Name:	Index Number:	Class:

HUA YI SECONDARY SCHOOL

Preliminary Examination

4E/5N 4E/5N

SCIENCE (PHYSICS/ CHEMISTRY) 5076/1

Paper 1
Multiple Choice

..... 2021
1 hour

Candidates answer on the Multiple Choice Answer Sheet
Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST
Write your Name, Index Number and Class on the Answer Sheet in the spaces provided.
Write in soft pencil.
Do not use staples, paper clips, highlighters, glue or correction fluid.

There are **forty** questions on 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.
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the periodic table is printed on page 14.

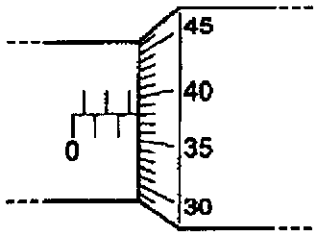
For Examiner's Use	
Paper 1	

This document consists of ..... printed pages including the cover page.

[Turn Over

Setter: Mr Lee Choon Kiong

1 A student measures the thickness of 20 sheets of paper with a micrometer.
The diagram shows the reading on the micrometer.



What is the average thickness of one sheet of paper?

A 0.119 mm
B 0.144 mm
C 0.169 mm
D 0.171 mm

2 Which is a vector quantity?

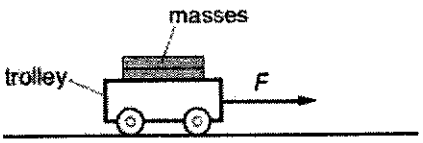
A a mass of 2.0 kg
B a temperature of –10 °C
C a weight of 15 N
D an average speed of 20 m / s

3 Oil drips at a constant rate from a moving car. The diagram shows the pattern of the drips on a road.

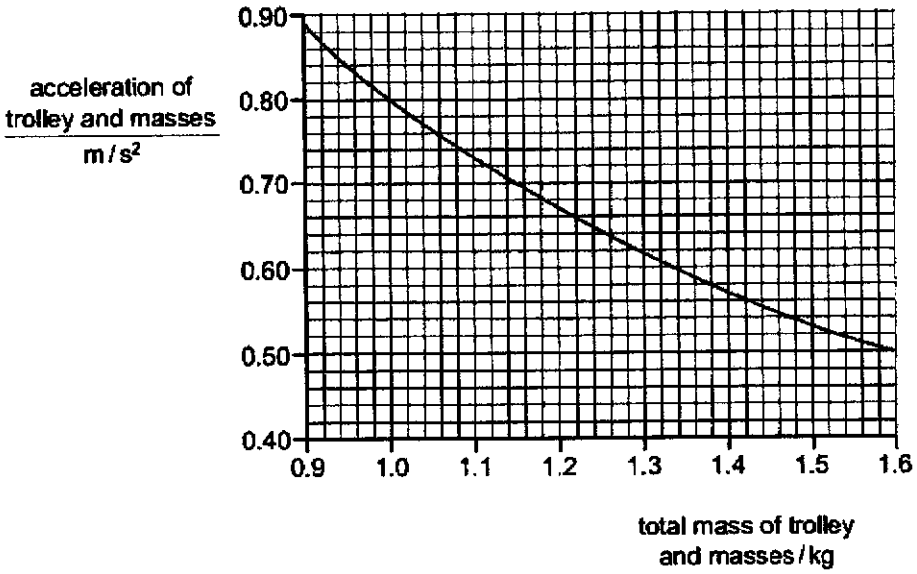
Which statement describes the motion of the car?

A It accelerated and then moved at a steady speed.
B It accelerated and then slowed down.
C It moved at a steady speed and then slowed down.
D It moved at a steady speed and then accelerated.

4 A student wishes to investigate how the mass of a trolley affects its acceleration. She applies a constant horizontal force F to the trolley.



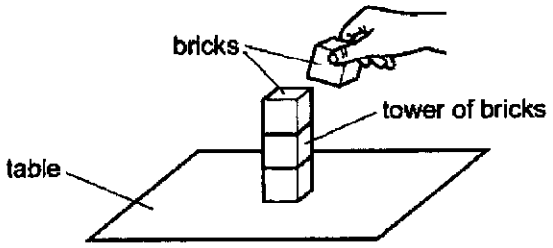
Different masses are placed on the trolley, and acceleration is measured.
The graph shows the student's results.



What is the value of F?

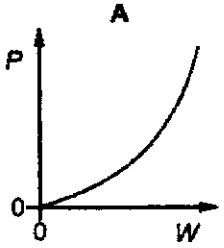
A 0.28 N **B** 0.66 N **C** 0.80 N **D** 1.51 N

5 Identical toy bricks are placed one on top of another to make a tower on a table.

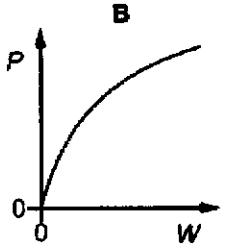


Which graph shows the relationship between the pressure P that the tower exerts on the table and the weight W of the tower?

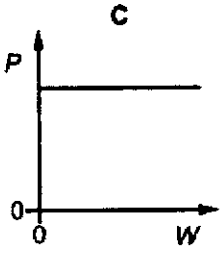
A



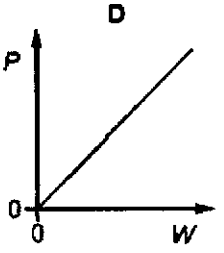
B



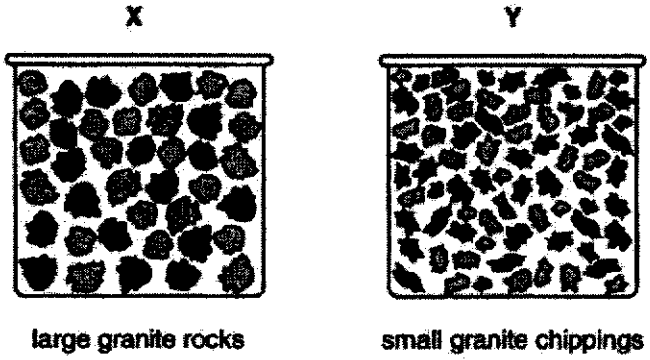
C



D



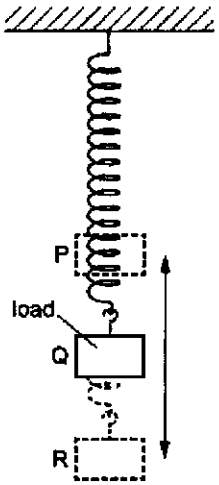
6 A box X full of large granite rocks is weighed. An identical box Y full of small granite chippings is then weighed.



Which box weighs more and why?

	heavier box	reason
A	X	there is more air in box X
B	X	the density of a chipping is less than a rock
C	Y	there is less air in box Y
D	Y	the density of a chipping is greater than a rock

7 A load hangs on a spring at point Q.
The load is now pulled down to point R and released. It moves up and down between its highest point P and its lowest point R.



Which statement describes the kinetic energy of the load?

A It is equal at points P, Q and R.
B It is greatest at point P.
C It is greatest at point Q.
D It is greatest at point R.

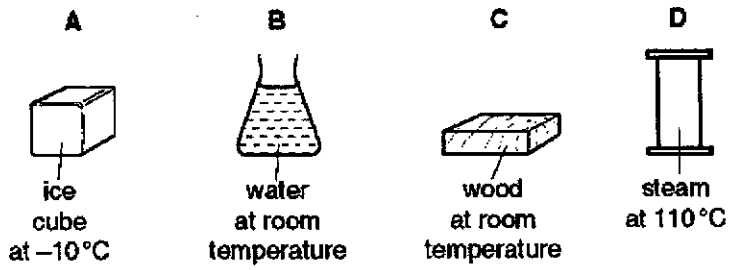
8 An object of mass 2 kg is initially at rest. The object is dropped from a 40 m tower.

Air resistance can be ignored. Assume that the potential energy of the object is zero when it is on the ground.

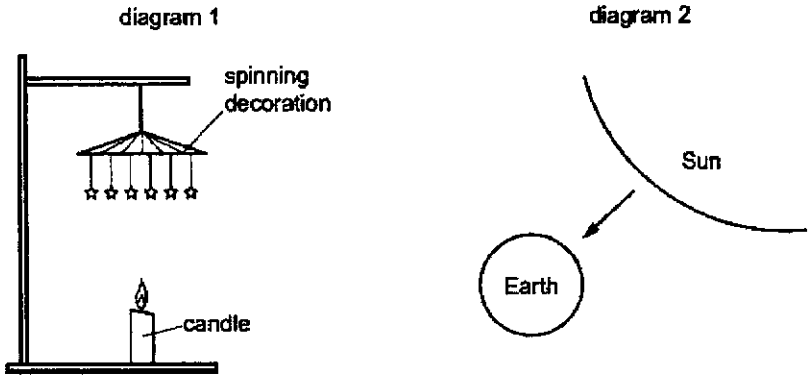
What is the ratio of the kinetic energy of the object to its potential energy at a height of 10 m from the ground?

A 4 : 3
B 2 : 1
C 3 : 1
D 4 : 1

9 Which of the following contains the molecules with the highest average speed?



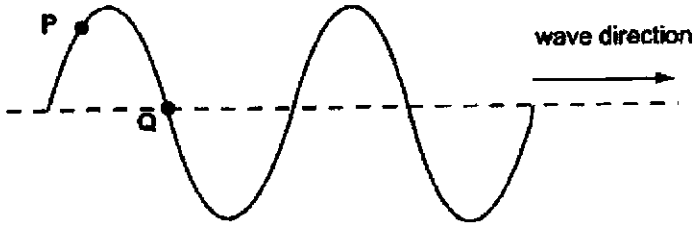
10 In diagram 1, a candle heats air and the heated air causes a decoration to spin. Diagram 2 shows the Earth being warmed due to heat produced by the Sun.



What is the main method of heat transfer involved in each case?

	candle to decoration	Sun to Earth
A	convection	convection
B	convection	radiation
C	radiation	convection
D	radiation	radiation

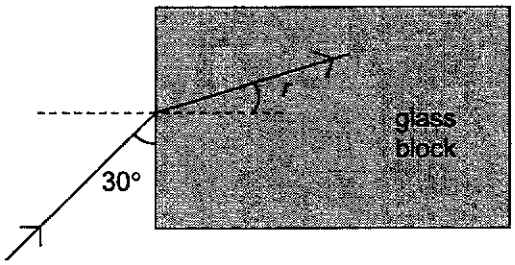
11 The diagram shows a wave on a string with two points **P** and **Q** marked. The wave is moving in the direction shown.



What will happen next?

A **P** will move to the right.
B **P** will move up.
C **Q** will not move.
D **Q** will move up.

12 A ray of light meets the face of a glass block at an angle of 30° as shown.

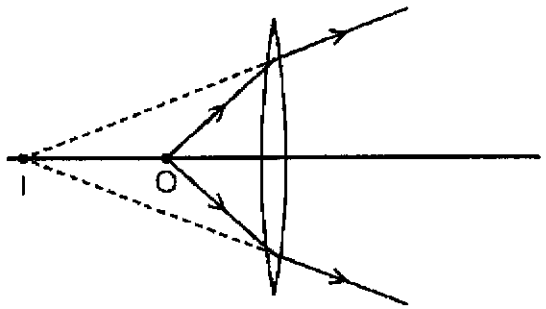


The refractive index of the glass is 1.5.

What is the angle of refraction *r* inside the glass block?

A 19° **B** 20° **C** 35° **D** 40°

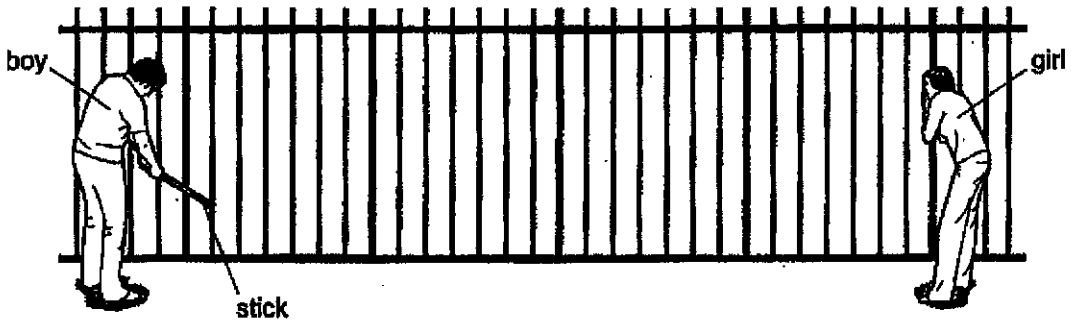
13 A small object O is placed near a converging lens, as shown. The lens forms an image I.



Which statement is correct?

A The image I is diminished.
B The image I is inverted.
C The image I is real.
D The object O is closer to the lens than its principal focus.

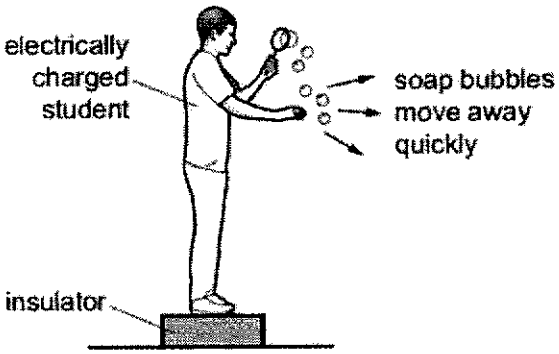
14 A boy strikes a rigid metal fence with a stick to create a sound along the fence. A girl listens with her ear against the fence. Two seconds after the fence is struck, the girl hears a sound through the air.



How long will it take for the sound to reach the girl through the fence?

A 0 second
B less than 2 seconds
C 2 seconds
D more than 2 seconds

15 An electrically charged student produces soap bubbles. When he holds his hand near the bubbles, they move away quickly from his hand.



For this movement of the bubbles to happen, which statement is correct?

A The bubbles must be negatively charged.
B The bubbles must be positively charged.
C The bubbles must have the opposite charge to the charge on the student.
D The bubbles must have the same charge as the charge on the student.

16 A spark plug produces a current of 35 mA between two electrodes.
How long does it take for a charge of 70 μC to pass through the space between the two electrodes?

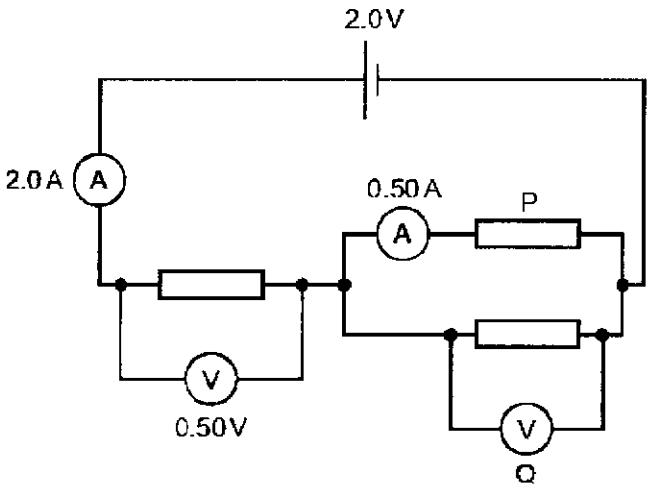
A 0.50 ms **B** 2.0 ms **C** 34 ms **D** 2500 ms

17 A cell is connected to a resistor.
What is the e.m.f. of the cell equal to?

A The potential difference across the resistor for each unit of current.
B The power produced in the circuit for each unit of charge that passes.
C The work done in the circuit for each unit of charge that passes.
D The work done in the circuit for each unit of current.

18 A circuit contains a cell of electromotive force (e.m.f.) 2.0 V, three resistors, three ammeters and two voltmeters. One of the resistors is labelled P and one voltmeter is labelled Q.

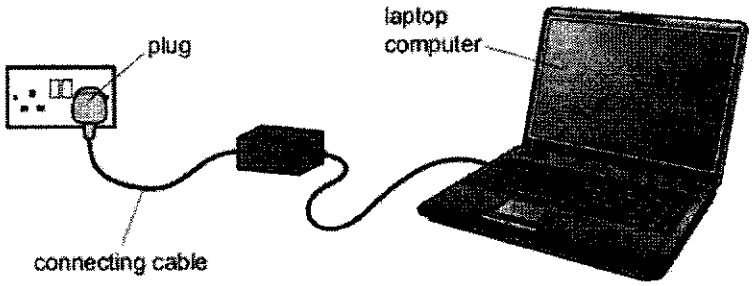
The readings on the other two ammeters and on the other voltmeter are shown.



What is the resistance of P and what is the reading on voltmeter Q?

	resistance of P / Ω	reading on Q / V
A	1.0	1.5
B	3.0	2.5
C	3.0	1.5
D	5.0	2.5

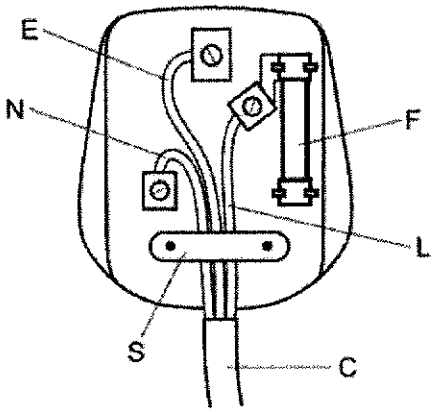
19 The charger for a laptop computer is connected by a cable to the mains supply through a plug.
The plug contains a 13 A fuse. The cable is designed to carry a current of 2 A.
A fault develops and the current in the cable increases to 5 A.



What is a possible danger caused by this larger current?

A A large amount of electrical energy is wasted.
B The user receives an electric shock.
C The fuse blows and starts a fire.
D The cable overheats and starts a fire.

20 The diagram shows the wiring of a three-pin mains plug. There is an error in the diagram.



What is the error?

A The cable cover C is not under the clip S.
B The earth wire E is connected to the wrong terminal.
C The fuse F is connected to the live wire L.
D The live wire L is connected to the wrong end of the fuse F.

Name:	Index Number:	Class:

HUA YI SECONDARY SCHOOL

Preliminary Examination 2021

4E5N **4E5N**

SCIENCE (PHYSICS) **5076/2**

Paper 2 15 Sep 2021

Candidates answer on the Question Paper. 1 hour 15 min

Additional Materials: NIL

READ THESE INSTRUCTIONS FIRST

Write your Name, Index Number and Class at the top of this page.
Write in dark blue or black pen.
You may use a soft pencil for any diagrams, graphs or tables.
Do not use staples, paper clips, highlighters, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A
Answer **all** questions.
Write your answers in the spaces provided on the question paper.

Section B
Answer **any two** questions.
Write your answers in the spaces provided on the question paper.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This document consists of **16** printed pages including the cover page.

[Turn Over]

Setter: Ms Lim Kai Xin

Section A [45 marks]
Answer **all** the questions in this section.

1 Fig. 1.1 shows a boy on a sledge travelling down a slope. The reaction force, **S**, from the slope acting on the sledge is 450 N. The weight, **W**, of the boy and sledge is 550 N.

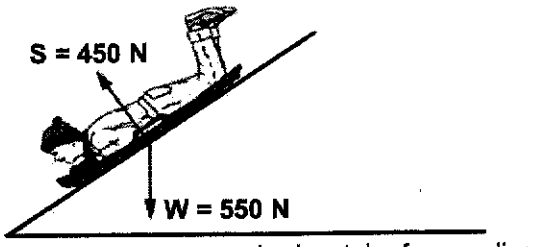


Fig. 1.1

Fig. 1.2 is drawn to scale. Indicate the scale used in this diagram.

On Fig. 1.2, draw a vector diagram to determine the resultant force, **F**.

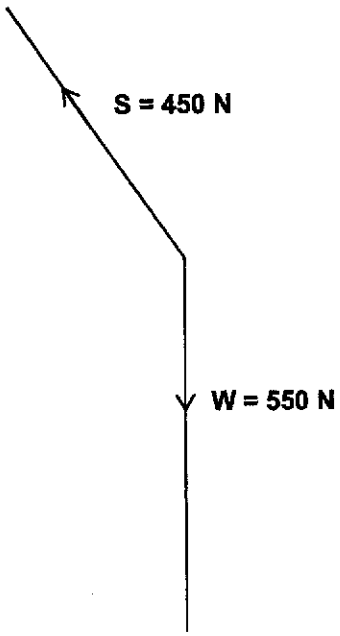


Fig. 1.2

scale is 1 cm represents ..... N [1]

F = ...N [2]

2 Fig. 2.1 shows a uniform metal beam, pivoted at one end and held in equilibrium by a cable attached to its other end.

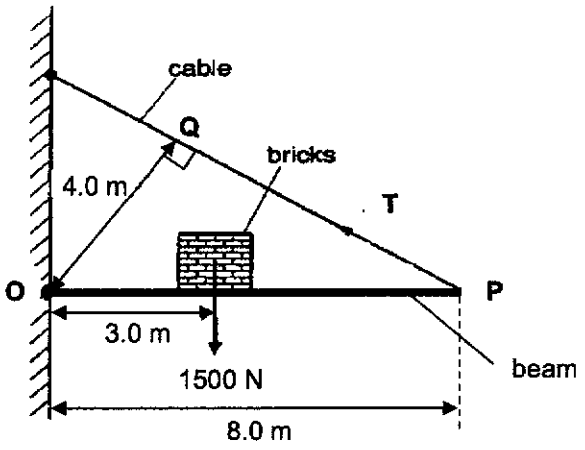


Fig. 2.1

The beam has weight 2100 N and length 8.0 m. A pile of bricks of total weight 1500 N is placed on the beam 3.0 m from the pivot **O**. The distance **OQ** is 4.0 m.

(a) Calculate the total clockwise moments of the weight of the beam and the weight of the bricks.

total clockwise moments = ... Nm [2]

(b) (i) State the principle of moments.

.....

.....

..... [1]

(ii) Hence, show that tension **T** in the cable is 3225 N. [2]

(c) Explain what would happen to the tension in the cable as the pile of bricks is slowly moved towards P.

.....

.....

.....

..... [2]

3 Fig. 3.1 shows a pin.
Fig. 3.2 shows a person pushing the pin into a wall.

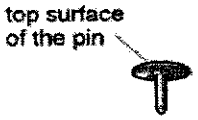


Fig. 3.1

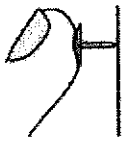


Fig. 3.2

(a) The area of the top surface of the pin is 1.8 cm^2. The person applies a force of 50 N. Calculate the pressure exerted on the top surface of the pin. Include the unit.

pressure = ... [2]

(b) Explain why the pressure exerted on the wall in Fig. 3.2 is different from the pressure calculated in **(a)**

.....

.....

.....

..... [2]

4 A pure solid substance is heated from -15 °C to 170 °C, using a 500 W heater. Fig. 4.1 shows the temperature change of the substance with respect to time.

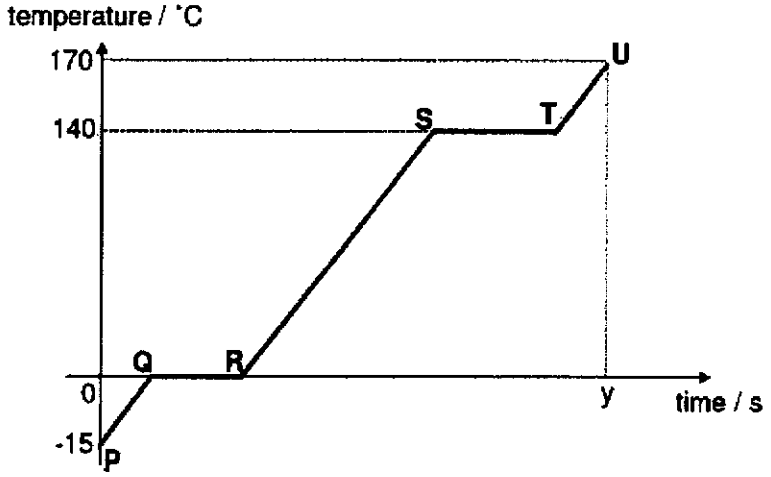


Fig. 4.1

(a) State the melting point of the substance.

melting point = ... [1]

(b) Describe what happens to the internal energy of the molecules in the substance when the temperature is increasing from 150 °C to 170 °C.

.....

.....

.....

..... [2]

(c) The total amount of thermal energy needed to raise the temperature of the substance from –15 °C to 170 °C is 400 kJ, calculate the time, *y* in Fig. 4.1. Assume no loss of energy to the surrounding.

y = ... s [2]

5 A diver uses fins to push himself through the water. The force on the diver produced by one kick of a fin is 15 N. The mass of the diver is 70 kg.

(a) Calculate the acceleration of the diver produced by one kick of a fin.

acceleration = ...m/s^2 [1]

(b) Table 5.1 shows the speed of light in air and water.

Table 5.1

material	air	water
speed of light / ms^{-1}	3.0 x 10^8	2.3 x 10^8

(i) Calculate the refractive index of glass block.

refractive index = ... [1]

(ii) The diver can see a flag above the surface of the water. Complete Fig. 5.1 by drawing the path of one ray of light between the flag and the diver. [2]

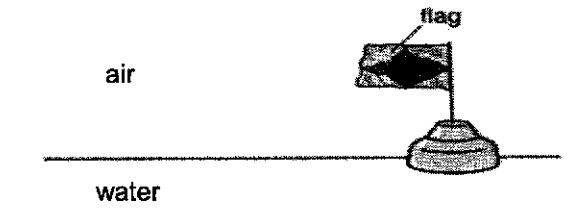


Fig. 5.1

(iii) Using data from the Table 5.1, explain the path of the light ray drawn in Fig. 5.1.

.....

.....

.....

..... [2]

6 Fig. 6.1 shows a boat has a winch powered by an electric motor that is used to raise an anchor.

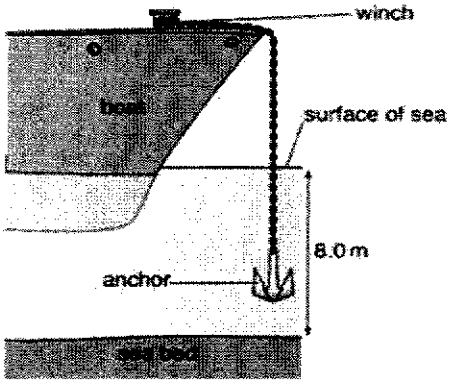


Fig. 6.1

(a) A force of 300 N is needed to raise the anchor and the anchor moves up with a constant speed through a distance of 8.0 m from the sea bed to the surface of the sea.

State the magnitude of the weight of the anchor and explain how you derive your answer.

.....

..... [2]

(b) Calculate the work done to raise the anchor from the sea bed to the surface of the sea.

work done = ... J [1]

(c) The potential difference across the electric motor is 12 V and the current in the motor is 10 A. The time taken to raise the anchor through 8.0 m is 25 s.

Calculate the energy transferred to the motor to raise the anchor from the sea bed to the surface of the sea.

energy transferred = ... J [2]

(d) Hence, determine the energy lost in the process of raising the anchor from the seabed to the surface of the sea.

energy lost = ... J [1]

7 A scientist studies the waves produced by earthquakes. When earthquakes move through the Earth, they are detected by sensors on the Earth's surface.

Fig. 7.1 shows an earthquake just underneath the surface of the Earth and two sensors **A** and **B** positioned in a straight line.

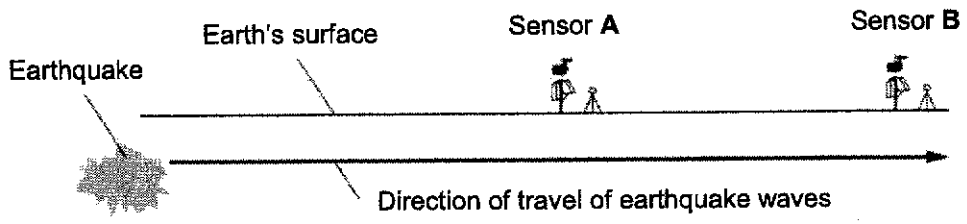


Fig. 7.1

(a) The scientist observes that the sensors show the particles of the ground moving in the same direction as the earthquake wave that is passing through.

State the name of the type of wave that produces this movement.

..... [1]

(b) Sensor **A** detects the wave at 3 minutes and 48 seconds after the earthquake happens. Sensor **B** detects the wave at 4 minutes and 17 seconds after the earthquake happens. The distance between sensor **A** and sensor **B** is 200 km.

Calculate the speed of this wave.

speed = ... km/s [2]

(c) Fig. 7.2 shows the wave on computer screens at sensor **A** and at sensor **B**.

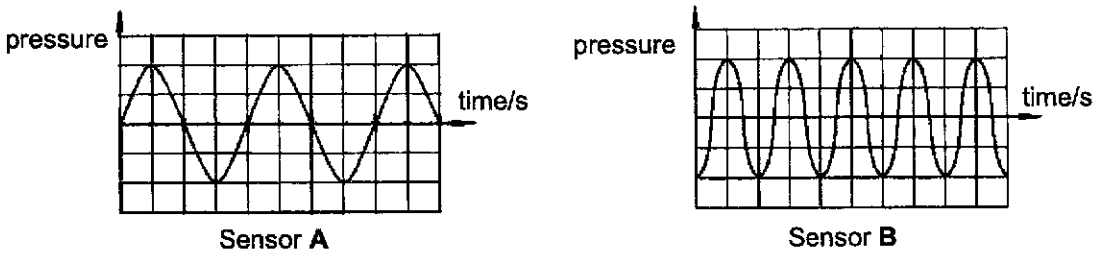


Fig. 7.2

Describe one difference between the wave when it is at sensor **A** and when it is at sensor **B**.

.....

..... [2]

8 Fig. 8.1 shows the electromagnetic spectrum. One type of radiation is not labelled.

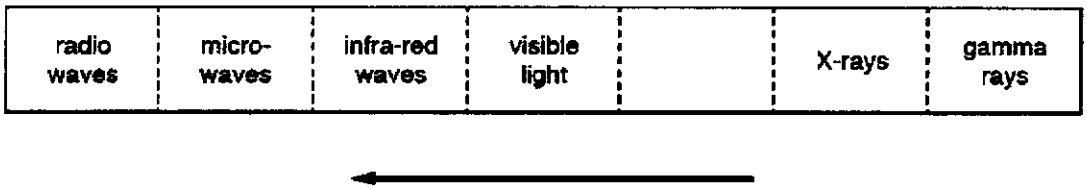


Fig. 8.1

(a) On Fig. 8.1, add the label for the missing type of radiation. [1]

(b) The arrow in Fig. 8.1 indicates a property that is increasing.
State the name of the property that is increasing in the direction of the arrow.

..... [1]

(c) Compare the speeds of radio waves and visible light in a vacuum.

.....[1]

(d) State one properties of X-rays that make them useful in airport security.

.....

..... [1]

9 Fig. 9.1 shows two isolated charges placed close to each other.

Fig. 9.1

(a) On Fig. 9.1, draw the electric field pattern between the two charges. Show clearly the direction of the field. [1]

(b) Describe how the field lines show the strength of an electric field.

.....

..... [1]

10 Fig. 10.1 shows an engine pulling an oil tanker.

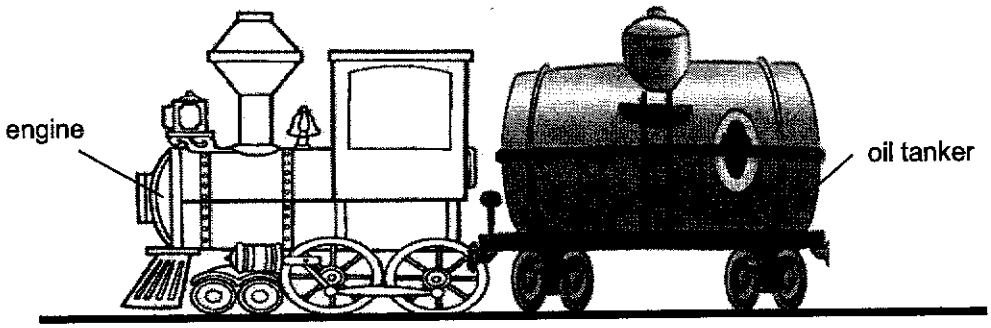


Fig. 10.1

Table 10.1 shows some information about the engine and the oil tanker.

Mass of the empty tank	3000 kg
Maximum volume of oil that the tanker can carry	25 m^3
Density of oil	740 kg/m^3

(a) State one difference between mass and weight.

.....

..... [1]

(b) Calculate the weight of the tanker when it is full.

weight = ... N [2]

Section B [20 marks]
Answer **any two** questions.
Write your answers on the spaces provided and, if necessary, continue on separate answer paper.

11 A parachutist jumps off a plane at **A**. He activates his parachute at **C** and finally lands on the ground at **D**.

Fig. 11.1 is a graph showing the motion of the parachutist after he jumps off the plane.

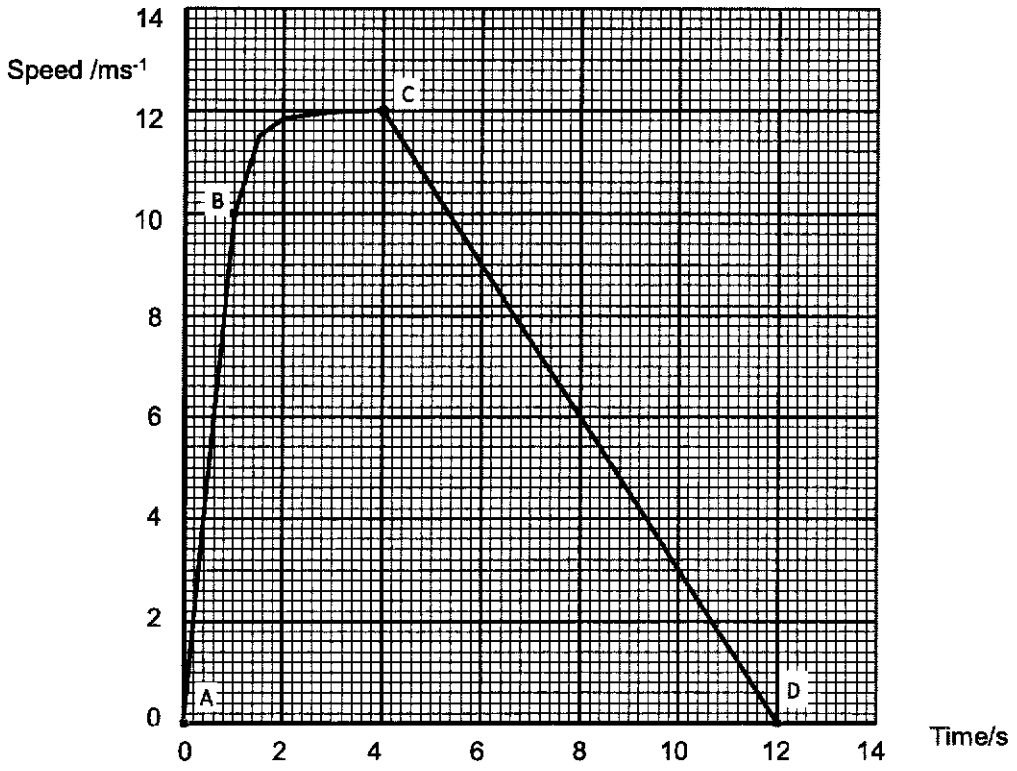


Fig. 11.1

(a) State the initial acceleration of the parachutist at **A**.

acceleration = ... m/s^2 [1]

(b) Calculate the height above the ground when the parachutist open his parachute at **C** to just before he reach the ground at **D**.

height = ... m [1]

(c) Given that the total mass of the parachute and the parachutist is m,

(i) write down an expression for the total energy of the parachutist at **C**.

total energy = ... [2]

(ii) Hence, calculate the speed of the parachutist before he hits the ground. Assume that there is no energy loss to the surrounding.

speed = ... m/s [2]

(d) (i) State the principle of conservation of energy.

.....

.....

..... [1]

(ii) Using the principle of conservation of energy, explain why the sum of the kinetic and gravitational potential energies at **C** is only 80% of the initial gravitational potential energy at point **A**.

.....

.....

..... [1]

(e) Describe and explain, in terms of forces acting on the parachutist, the motion of the parachutist from **B** to **C.**

.....

.....

.....

..... [2]

12 Fig. 12.1 shows how a baby's milk bottle can be heated using a bottle warmer. The bottle warmer has foam-filled walls and a shiny outer casing.

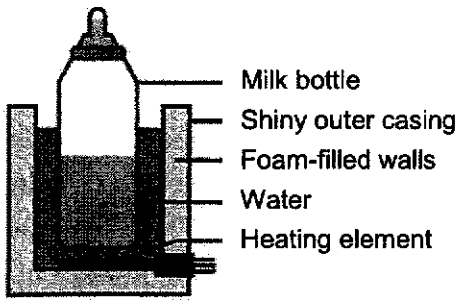


Fig. 12.1

(a) Explain how the foam-filled walls and shiny outer casing reduce heat loss from the bottle warmer to the surroundings.

Foam-filled wall: .....

.....

..... [1]

Shiny outer casing: .....

.....

..... [1]

(b) Describe how thermal energy is transferred from the heater throughout the water.

.....

.....

.....

..... [2]

(c) The bottle warmer is plugged into a 230 V mains supply. Heat is provided by a 200 W heating element. The heating element raises the temperature of the liquid in the warmer to 40 °C.

(i) Calculate the current flowing through the heating element.

current = ... A [1]

(ii) Explain why the bottle warmer is not safe to use when the fuse is fitted to the neutral wire instead of the live wire.

.....

.....

..... [2]

(i) The cost of electricity incurred for the using the bottle warmer in a month of 30 days is \$0.96. Given that the electrical tariff is \$0.32 per kWh, calculate the total time the bottle warmer is switched on per day.

time = ...[2]

(d) The heating element supplies thermal energy at a constant rate. However, it takes more time for the temperature of the milk to increase from 30 °C to 40 °C than from 10 °C to 20 °C. In both cases, the increase in temperature is the same.

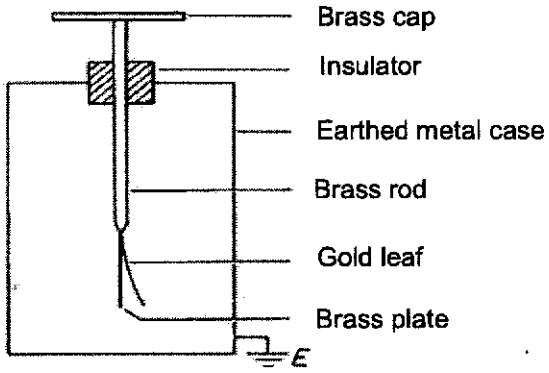
Suggest why it takes more time for the temperature to increase from 30 °C to 40 °C than from 10 °C to 20 °C.

.....

.....

..... [1]

13 Fig. 13.1 shows a gold leaf electroscope.



A Perspex rod become positively charged after rubbing a piece of cloth, it is brought near to the brass cap of the electroscope.

(a) **(i)** Explain how the Perspex rod becomes positively charged.

.....

..... [1]

(ii) Describe and explain what happen to the gold leaf when the positively charged Perspex rod is brought near to the brass cap.

.....

.....

.....

..... [3]

(b) 0.025 C of positive charge is accumulated in the brass cap of another electroscope. When a wire **A** is used to earth the brass cap, it is discharged in 0.01 ms, releasing 10 J of energy in the process.

(i) Calculate the current flowing through wire **A** when the brass cap is earthed.

current = ... [2]

(ii) Calculate the voltage of the brass cap and earth before it is earthed.

voltage = ... [2]

(c) The brass cap is now earthed using wire **B** which is made of the same material as wire **A**. Wire **B** is twice the length and half the cross-sectional area as compared to wire **A**.

(i) State how the resistance of wire **B** will differ from wire **A**.

.....

..... [1]

(ii) Hence, describe how the current flowing through wire **B** will differ from wire **A**.

.....

..... [1]

End of paper

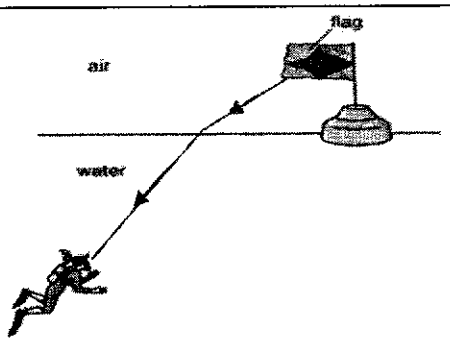
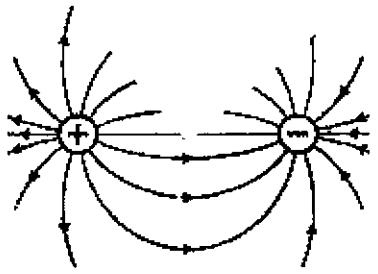
Hua Yi Secondary School
2021 Preliminary Examinations
Science (Physics) 5076/01
TOS & Answers

Qn	Ans
1	B
2	C
3	C
4	C
5	D
6	C
7	C
8	C
9	D
10	B
11	D
12	C
13	D
14	B
15	D
16	B
17	C
18	C
19	D
20	A

HUA YI SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2021
SECONDARY 4E5N SCI (PHYSICS) 5076 ANSWER SCHEME

Paper 2 Section A (45 marks)

Qn		Answers	Marks
1		scale is 1 cm : 100 N resultant force, F = 320 N **(Accept 310 N – 330 N)** Correct diagram with dotted lines, double arrow for resultant force	B1 A1 B1
2	(a)	Total clockwise moments = (1500 x 3) + (2100 x 4) = 12900 Nm **Allow 1 m if they calculate moment 1500 x 3 correctly**	M1 A1
	(b) (i)	Principle of moments states that when an object is in equilibrium, the sum of the clockwise moments about a pivot is the equal to the sum of the anticlockwise moments about the same pivot.	B1
	(b) (ii)	Taking moments about the pivot, Sum of anticlockwise moments = sum of clockwise moments T x 4 = 12900 T = 3225 N **Allow ecf 1 m**	 M1 A1
	(c)	As the pile of bricks moves towards end P, the **perpendicular distance between the brick weight and the pivot increases**. Hence, **the total clockiwse moments on the beam increases.** **The tension T increases to create the same anti-clockwise moments/ to increase the anti-clockwise moment** so as to ensure the beam stay horizontal.	B1 B1
3	(a)	P = F/A = 50 N / 1.8 cm^2 = 27.8 N/cm^2 **[-1] if unit is wrong or if they do conversion wrongly**	 M1 A1
	(b)	The **area of the pin in contact with the wall is much smaller** than the top surface of the pin. Hence, the **pressure exerted on the wall will be greater.**	B1 B1
4	(a)	0 °c **[-1] if unit is wrong**	A1
	(b)	The molecules will **gain kinetic energy and move faster.** The **potential energy of the molecules remains constant.**	B1 B1
	(c)	E = Pt 400 x 10^3 = 500 x t **(Allow 1 m if they did not convert to J)** t = 800 s	 M1 A1
5	(a)	F = ma 15 = 70 x a a = 0.214 m/s^2	 A1
	(b) (i)	n = c/v = 3 x 10^8 / 2.3 x 10^8 = 1.30	 A1

	(b) (ii)	 Correct bending of light ray Correct direction of arrow	 B1 B1
	(b) (iii)	As the **speed of light slows down in water**, the light ray will **bend towards the normal** when it enter the water.	B1 B1
6	(a)	Since the anchor moves up with a **constant speed**, the **resultant force acting on the anchor must be zero**. Hence, the weight of the anchor is equal to the upward force of **300 N.**	B1 B1
	(b)	WD = F x d = 300 x 8 = 2400 J	 A1
	(c)	E = VIt = 12 x 10 x 25 **(Allow 1m if managed to calculate P =VI or Q = It)** = 3000 J	 M1 A1
	(d)	Energy Lost = 3000 – 2400 = 600 J **(ECF – full 1 m)**	 A1
7	(a)	Longitudinal wave	
	(b)	Time taken = 4 min 17s – 3 min 48s = 29 s Speed = Distance / time = 200 / 29 = 6.90 km/s	M1 A1
	(c)	The wave at Sensor B has a **higher pitch** as it has a **higher frequency**.	B1 B1
8	(a)	Ultraviolet radiation	B1
	(b)	Wavelength	B1
	(c)	The speed is the same	B1
	(d)	They have **high frequency** and can penetrate through materials.	B1
9	(a)	 **Reject the field lines at the two sides are not drawn / incorrectly drawn**	B1
	(b)	The closer the electric field lines, the stronger the electric field. **Reject the more the field lines, the stronger the field**	B1

10	(a)	Mass is the amount of matter in an object while weight is the force of gravity acting on the object. Mass is measured in kg while weight is measured in newton. Mass is measured using an electronic balance while weight is measured using a spring balance Mass is constant everywhere while weight is dependent on the gravitational field strength. **Mass is a scalar quantity while weight is a vector quantity**	B1 Any one
	(b)	Mass of oil = 25 x 740 = 18500 kg Total weight = Weight of oil + weight of tank **= (18500+3000) x 10 = 215000 N**	M1 A1

Paper 2 Section B (30 marks)

11	(a)	10 m/s^2	A1
	(b)	Height = Area under speed-time graph from C to D = ½ x 12 x 8 = 48 m	A1
	(c) (i)	GPE = mgh = m(10)(48) = 480 m K.E = ½ mv^2 = ½ m (12^2) = 72m TE = 480m + 72m = 552 m **Allow 1 m if they do calculation for either GPE or KE correctly** Allow ecf for GPE calculation	M1 A1
	(ii)	TE at C = K.E at D 552m = ½ m v^2 v = 33.2 m/s **Allow ecf (1 m) based on ans in (i)**	M1 A1
	(d) (i)	The principle of conservation of energy state that energy cannot be created nor destroyed but it can be converted from one form to another.	B1
	(d) (ii)	20% of the gravitational potential energy is converted to heat energy as it falls and reaches C. **The total kinetic energy, gravitational potential energy and heat energy at C is equal to the gravitational potential energy at A.** **Reject: Some of the energy is converted to heat and sound energy**	B1
	(e)	During B to C, as the speed of the parachutist increases, the **air resistance acting on the parachutist also increases.** Hence the **downwards resultant force decreases**. Thus, the **acceleration decreases.**	B1 B1
12	(a)	Foam- filled wall: The foam traps air. Air is a **poor conductor of heat**. Hence, **less heat is conducted away.** **Reject: Foam is a poor conductor of heat.** Shiny outer casing: The shiny surface is a poor emitter of heat. Hence, **less heat is emitted.**	B1 B1
	(b)	The water near the heating element get **heated up, expand, become less dense and rises. The cooler water at the top is denser and sinks.** This sets up a **convection current** that allow thermal energy to be transferred throughout the water.	B1 B1
	(c) (i)	P =VI 200W = 230 V x I I = 0.87 A	A1
	(c) (ii)	If the fuse is in the neutral wire, when the fuse melt and break the circuit, the **bottle warmer is still at high voltage**. Hence, the person touching the bottle water might still get an **electric shock.**	B1 B1

	(c) (iii)	$0.96 = E x $0.32 E = 3kWh Pt = 3kWh (200/1000) kW x t x 30= 3 t = 0.5 h	M1 A1
	(d)	The **rate of heat lost to the surrounding is greater when the temperature is higher.** Hence, it takes more time for temperature to increase from 30 °C to 40 °C than from 10 °C to 20 °C.	B1
13	(a) (i)	The Perspex rod **loses electrons** to the cloth. As there are more positive charges than negative charges, the rod becomes positively charged.	B1
	(a) (ii)	The gold leaf will **move away/deflect from the brass plate** The **electrons** will be attracted and **move to the top** as **unlike charges attract**. The **brass plate and gold leaf will become positively charged.** Since **like charges repel**, the gold leaf deflect away	B1 B1 B1
	(b) (i)	$I = 0.025/ (0.01 x 10^{-3})$ **$= 2.5 x 10^3$ A**	M1 A1
	(b) (ii)	V = 10/ 0.025 = 400 V	M1 A1
	(c) (i)	Resistance of **B** will be **4 times of A**	B1
	(c) (ii)	Since V remains the same, the **current through B will be ¼ of A**	B1