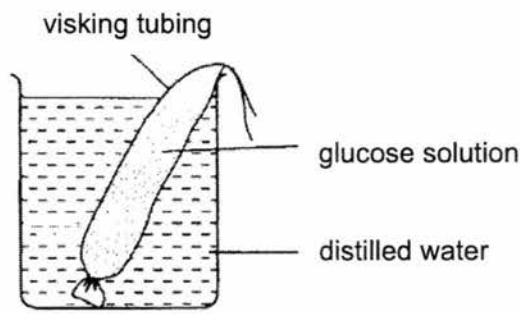
4 The diagram below shows a blood vessel. A section of the blood vessel wall has been cut to show the blood flowing inside.



Which option correctly identifies the order of classification for **P** and **Q**?

	P	Q
A	cell	organ
B	organ	cells
C	organ	tissue
D	tissue	organ

5 An experiment was set up as shown below and left for half an hour.



The process responsible for the movement of glucose molecules out of the visking tubing is

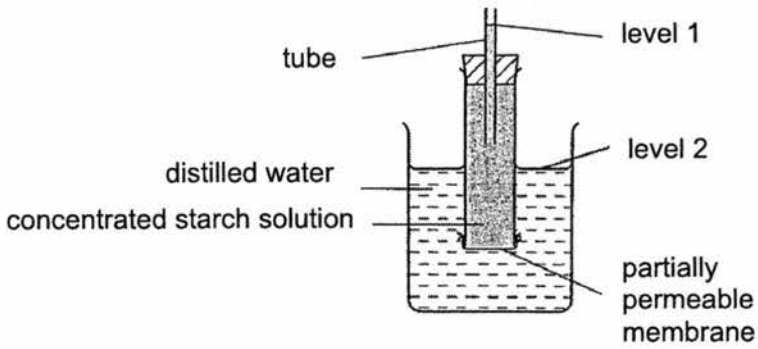
A osmosis.

B diffusion.

C absorption.

D transport.

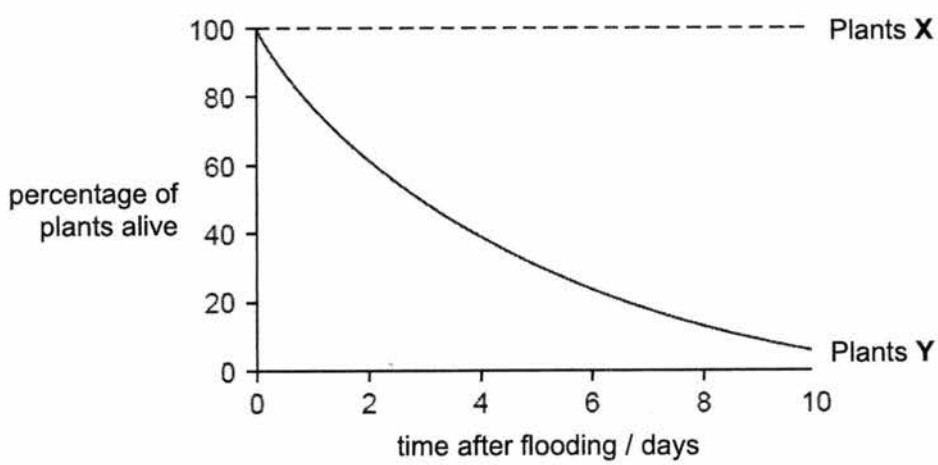
6 The diagram shows a set-up used to investigate osmosis.



Which molecules will move across the partially permeable membrane and how will levels 1 and 2 change?

	molecules	level 1	level 2
A	starch	fall	rise
B	starch	rise	fall
C	water	fall	rise
D	water	rise	fall

7 Concentrated salt solution accidentally flooded a field of young rice plants. The graph shows the effect on two varieties of rice plants, **X** and **Y**, in the field.



What caused the effect shown by the graph?

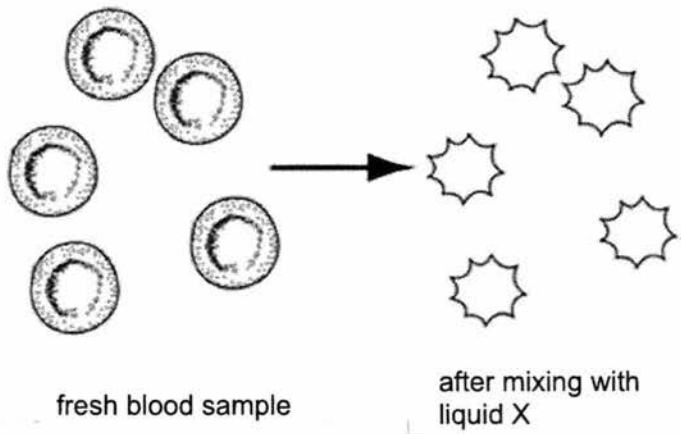
A Water enters the root cells of plants **X**.

B Water enters the root cells of plants **Y**.

C Water leaves the root cells of plants **X**.

D Water leaves the root cells of plants **Y**.

8 The diagram below shows cells in fresh blood and the same cells after it has been mixed with liquid X.



fresh blood sample

after mixing with liquid X

Which statement describes the water potential of liquid X?

A It is lower than that of the cell cytoplasm.

B It is equal to that of the cell cytoplasm.

C It is higher than that of the cell cytoplasm.

D It is equal to that of distilled water.

9 The table below shows the percentage nutritional content of four different food substances.

Which of the following food should be avoided by someone who suffers from obesity?

	carbohydrates / %	fats / %	protein / %
A	11.5	15.0	73.5
B	12.0	75.6	12.4
C	15.1	60.4	24.5
D	45.2	16.4	38.4

10 Which of the following substances are built from amino acids?

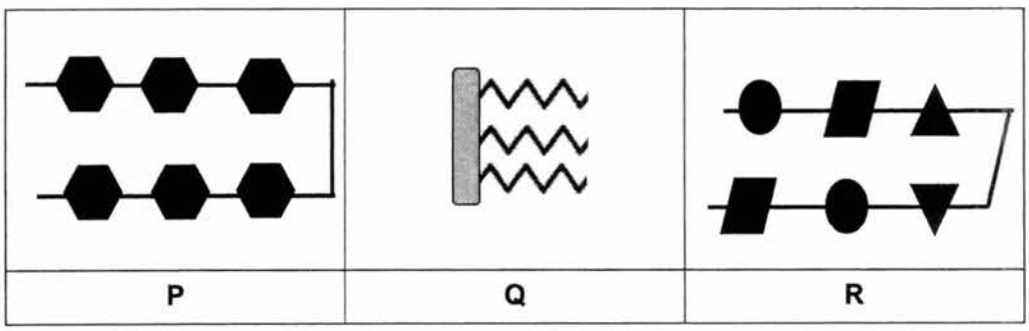
A bread

B butter

C lean meat

D potato chips

11 The diagram below represents three types of nutrients found in food.



What are **P**, **Q** and **R**?

	P	Q	R
A	fat	carbohydrate	protein
B	carbohydrate	fat	protein
C	protein	carbohydrate	fat
D	protein	fat	carbohydrate

12 In which order do these events occur in human nutrition?

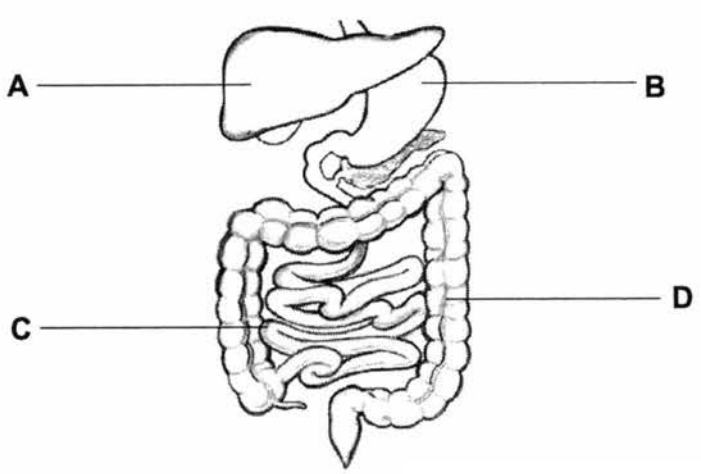
A digestion → ingestion → absorption → assimilation

B digestion → ingestion → assimilation → absorption

C ingestion → digestion → absorption → assimilation

D ingestion → digestion → assimilation → absorption

13 Which organ is **not** part of the alimentary canal?



14 Litmus paper turns red in acidic solutions and blue in alkaline solutions.

Which part of the alimentary canal has secretions that would change litmus paper red?

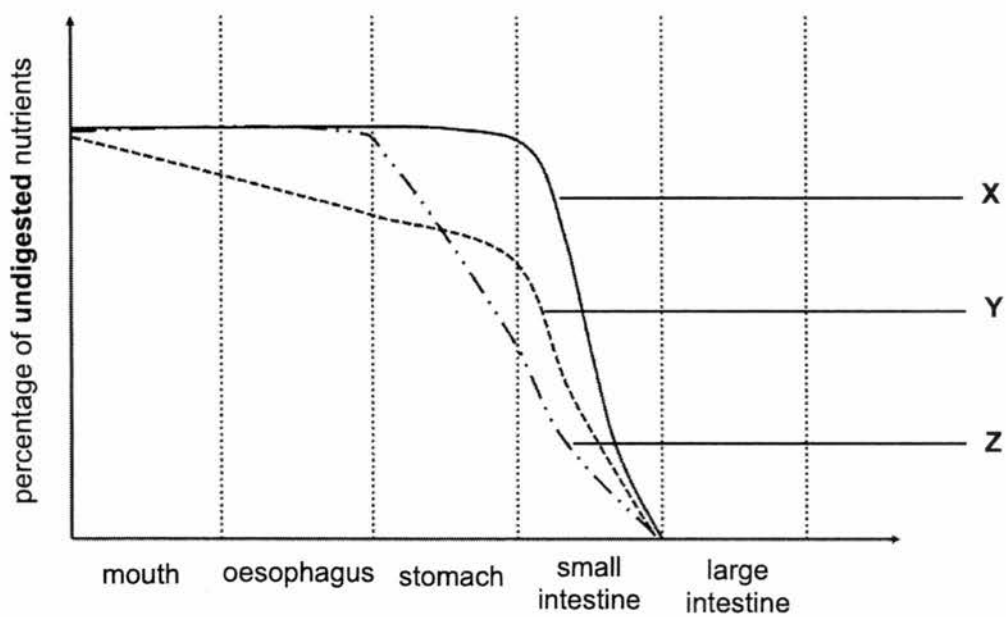
A colon

B duodenum

C ileum

D stomach

15 The following figure shows the changes in the amounts of nutrients, **X**, **Y** and **Z**, as they pass through the different parts of the human alimentary canal.



What nutrients are **X**, **Y** and **Z**?

	X	Y	Z
A	carbohydrate	fat	protein
B	carbohydrate	protein	fat
C	fat	carbohydrate	protein
D	protein	carbohydrate	fat

Section B (20 marks)
Answer **all** questions in the spaces provided.

1 Fig.1.1 shows a unicellular organism, yeast.

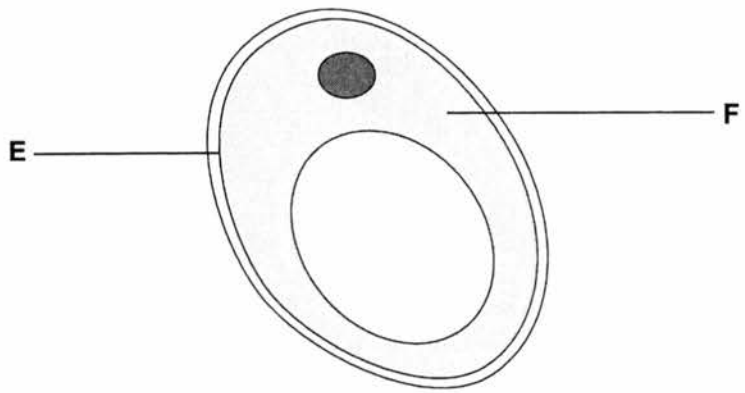


Fig. 1.1

(a) Structures labelled **E** and **F** can also be found in human cells. Name these structures.

E: .....

F: ..... [2]

(b) Yeast cells do not have complex reproductive systems like humans. To reproduce and produce offspring, they expand and split themselves into two.

Name the structure found in yeast cells that contains genetic material and controls reproduction in yeast.

..... [1]

(c) Fig. 1.2 shows a root hair cell. It is a specialized plant cell that absorbs water and mineral salts from the surrounding soil.

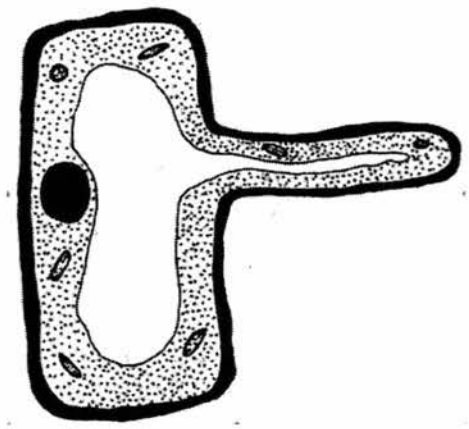


Fig. 1.2

Describe and explain one feature that allows the root hair cell to perform its function efficiently.

.....

.....

..... [2]

[Total: 5]

2 Two freshly-peeled potato cylinders, **J** and **K**, each have a mass of 5.0g.

In an experiment, they are balanced on each end of a pivoted ruler, as shown in Fig. 2.1. Then, the cylinders are placed into different solutions, **X** and **Y**, for 30 minutes, before being removed.

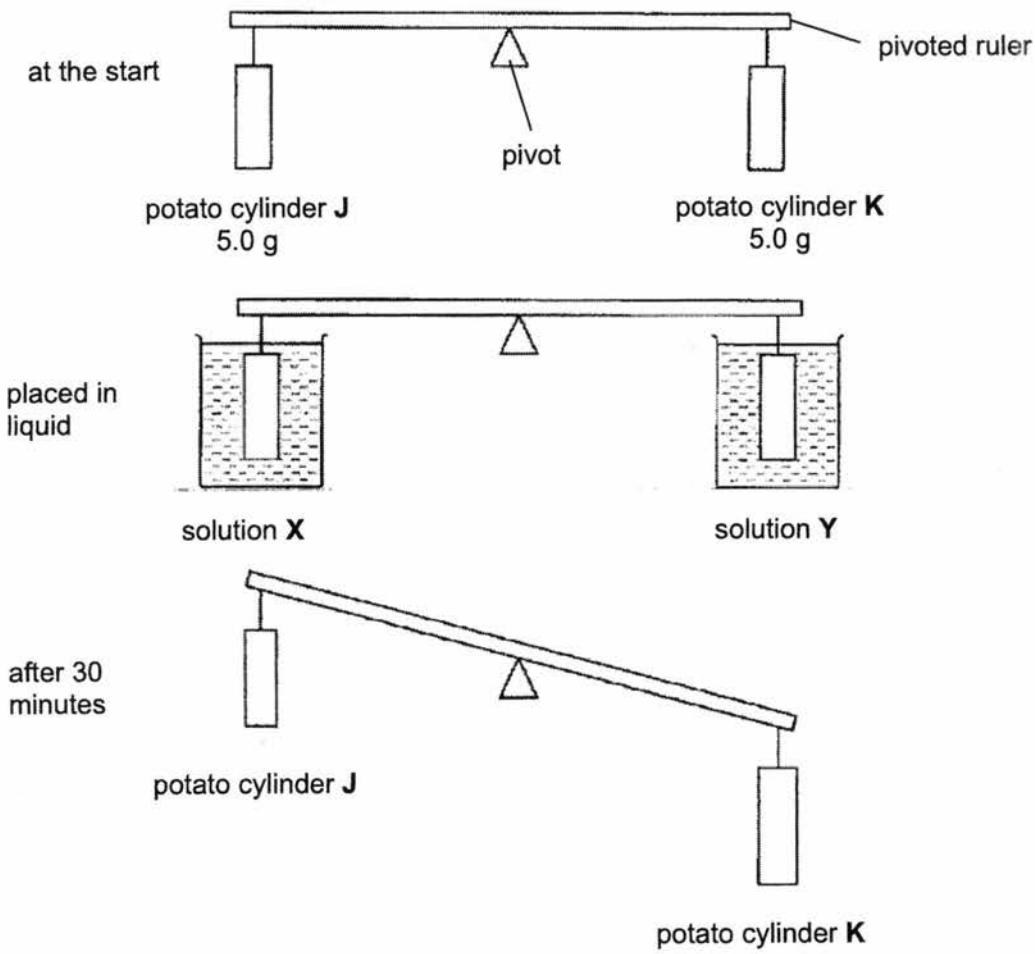


Fig. 2.1

(a) **(i)** State how the mass of potato cylinder **J** has changed after the experiment.

..... [1]

(ii) Explain this change in mass of potato cylinder **J**.

.....

.....

..... [2]

(b) If both potato cylinders **J** and **K** were placed in the same liquid for 30 minutes, draw a labelled diagram of the expected positions of the ruler and potato cylinders **J** and **K** to show the expected results.

The pivot has been drawn for you.

[1]

[Total: 4]

3 A 65-year-old man was shopping for some biscuits in the supermarket. The table below shows the nutritional facts of two brands of biscuits, **X** and **Y**.

Table 3.1

Values per serving	Brand X	Brand Y
Energy	550kJ	380KJ
Carbohydrates	20.1g	18.7g
Lipids (fats) Saturated fat	4.2g 3.7g	1.2g 0.9g
Dietary Fibre	0.1g	4.4g

(a) Which brand of biscuits would you recommend for the 65-year-old man? Give a reason to support your answer.

.....

.....[2]

(b) State the nutrient that is **not** found in both Brand **X** and Brand **Y** biscuits.

.....[1]

(c) State one use of consuming fats.

.....[1]

(d) He finally chose Brand **X**. He ate 4 servings of biscuits.

Calculate the amount of energy 4 servings of Brand **X** biscuits would provide. Show your working and include the appropriate units.

.....[1]

[Total: 5]

4 Fig. 4.1 shows the human digestive system.

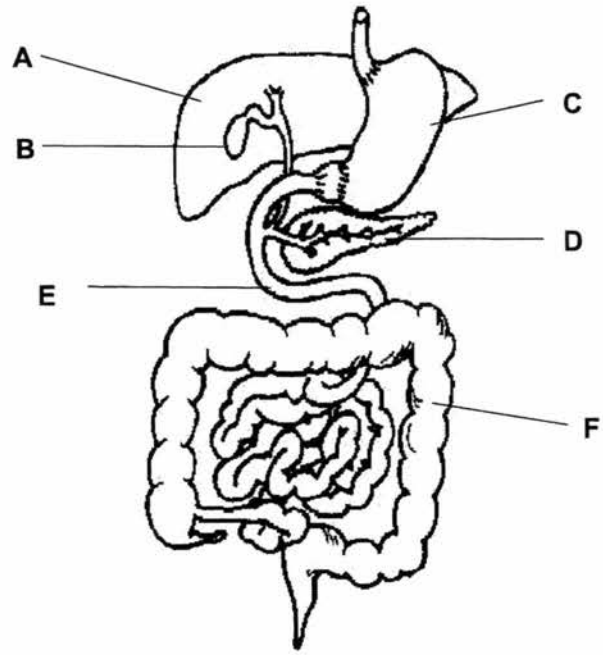


Fig. 4.1

(a) **(i)** Name organs **A** and **D**.

A: ..... **D**: ..... [2]

(ii) State the letter(s) for the part(s) where protein digestion takes place.

..... [1]

(b) Gallstones are small stones that are formed in the gall bladder from some components of bile. Patients who suffer from this may experience pain and vomiting.

(i) State the function of the gall bladder.

..... [1]

(ii) How would having gallstones affect fat digestion in patients? Explain why.

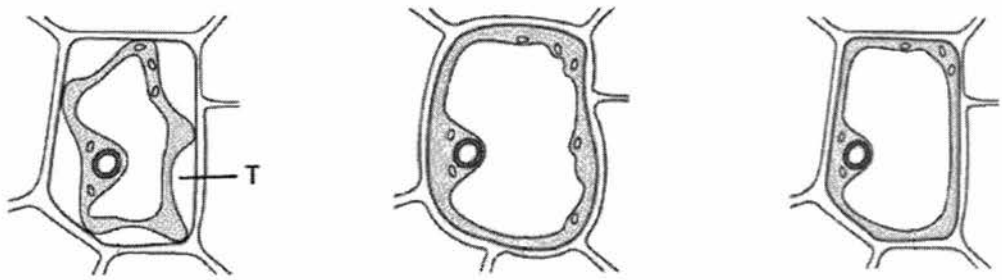
.....

..... [2]

[Total: 6]

Section C (15 marks)
Answer **all** questions in the spaces provided.

5 Fig. 5.1 shows three plant cells which had been placed in distilled water, 0.45% sucrose solution and 10% sucrose solution respectively for 30 minutes.



Cell **Q** Cell **R** Cell **S**

Fig. 5.1

(a) With reference to Fig. 5.1, identify the cell (**Q, R** or **S**) placed in each solution.

(i) Distilled water: .....

(ii) 0.45% sucrose solution: .....

(iii) 10% sucrose solution: ..... [2]

(b) Describe the appearance of cells **Q** and **R** after the experiment.

Cell **Q**: ..... [1]

Cell **R**: ..... [1]

(c) Using ideas about osmosis, explain why cell **S** remain unchanged.

.....

.....

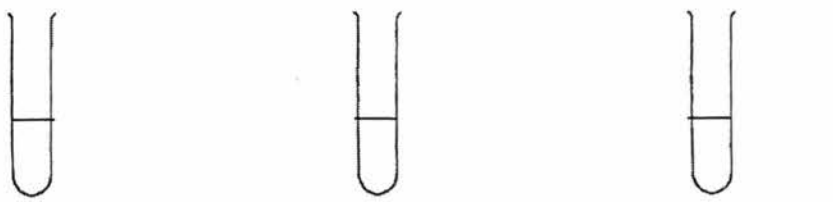
..... [2]

(d) State what can be found in region **T**.

..... [1]

[Total:7]

6 Kenneth carried out an experiment to compare the amounts of starch that three different liquid food supplement, **X**, **Y** and **Z** contain. He prepared three test tubes containing equal amounts of food supplement, iodine solution and amylase enzyme, as shown in Fig. 6.1.



food supplement **X** + iodine solution + amylase enzyme

food supplement **Y** + iodine solution + amylase enzyme

food supplement **Z** + iodine solution + amylase enzyme

Fig. 6.1

Every 5 minutes, he observed the colour of the mixture and recorded his observations in Table 6.2.

Table 6.2

time in minutes	food supplement		
	X	**Y**	**Z**
0 (start of experiment)	blue-black	blue-black	blue-black
5	blue-black	blue-black	blue-black
10	blue-black	blue-black	blue-black
15	blue-black	blue-black	yellow brown
20	blue-black	blue-black	yellow brown
25	blue-black	yellow brown	yellow brown

(a) What do the colours of the mixture indicate about the presence of starch?

Blue-black: .....

Yellow brown: ..... [1]

(b) Name the product that is obtained after starch is fully digested.

..... [1]

(c) From Table 6.2, state the food supplement (**X**, **Y**, or **Z**) that likely contains the least amount of starch.

..... [1]

(d) Provide an explanation for your answer in (c).

..... [1]

[Total:4]

7 Fig. 7.1 shows an example of a jar of baby food sold in supermarkets. Baby food is usually meant for infants less than 6 months old, and is pureed into a semi-solid mush form.

Fig. 7.1

(a) Using your knowledge of physical digestion, suggest an explanation why baby food needs to be in a semi-solid form.

.....

..... [1]

(b) Baby food usually contains high amounts of protein. Explain why babies need to consume protein.

..... [1]

(c) Explain why it is important for nutrients to be completely digested.

.....

..... [2]

[Total: 3]

End of Paper

Section A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	B	D	B	B	D	D	A	B	C	B	C	A	D	C

Section B [20 marks]

1	Answer	Marks
a	E: cell membrane F: cytoplasm *Spelling must be correct. 1m each.*	2
b	Nucleus	1
c	Describe: Long and narrow protrusion Explain: Increases surface area to volume ratio of the cell for faster absorption of water and mineral salts by osmosis and diffusion. Describe: Large central vacuole Explain: allows storage of water Describe: Concentrated cell sap Explain: maintains steep concentration gradient for continuous absorption of water and mineral salts by osmosis and diffusion respectively. *Reject: "has no chloroplasts".*	*1m for stating correct adaptation only.* *1m for matching explanation.*
		Total 5

2	Answer	Marks
ai	The mass of potato cylinder **J** <u>decreased</u>	1
aii	Solution **X** has lower water potential than (the cell sap of) potato cylinder J. Water leaves the potato cylinder by osmosis. Or Water molecules move from potato cylinder **J** (a region of higher water potential) to solution **X** (a region of lower water potential) by osmosis. *1m – identification of direction of movement of water molecules out of potato* *1m – comparison of higher/lower water potential*	1 1
b	Drawing to show: The pivoted ruler remains balanced. Drawing must include: ruler, cylinder J and K.	1
		Total 4

3	Answer	Marks
a	Brand Y. Reason: It provides more dietary fibre / less fat than Brand Y.	1 1
b	protein	1
c	Any of the following: - Fats is an efficient/good store of energy - Insulation / provide warmth	1
d	550 kJ X 4 = <u>2200 kJ</u>	1
		Total 5

4	Answer	Marks
ai	A – liver D – pancreas	1 1
aii	C, E *Both must be correct to be awarded 1m.*	1
bi	Stores bile	1
bii	Fat digestion will be slower. Less bile is secreted to carry out <u>emulsification</u>.	1 1
		Total 6

Section C [15 marks]

5	Answer	Marks
a	Distilled water: R 0.45% sucrose solution: S 10% sucrose solution: Q *1 correct – 0m; 2 correct – 1m; 3 correct – 2m.*	2
b	Cell Q : It decreased in size/ became plasmolysed/ became flaccid Cell R: It increased in size/swelled/ became turgid	1 1
c	The water potential of cell sap of S is equal to the water potential of the solution it was placed in. There was no net movement of water molecules into or out of the cell.	1 1
d	10% sucrose solution	1 Allow ECF
		Total 7

6	Answer	Marks
a	Blue black: Starch is present / has not been digested. Yellow brown: Starch is absent / has been digested.	1 for both
b	Glucose	1
c	Z	1
d	It takes the shortest time to turn yellow-brown Which means it takes the shortest time for all the starch to be digested.	1
		Total 4

7	Answer	Marks
a	Babies do not have teeth to chew food into smaller pieces for easier digestion.	1
b	For growth of new tissues as the babies are still developing	1
c	So that they are digested into simpler, soluble molecules Which can be absorbed /diffuse into the blood	1 1
		Total 4

Name: _____ ( ) Class: _____

WOODLANDS SECONDARY SCHOOL
END OF YEAR EXAMINATION 2017

Level:	Sec 1 Express	Marks:	50
Subject:	Lower Sec Science	Day:	Wednesday
Paper:	Physics	Date:	11 October 2017
Duration:	2 hours (with Biology)	Time:	0800 - 1000

READ THESE INSTRUCTIONS FIRST

Write your name, index number and class on the question paper.
Write in dark blue or black pen. You may use a soft pencil for any diagrams, graphs, tables or rough working. Do not use staples, paper clips, highlighters, glue or correction fluid.

For each question in **Section A**, 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 optical answer sheet provided. Hand in **both** multiple choice answer sheet and question paper separately.

Answer all questions from **Section B** and **Section C** in the spaces provided on the question paper.

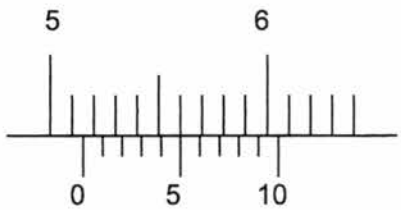
FOR EXAMINER'S USE	
Section A	/15
Section B	/20
Section C	/15
Total	/50

DO NOT TURN THE PAGE UNTIL YOU ARE TOLD TO DO SO.

This document consists of **14** printed pages.

Section A (15 marks)
Answer **all** questions.
Shade your answers in the optical answer sheet provided.

1 The diagram shows the reading on a vernier calipers when its two jaws clamp a wooden block. What is the reading shown?



A 5.10 cm **B** 5.15 cm **C** 5.60 cm **D** 5.65 cm

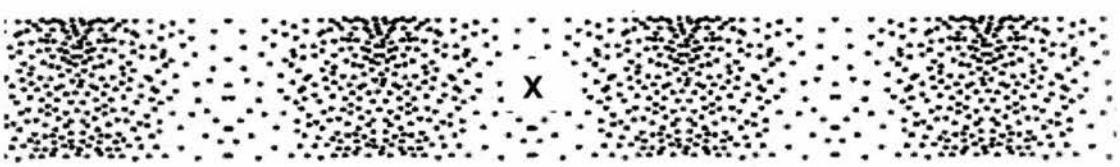
2 Which of the following is the SI unit of density?

A g/cm^3 **B** kg/m^3 **C** m/v^3 **D** ρ

3 The handles of most cooking utensils are made of plastic.
Which property of plastic is the main reason for using it as handle?

A electrical insulator
B high melting point
C low density
D thermal insulator

4 The diagram shows the air particles as sound travels through them.



What is the name of region **X** and the density of air in this region compare to the surrounding?

	region X	density compared to surrounding air
A	compression	higher
B	compression	lower
C	rarefaction	higher
D	rarefaction	lower

5 Which of the following is the correct order of the speed of sound from the fastest to the slowest?

	Fastest				Slowest
A	Iron	→	Water	→	Air
B	Water	→	Air	→	Iron
C	Air	→	Water	→	Iron
D	Water	→	Iron	→	Air

6 A guitarist wants to play a note of higher pitch with his guitar string.
What will be the change in the frequency and vibration of the guitar string?

	frequency	vibration
A	decrease	faster
B	decrease	slower
C	increase	faster
D	increase	slower

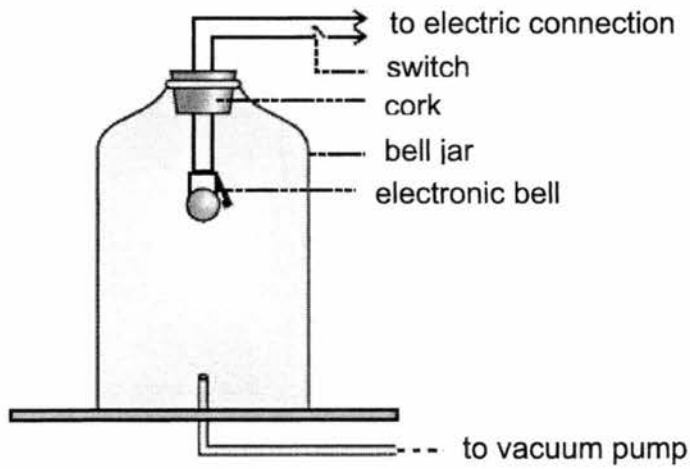
7 A student stands in front of a building and shouts. She hears an echo. What happens to the echo when she shouts at a greater distance from the building?

A It is louder and takes a longer time to reach her.
B It is louder and takes a shorter time to reach her.
C It is softer and takes a longer time to reach her.
D It is softer and takes a shorter time to reach her.

8 Which of the following statements about sound is incorrect?

A A body must vibrate in order to produce sound.
B Sound cannot pass through vacuum.
C Sound travels at the same speed as light in air.
D Sound carries energy from one place to another.

9 A student puts a bell into a jar, and switches it on so that it rings continuously. He turns on the vacuum pump to remove air from the jar slowly.



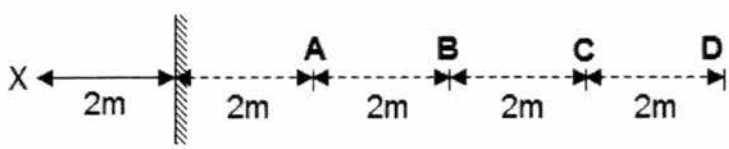
What will the student hear as the air is being pumped out?

A The bell will sound louder.
B The bell will sound softer.
C There will be no change in loudness.
D There will be no sound instantly.

10 An image which **cannot** be caught on a screen is known as a

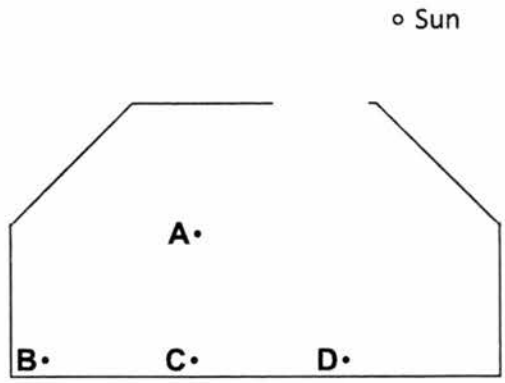
A real image
B virtual image
C diminished image
D magnified image

11 The diagram below shows an object, X, placed 2 metres in front of a plane mirror.

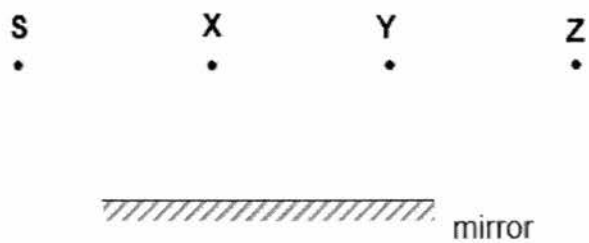


At which position is the object's image located?

12 The diagram below shows the position of Sun above a house. Sun light cannot pass through the roof of the house, but there is a hole that allows light to pass through. The walls and roof of the house are not reflective.
Which point will be in the shadow?



13 A student stands in front of a mirror at point **S**. There are objects placed at points **X**, **Y** and **Z**.

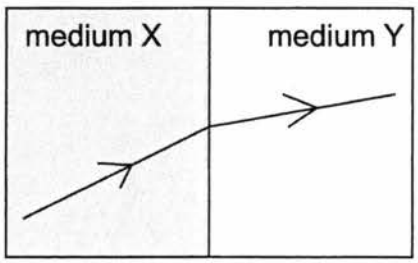


How many images of the objects can the student see in the mirror?

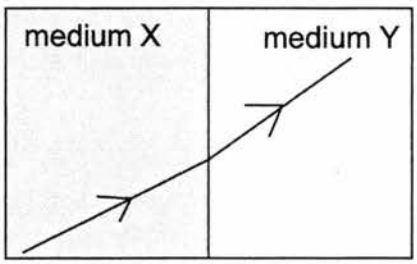
A 0
B 1
C 2
D 3

14 A ray of light travels from medium X to medium Y. If medium X is optically denser than medium Y, which of the following correctly shows the light path?

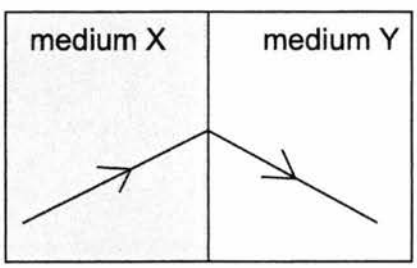
A



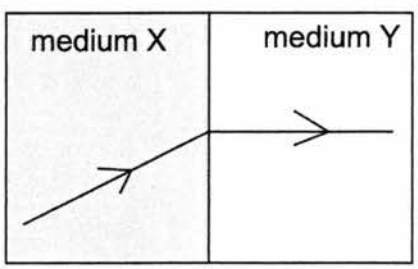
B



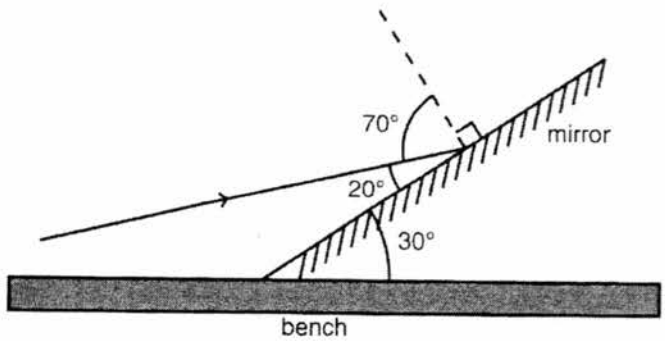
C



D



15 A mirror is tilted at an angle of 30° to the bench. A ray of light is directed so that it hits the mirror at an angel of 20° to the surface of the mirror



What is the angle of reflection?

A 20 ° **B** 30 ° **C** 50 ° **D** 70 °

Section B (20 marks)

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

16 A student attempts to measure the diameter of a sphere. He uses 5 identical spheres, 2 triangular blocks and a metre rule as shown in Fig. 16.1.

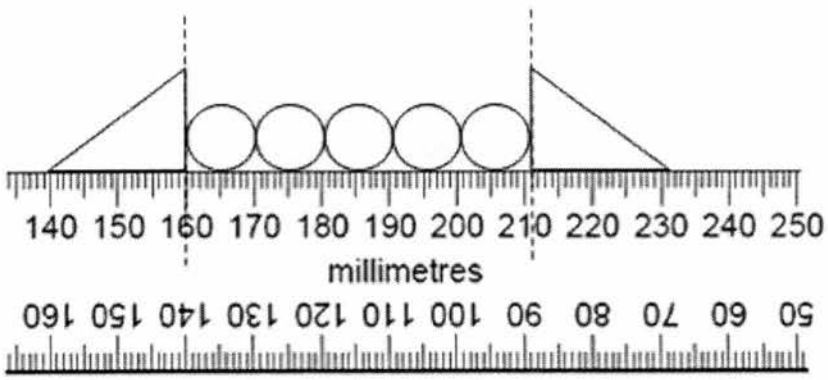


Fig. 16.1

(a) Determine, with working, the diameter of **two** spheres.

diameter of two spheres = ... mm [2]

(b) State one precaution the student needs to take to ensure accurate reading.

.....

..... [1]

(c) Name an instrument that is suitable to be used to measure the diameter of the sphere to a precision of 0.1 mm.

..... [1]

17 A time keeper of a race stands a certain distance away from a starter. He starts his stopwatch when he sees the smoke from the starter who fires the gun and stops the stopwatch when he hears the loud bang from the gun. The time recorded is 0.65 s. Take the speed of sound in air = 300 m/s.

(a) Explain why the time keeper sees the smoke from the gun first before hearing the loud bang.

.....

..... [1]

(b) Calculate the distance between the time keeper and the starter.

distance = ... m [2]

18 A boy holds a signboard with the word '**STOP**' and stands in front of a plane mirror.

(a) Write down the appearance of the word that the boy sees in the mirror.

..... [1]

(b) State two characteristics of the image formed by a plane mirror.

.....

..... [2]

19 Fig. 19.1 shows a ray of blue light being refracted at points **A** and **B** on a semi circular glass block.

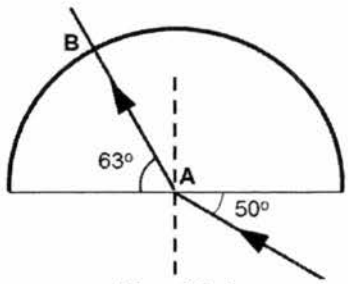


Fig. 19.1

(a) Why did the ray not change direction at **B**?

..... [1]

(b) What are the angles of incidence and refraction, in degrees, at A?

angle of incidence = ...

angle of refraction = ...
[2]

(c) Calculate the refractive index of the glass.

refractive index = ...[2]

(d) Hence or otherwise, calculate the speed of light in the glass block using the answer in part **(c)**. (Given that the speed of light travelling in vacuum is 3.00 x 10^8 m/s)

speed = ...m/s[2]

20 On Fig 20.1, draw 2 light rays to show how the observer sees the image of the object **O** in the mirror. [3]

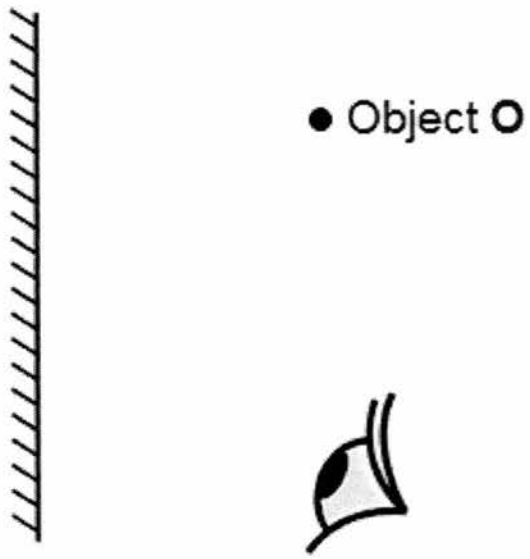


Fig 20.1

Section C (15 marks).
Write your answers in the spaces provided.

21 (a) Fig. 21.1 shows four different materials and their physical properties.

material	melting point / °C	boiling point / °C	thermal conductivity	electrical conductivity
P	– 39	357	good	good
Q	660	2743	good	good
R	1495	2927	good	good
S	3527	4440	poor	poor

Fig. 21.1

(i) State and explain which material is a non-metal.

.....

..... [2]

(ii) Determine the state of matter for the following materials at 1000 °C.

Material **P**: .....

Material **Q**: .....
[2]

(iii) State all the material(s) which is/are suitable to be used to make the body of a frying pan.

..... [1]

21 **(b)** Fig. 20.2 shows the masses and volumes of two solids **X** and **Y**.

	X	**Y**
mass / g	28.0	4.5
volume / cm^3	17.5	6.0
density / g/cm^3		

Fig. 20.2

(i) Complete Fig. 20.2 by filling in the blanks with the densities of solids **X** and **Y** respectively. Show your working. [2]

(ii) Liquid **Z** has a density of 0.90 g/cm^3. Given that both solids **X** and **Y** are insoluble in liquid **Z**, state which solid(s) will sink in liquid **Z**.

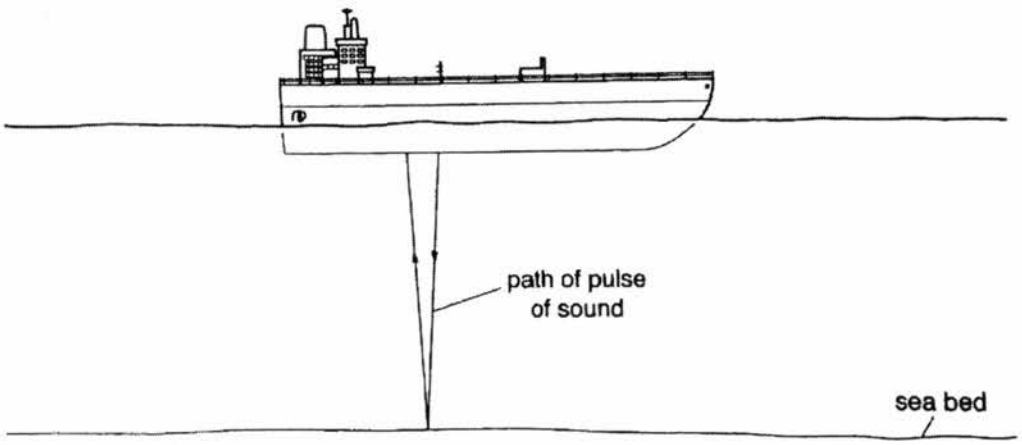
..... [1]

(iii) Solid **X** is cut into two equal halves. State and explain what will happen to the half if it is placed in liquid **Z**.

.....

..... [2]

22 Sound navigation and ranging (Sonar) is a technique that uses sound propagation to navigate, communicate with or detect objects on or under the surface of the water.



(a) Sonar is an ultrasound. Explain what is meant by ultrasound and state one other use for ultrasound.

.....

.....

..... [2]

(b) Given the speed of sound in water is 1480 m/s, calculate the depth of the sea bed if it took 3 seconds for the echo to be detected by the ship.

depth = ...m[2]

(c) Explain why the echo is smaller in amplitude than the original sound from the transmitter of the ship.

.....

..... [1]

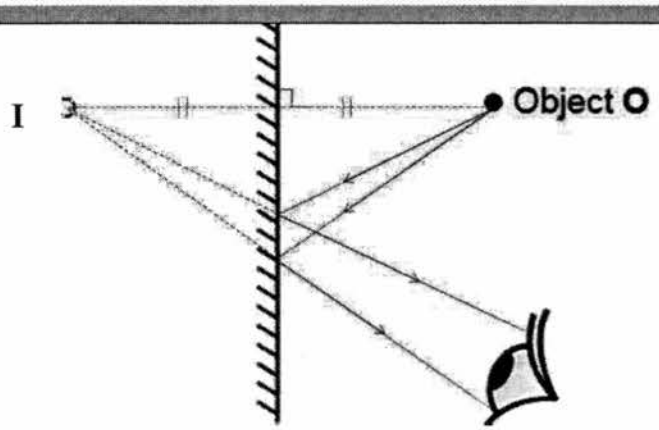
END OF PAPER

Section A

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	B	D	D	A	C	C	C	B	B	A	D	D	B	D

Section B

16(a)	length of 5 spheres = 211 – 160 = 51 mm	[1]
	diameter of 1 sphere = (51/5) x 2 = 20.4 mm	[1]
(b)	avoid parallax error / place eyes directly above the metre rule when taking reading	[1]
(c)	vernier calipers	[1]
17(a)(i)	light travels faster than sound	[1]
(ii)	d = v x t = 300 x 0.65	[1]
	= 195 m	[1]
(b)	No, sound cannot travel in vacuum.	[1]
18(a)		[1]
(b)	Any **two** from the following: - laterally inverted - virtual - same size as object - upright - object distance = image distance	[1]
19(a)	The angle of incidence is zero degrees	[1]
(b)	angle of incidence = 40°	[1]
	angle of refraction = 27 °	[1]
(c)	n = sin i /sin r = sin40 / sin 27	[1]
	=1.42 (3 s.f.)	[1]
(d)	n = c/v 1.415 = (3.00 x 10^8) / (v)	[1]
	v = 2.12 x 10^8 m/s	[1]

	 *(a) Draw two rays from I to Eye. Mark the point as I, the image. [1]* *(b) Draw dotted perpendicular line with perpendicular sign. Mark equidistance. Draw O, the object. [1]* *(c) Draw two converging real rays from the mirror to the object. [1]* *Advise students that it is a good practice to draw the normal at the interface to check that the angle of incidence is equal to the angle of reflection.*	[3]

Section C

21(a)(i)	S	[1]
	It is a poor electrical (& thermal) conductor	[1]
(ii)	P = gas	[1]
	Q = liquid	[1]
(iii)	Q and R	[1]
(b)(i)	Density = m/V =28/17.5 =1.6 *Students need not state unit as it is in the header of table.*	[1]
	Density = m/V =4.5/6.0 =0.75	[1]
(ii)	Solid X	[1]
(iii)	The half will sink in liquid **Z**,	[1]
	as the density of the half remains unchanged / denser than liquid **Z**	[1]
22(a)	Sound that has frequency higher than 20000 Hz	[1]
	cleaning delicate jewellery OR scanning pregnant women to examine the foetus OR any suitable scientific used for ultrasound.	[1]
(b)	d = v x t = 1480 x 3 =4440 m	[1]
	depth = 4440 /2 =2220 m	[1]
(c)	Energy is lost to the surrounding/ Accept the echo is softer (For sec1)	[1]

General notes:

Do not penalize for carry forward errors. Award full marks for subsequent parts if **both** method and units are correct.
Do not penalize for spelling errors but do highlight them to the students.
Remind students to show formulae, working and units for all calculations.
Answers must not be more than 3.s.f. if accuracy is not specified.

If students do not show formulae and intermediate working for more than 2 times for questions involving calculations, deduct **1 mark** overall.
If students give more than 3.s.f. for more than 2 times, deduct **1 mark** overall.