Neap

Trial Examination 2020

VCE Physics Units 1&2

Written Examination

Question and Answer Booklet

Reading time: 15 minutes
Writing time: 2 hours 30 minutes

Student's Name: _____

Teacher's Name: _____

Structure of booklet

Section	*Number of questions*	*Number of questions to be answered*	*Number of marks*
A	20	20	20
B	18	18	110
			Total 130

Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, pre-written notes (one folded A3 sheet or two A4 sheets bound together by tape) and one scientific calculator.

Students are NOT permitted to bring into the examination room: blank sheets of paper and/or correction fluid/tape.

Materials supplied

Question and answer booklet of 31 pages

Formula sheet

Answer sheet for multiple-choice questions

Instructions

Write your **name** and your **teacher's name** in the space provided above on this page, and on the answer sheet for multiple-choice questions.

Unless otherwise indicated, the diagrams in this booklet are **not** drawn to scale.

All written responses must be in English.

At the end of the examination

Place the answer sheet for multiple-choice questions inside the front cover of this booklet.

You may keep the formula sheet.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

SECTION A – MULTIPLE-CHOICE QUESTIONS

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1; an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Unless otherwise indicated, the diagrams in this booklet are **not** drawn to scale.

Take the value of g to be 9.8 m s^{-2}.

Question 1

Mia stirs her coffee with a metal spoon and notices that the spoon becomes warmer.

The method of heat transfer occurring is

A. evaporation.
B. conduction.
C. convection.
D. radiation.

Question 2

In an experiment, a 1.0 kg aluminium block is heated to 90°C. It is then dropped into 5.0 kg of water at 20°C. The specific heat capacity of water is 4200 J kg^{-1} K^{-1} and the specific heat capacity of aluminium is 880 J kg^{-1} K^{-1}.

Assuming no energy is transferred to the surrounding air or container, the final temperature of the aluminium block and water is closest to

A. 21°C
B. 23°C
C. 35°C
D. 55°C

Question 3

4.00 g of silver in liquid form solidifies at a constant temperature. The latent heat of fusion of silver is 1.05×10^5 J kg^{-1}.

How much energy is removed when this change is made?

A. 420 J
B. 2.60×10^4 J
C. 4.20×10^5 J
D. 2.60×10^7 J

Question 4

According to Wien's Law, objects that have different temperatures emit spectra that peak at different wavelengths.

Which one of the following statements is correct?

A. Hotter objects emit most of their radiation at longer wavelengths; therefore, they appear more red than cooler objects.

B. Cooler objects emit most of their radiation at longer wavelengths; therefore, they appear more blue than hotter objects.

C. Hotter objects emit most of their radiation at shorter wavelengths; therefore, they appear more blue than cooler objects.

D. Cooler objects emit most of their radiation at shorter wavelengths; therefore, they appear more red than hotter objects.

Question 5

A battery supplies 4.5 J of energy to every 3.0 coulombs of charge that flow through it.

What is the voltage of the battery?

A. 0.7 V

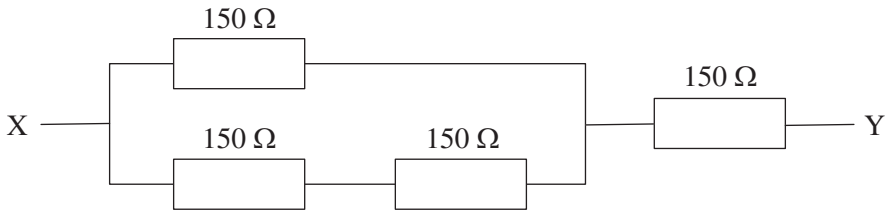
B. 1.5 V

C. 4.5 V

D. 13.5 V

Question 6

The diagram below shows an arrangement of four 150 Ω resistors.



The equivalent effective resistance between X and Y is

A. 150 Ω

B. 200 Ω

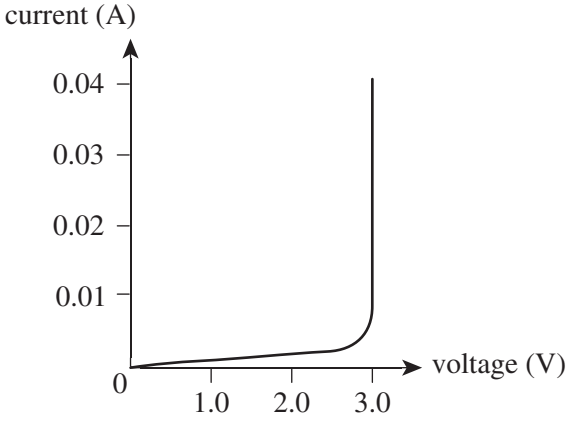
C. 250 Ω

D. 300 Ω

Question 7

A light-emitting diode (LED) is connected in series with a 100 Ω resistor and a 5.0 V power supply, as shown in the diagram below.

The current versus voltage graph for the LED is shown below.

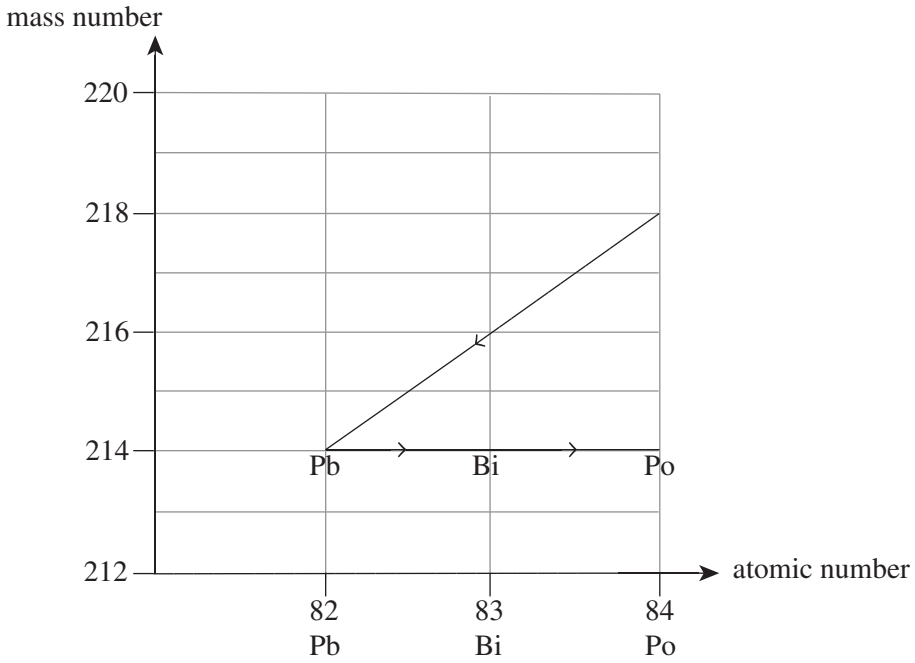


The current flowing through the 100 Ω resistor is

A. 10 mA
B. 20 mA
C. 30 mA
D. 50 mA

Question 8

The spontaneous nuclear decay of polonium-218 to polonium-214 that occurs during the decay series of uranium-238 into lead is shown in the graph below.



What is the order of the decay for polonium-218 to polonium-214?

A. α, α, β^-

B. α, β^-, β^-

C. β^-, β^-, α

D. $\beta^-, \beta^-, \beta^-$

Question 9

Consider the following nuclear transmutation.

$$^{27}_{13}\text{Al} + X \rightarrow {}^{27}_{12}\text{Mg} + {}^{1}_{1}\text{H}$$

What type of particle is X?

A. proton

B. beta particle

C. alpha particle

D. neutron

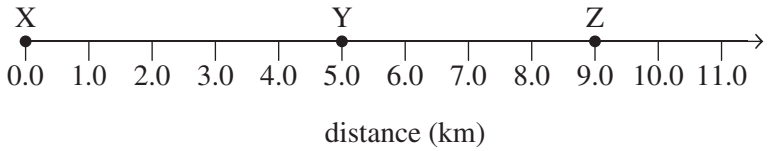
Question 10

Which one of the following is **not** considered to be one of the four observed fundamental forces?

A. weak nuclear force
B. strong nuclear force
C. dark matter force
D. electromagnetic force

Question 11

An object moves along a line from point X to point Z, then back to point Y and then to point Z, as shown in the diagram below.



The displacement of the object, in km, is

A. 5.0
B. 9.0
C. 13.0
D. 17.0

Question 12

An object is moving to the right at $2.0\ \text{m s}^{-1}$. After $2.0\ \text{s}$ the object is moving to the left at $4.0\ \text{m s}^{-1}$.

The acceleration of the object for the $2.0\ \text{s}$ is closest to

A. $1.0\ \text{m s}^{-2}$ to the left.

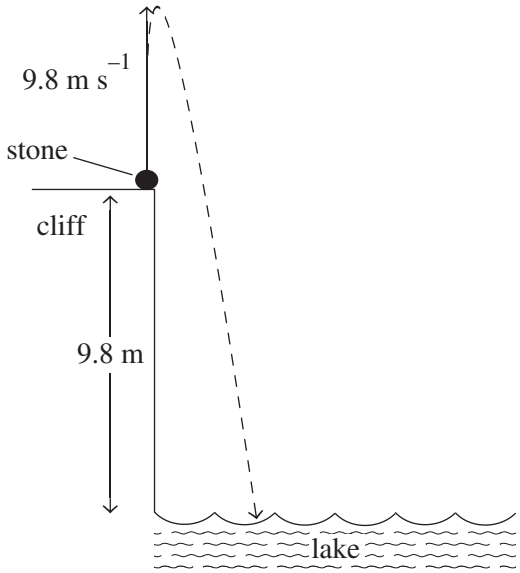
B. $1.0\ \text{m s}^{-2}$ to the right.

C. $3.0\ \text{m s}^{-2}$ to the left.

D. $3.0\ \text{m s}^{-2}$ to the right.

Question 13

A stone is thrown upwards at $9.8\ \text{m s}^{-1}$ from a small cliff that is $9.8\ \text{m}$ above the surface of a lake, as shown below.



The stone's time of flight is closest to

A. 1.0 s
B. 2.0 s
C. 2.7 s
D. 3.4 s

Question 14

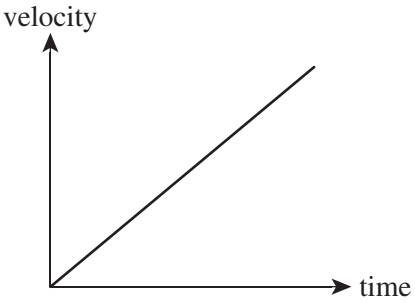
A parachutist of mass 60 kg is descending vertically towards the ground at a constant speed of $72\ \text{km h}^{-1}$.

The air resistance force is

A. 0 N
B. 588 N
C. 1200 N
D. 4320 N

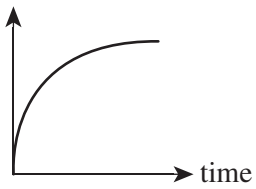
Question 15

The graph below shows how a car's velocity changes with respect to time.

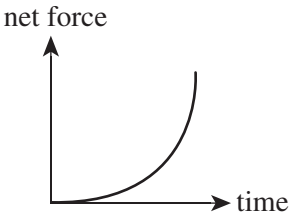


Which one of the following graphs best represents how the net force acting on a car changes with respect to time?

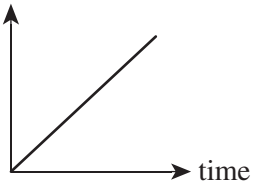
A.



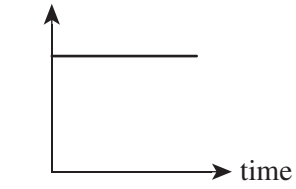
B.



C.



D.



Question 16

In a golf tournament, a competitor hits a 45.9 g golf ball. The ball travels at a speed of 70.0 m s^{-1}.

The golf ball's kinetic energy is closest to

A. 1.61 J
B. 112 J
C. 16 100 J
D. 112 000 J

Question 17

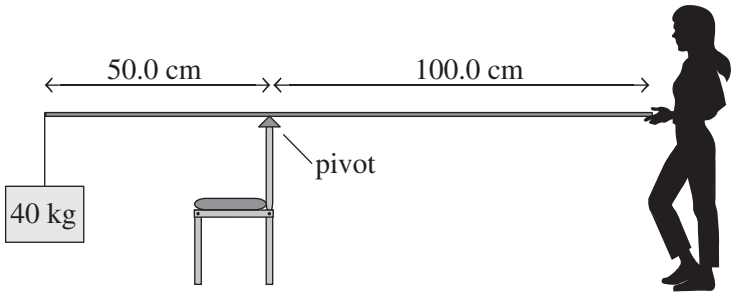
Sophie accidentally drops her mobile phone from a hot-air balloon that is 76.0 m above the ground.

If air resistance is ignored, the ratio of the phone's potential energy to its kinetic energy when the phone is 15.2 m from the ground is closest to

A. 1 : 5
B. 1 : 4
C. 1 : 2
D. 4 : 1

Question 18

Hannah holds a 40.0 kg hanging mass stationary with a 5.0 kg pole lever, using the back of a chair as the pivot, as shown below. The mass is suspended from the pole by a piece of string at a distance of 50 cm from the pivot. Hannah stands 100.0 cm from the pivot point.

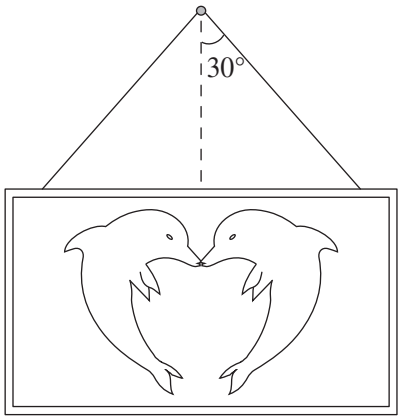


The magnitude of the torque that Hannah must apply to keep the pole suspended is closest to

A. 35 N m
B. 184 N m
C. 196 N m
D. 392 N m

Question 19

A painting hangs on a wall, as shown in the diagram below, suspended by two wires. Each wire is at an angle of 30° to the vertical. The painting has a mass of 10 kg.



The tension in **one** of the wires is closest to

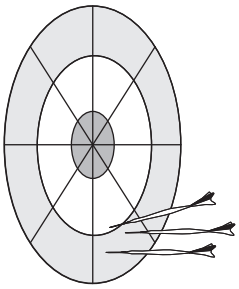
A. 42 N
B. 49 N
C. 57 N
D. 98 N

Question 20

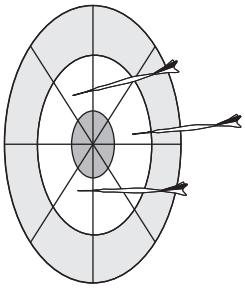
A common way of demonstrating the difference between precision and accuracy is with a dartboard.
In the game of darts, the aim is to strike the bullseye of a dartboard with a dart. A group of friends play four rounds of darts and get different results for each round.

Which one of the following results can best be described as 'not accurate but precise'?

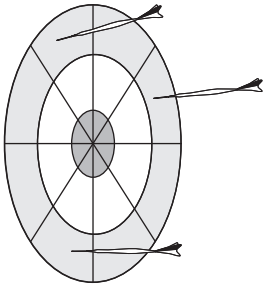
A.



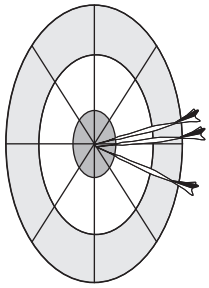
B.



C.



D.



END OF SECTION A

SECTION B

Instructions for Section B

Answer **all** questions in the spaces provided. Write using blue or black pen.

Where an answer box is provided, write your final answer in the box.

If an answer box has a unit printed in it, give your answer in that unit.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this booklet are **not** drawn to scale.

Take the value of g to be 9.8 m s^{-2}.

Question 1 (3 marks)

The water of an Olympic swimming pool is measured to be at a temperature of 18ºC. The human body has a standard internal temperature of 37ºC.

Compare the kinetic energies of the swimming pool water and a human, making reference to their temperatures.

Question 2 (5 marks)

Figure 1 shows a temperature (°C) versus energy removed (kJ) graph for 200 g of a substance that begins an experiment as a liquid and finishes as a solid. Energy is removed from the material at a constant rate.

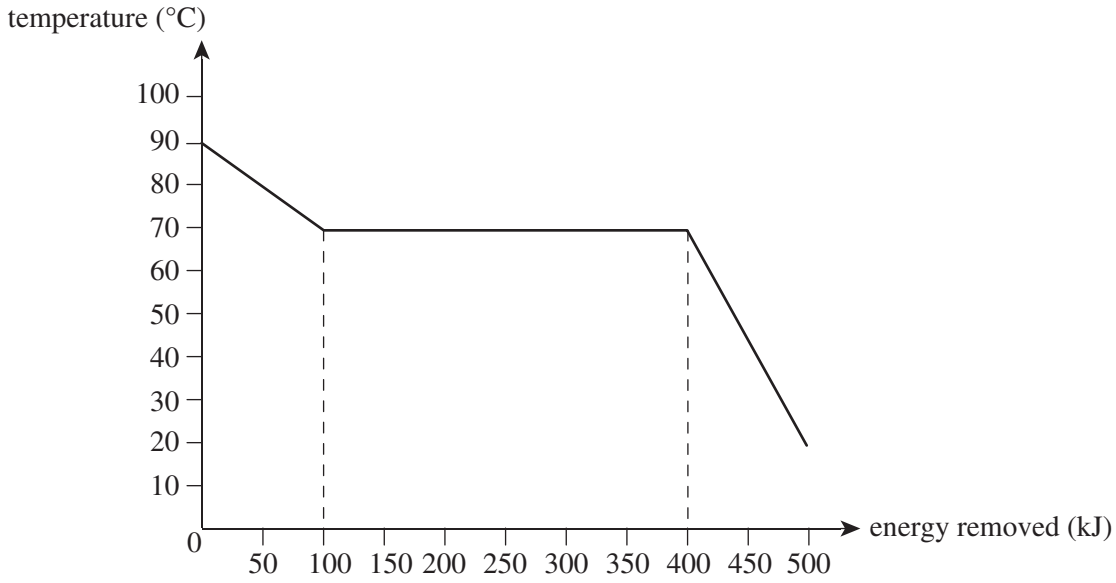


Figure 1

a. What happens to the substance when it reaches 70ºC? 1 mark

_____

_____

b. Calculate the latent heat of fusion of the substance. 2 marks

_____

_____

_____

_____

J kg^{-1}

c. Calculate the specific heat capacity of the substance when it is a liquid. 2 marks

_____

_____

_____

_____

J kg^{-1} K^{-1}

Question 3 (4 marks)

A system undergoes the following process:

Step 1: The system absorbs 70 J of heat while 35 J of work is done on it.

Step 2: The system absorbs 35 J of heat while performing 70 J of work.

a. Calculate the change in internal energy for the overall process. 3 marks

_____

_____

_____

_____

_____

_____

_____

J

b. State whether there has been an increase, decrease or no change in the internal energy of the system. 1 mark

_____

Question 4 (2 marks)

Aldebaran is a red giant star with a surface temperature of 3900 K.

Calculate Aldebaran's peak wavelength in nanometers.

_____

_____

_____

_____

nm

Question 5 (4 marks)

a. Explain how greenhouse gases in the atmosphere absorb and re-emit infrared radiation, contributing to the natural greenhouse effect. 2 marks

_____

_____

_____

_____

_____

_____

b. Explain how greenhouse gases produced by human activity, such as burning fossil fuels, contribute to the enhanced greenhouse effect. 2 marks

_____

_____

_____

_____

_____

_____

Question 6 (2 marks)

Lead-210 emits a beta particle to become bismuth-210. Bismuth is an excited nucleus, denoted by an asterisk (*), and it goes on to emit a gamma ray.

Complete the decay equation below.

$$^{210}_{83}\text{Bi}^* \rightarrow \_\_\_\_\_$$

Question 7 (11 marks)

Carbon-14 is a naturally occurring radioactive isotope of carbon. The half-life of carbon-14 is approximately 5700 (± 40) years. Carbon-14 undergoes beta decay to form the stable isotope nitrogen-14.

a. Write a decay equation for carbon-14 into nitrogen-14. 3 marks

_____

b. Complete the table below by filling in the missing values. Round the percentages to one decimal place. 3 marks

Years from present	0	5700	11 400					39 900
% ^{14}C	100.0							
% ^{14}N	0.0							

c. On Figure 2 below, sketch **one** curve showing the percentage of parent carbon-14 versus years, and **one** curve showing the percentage of daughter nitrogen-14 versus years. 4 marks

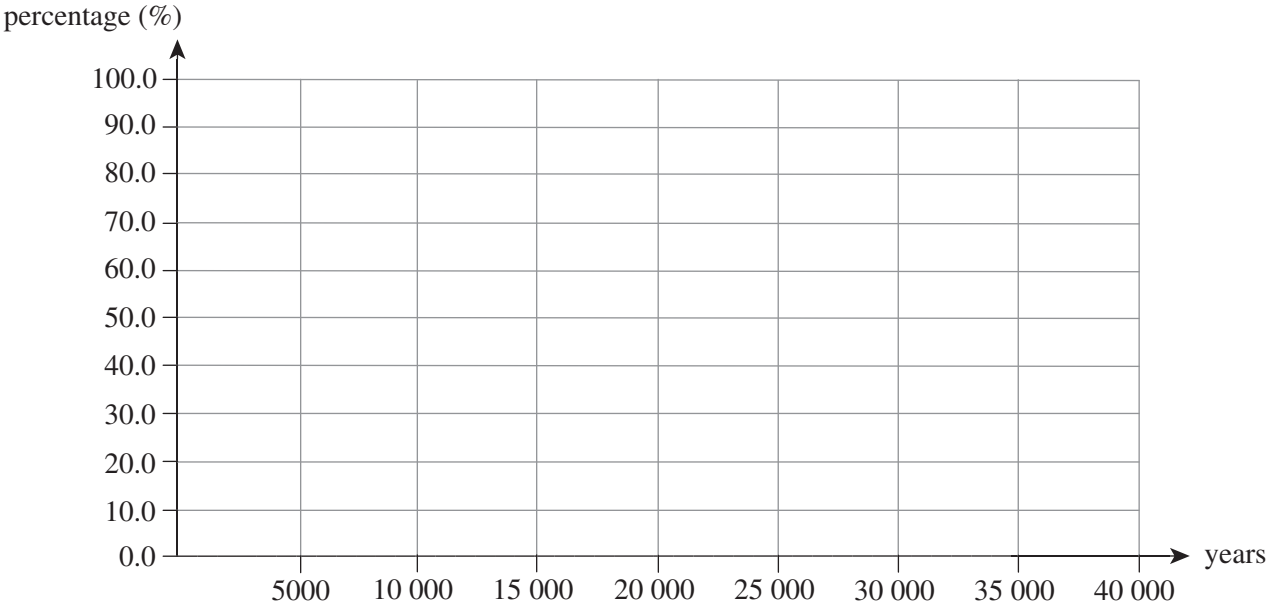


Figure 2

d. When the percentage for carbon-14 falls below 0.1%, it becomes very difficult to detect.

After approximately how many half-lives will the carbon-14 in an organic material become difficult to detect? 1 mark

_____

Question 8 (7 marks)

A lithium-7 nucleus consists of three protons and four neutrons. The table below shows the masses of a proton, neutron and lithium-7 nucleus.

Particle	Mass
proton	1.6726×10^{-27} kg
neutron	1.6749×10^{-27} kg
lithium-7 nucleus	1.1650×10^{-26} kg

a. Show that the lithium-7 nucleus is lighter than the sum of three protons and four neutrons by an amount of 6.7400×10^{-29} kg. 3 marks

_____

_____

_____

_____

_____

_____

b. State what happens to the difference of mass indicated in **part a.** 1 mark

_____

_____

c. Calculate the energy released due to the mass difference. 3 marks

_____

_____

_____

_____

_____

MeV

Question 9 (6 marks)

a. A student set up a circuit as shown in Figure 3.

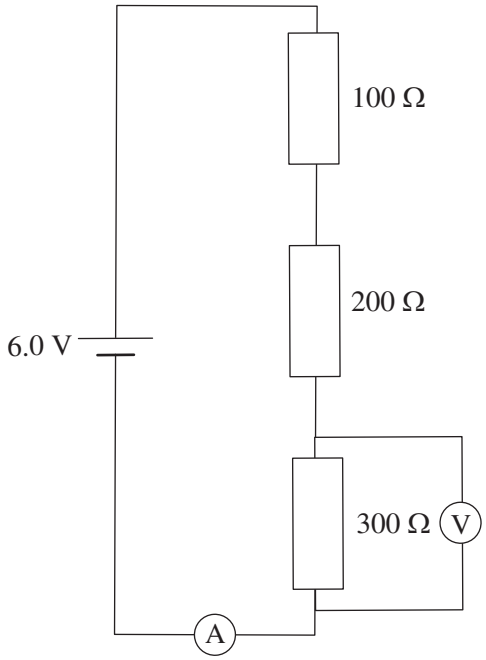


Figure 3

State the effective resistance, ammeter reading and voltmeter reading for the circuit shown above. 3 marks

$R_T =$	Ω
$I_{ammeter} =$	mA
$V_{voltmeter} =$	V

b. The same student set up a circuit as shown in Figure 4.

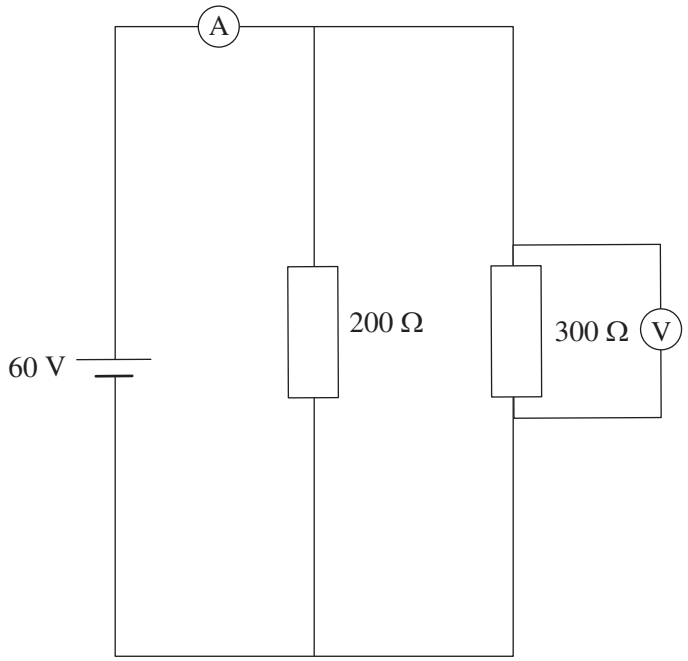


Figure 4

State the effective resistance, ammeter reading and voltmeter reading for the circuit shown above. 3 marks

$R_T =$	Ω
$I_{ammeter} =$	mA
$V_{voltmeter} =$	V

Question 10 (8 marks)

Amy is choosing between two new electrical components: component X and component Y. She has obtained a graph of their current–voltage (I–V) characteristics as shown in Figure 5.

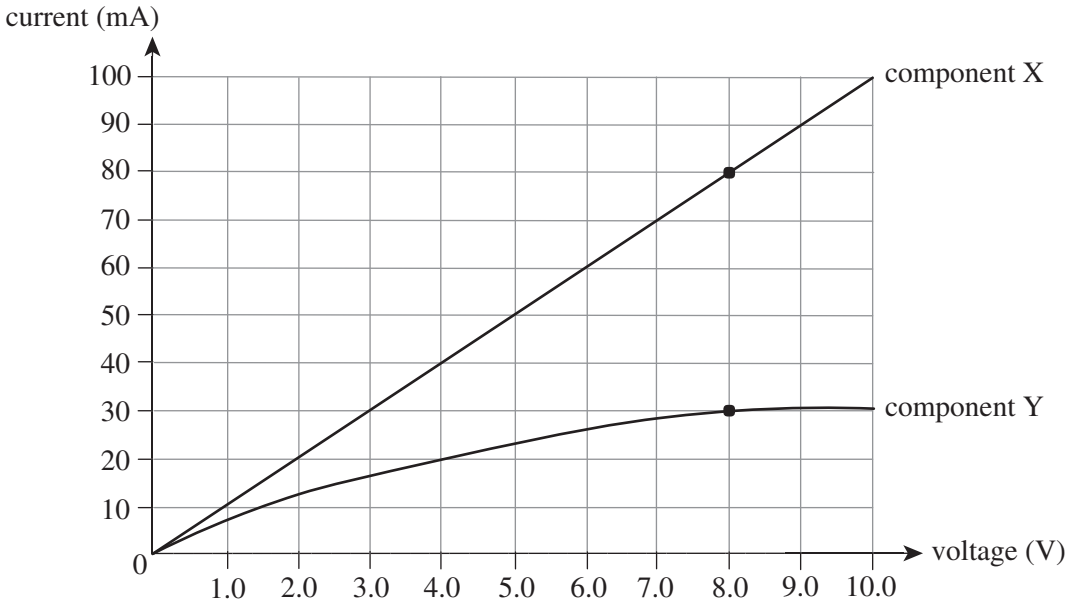


Figure 5

a. Circle the component that is ohmic and explain your choice. 2 marks

component X component Y

_____

_____

_____

_____

b. Components X and Y are connected in parallel with an 8 V DC power source.

i. Determine the current through component Y. 1 mark

A

ii. Determine the current through component X. 1 mark

A

iii. Determine the effective resistance of the circuit if components X and Y are connected in parallel. 4 marks

_____

_____

_____

_____

_____

_____

_____

_____

Ω

Question 11 (3 marks)

In Australia and New Zealand, metal toasters are required to have earth wires that are permanently connected to the metal case of the toaster.

a. State a hazard of a metal toaster that does not have an earth wire connected to the metal case. 1 mark

_____

_____

b. Explain how your answer to **part a.** could result from the absence of an earth wire connected to the metal case. 2 marks

_____

_____

_____

_____

Question 12 (15 marks)

A graph demonstrating how velocity varies with time for an object travelling in a straight line is shown in Figure 6. Travelling East is positive in direction.

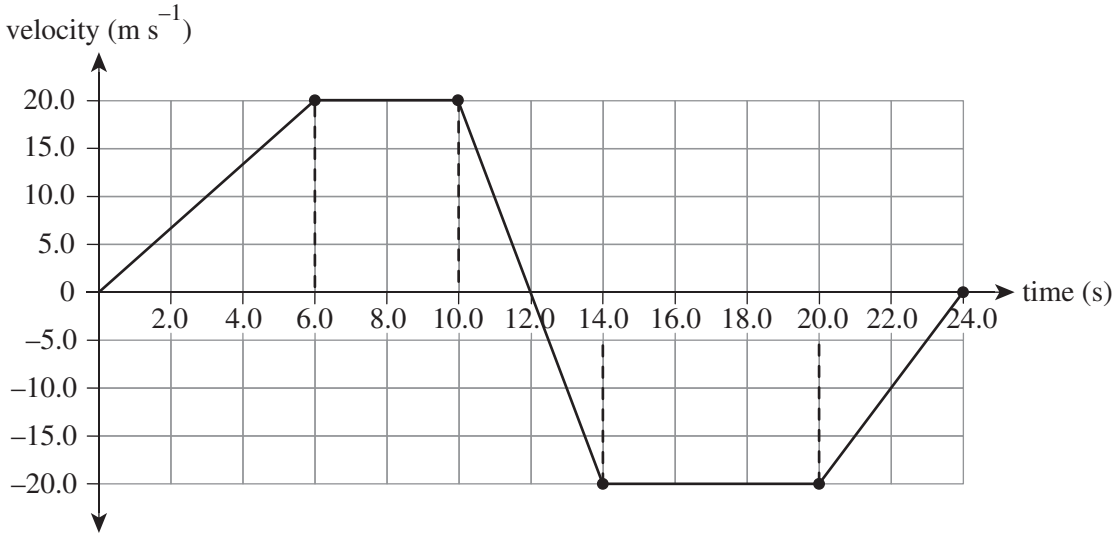


Figure 6

a. What is the object's velocity 3.0 s after the objects starts its motion? If the direction is not applicable, write NA in the answer box. 2 marks

_____

_____

m s^{-1}	

b. What is the object's acceleration 12.0 s after the object starts its motion? Show your working. If the direction is not applicable, write NA in the answer box. 3 marks

_____

_____

_____

m s^{-2}	

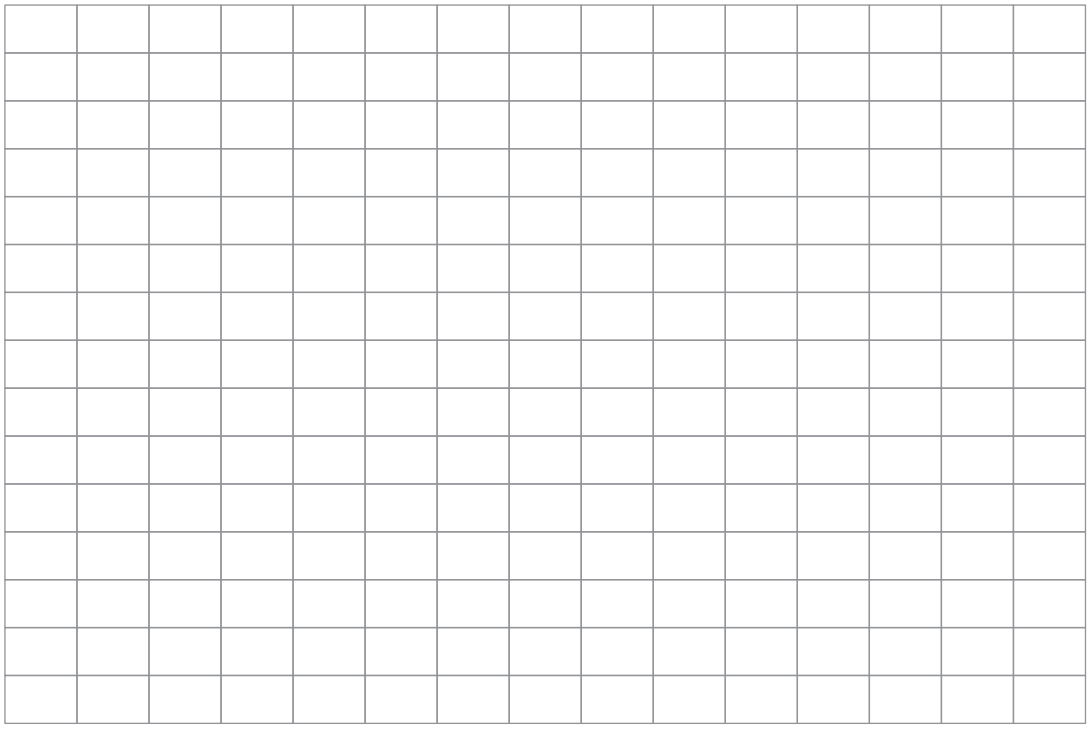
c. What distance does the object travel in the first 24.0 s of its motion? Show your working.
If the direction is not applicable, write NA in the answer box. 4 marks

m	

d. What is the object's final displacement? Show your working. 2 marks

m

e. On the grid provided below, draw a graph of acceleration versus time for the object's motion. Include axes labels and an appropriate scale and unit for each axis. 4 marks



Question 13 (4 marks)

Four Physics students are pulling ropes in a four person tug-of-war, as shown in Figure 7.

The students pull their ropes with the following amounts of force:

- Mackenzie pulls her rope with a force of 220.0 N.
- Mia pulls her rope with a force of 210.0 N.
- Zac pulls his rope with a force of 200.0 N.
- Jack pulls his rope with a force of 180.0 N.

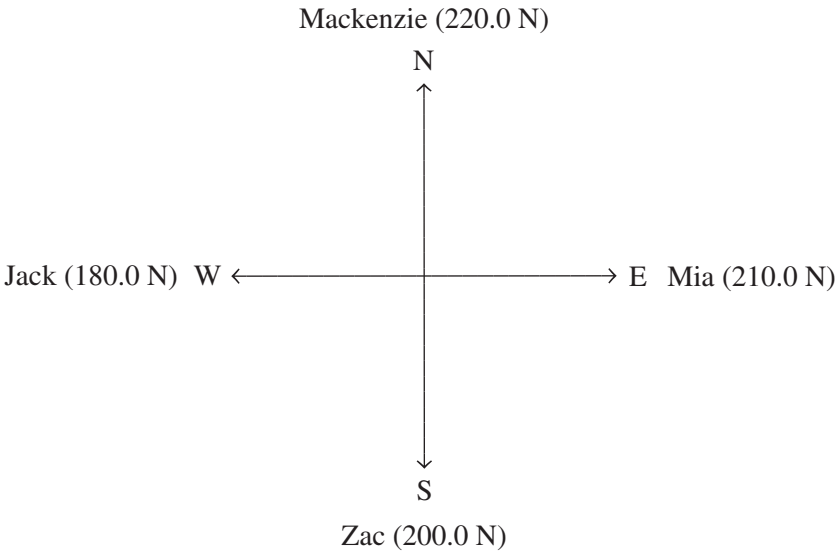


Figure 7

a. Draw a vector diagram showing the net force (F_{net}) at the centre of the ropes. 1 mark

b. What is the magnitude **and** direction of the net force (F_{net}) at the centre of the ropes?
Show your working. 3 marks

_____

_____

_____

N	

Question 14 (6 marks)

Zixuan pushes two large boxes to the right with a force of 300.0 N along a smooth surface, as shown in Figure 8. Ignore the effects of friction.

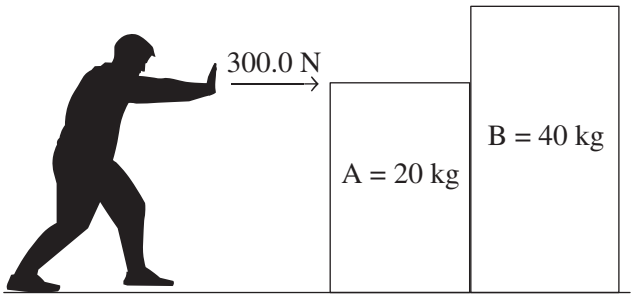


Figure 8

a. What is the magnitude of the acceleration of the boxes? Show your working. 2 marks

_____

_____

_____

	m s^{-2}

b. Calculate the magnitude of the force on box B by box A ($F_{A \text{ on } B}$). Show your working. 2 marks

_____

_____

_____

	N

c. Calculate the magnitude and direction of the force on box A by box B ($F_{B \text{ on } A}$). Show your working. 2 marks

_____

_____

_____

	N	

Question 15 (5 marks)
The pulley system shown in Figure 9 is set up with a 4.0 kg block on one side and a 5.0 kg block on the other side, connected with fishing wire. The two blocks are held stationary and then released to move.

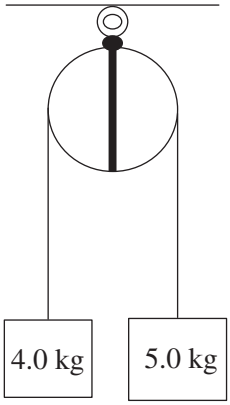


Figure 9

a. Calculate the acceleration of the 4.0 kg block. Include a direction in your answer. Show your working. 3 marks

m s^{-2}	

b. Calculate the tension in the fishing wire. Show your working. 2 marks

N	

Question 16 (9 marks)

Kegan is sliding down a slide inclined at 30.0° to the ground, as shown in Figure 10. There is a constant frictional force of 100.0 N that acts on Kegan. Kegan has mass of 80 kg.

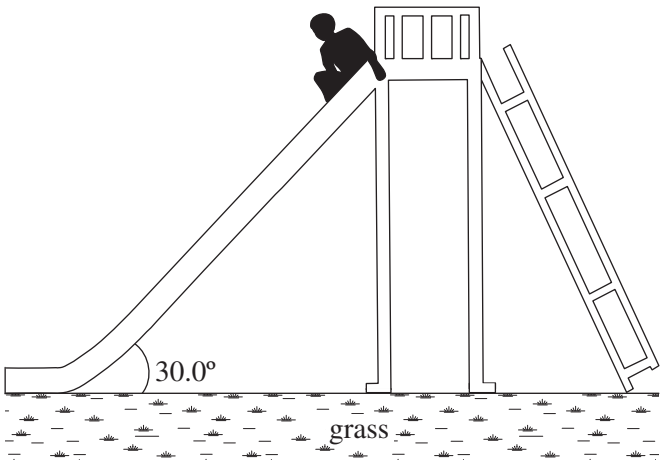


Figure 10

a. On Figure 10, sketch and label the forces acting on Kegan. 3 marks

b. What is the magnitude of the normal force acting on Kegan? Show your working. 2 marks

_____

_____

_____

_____

N

c. What is the magnitude of the net force acting on Kegan? Show your working. 2 marks

_____

_____

_____

N

d. What is the magnitude of Kegan's net acceleration? Show your working. 2 marks

_____

_____

_____

_____

$m\ s^{-2}$

Question 17 (4 marks)

'Sprung floors' are used in sport halls. They use simple coil springs to absorb shock and reduce injuries. The force (F) versus compression (Δx) graph of a sprung floor is shown in Figure 11.

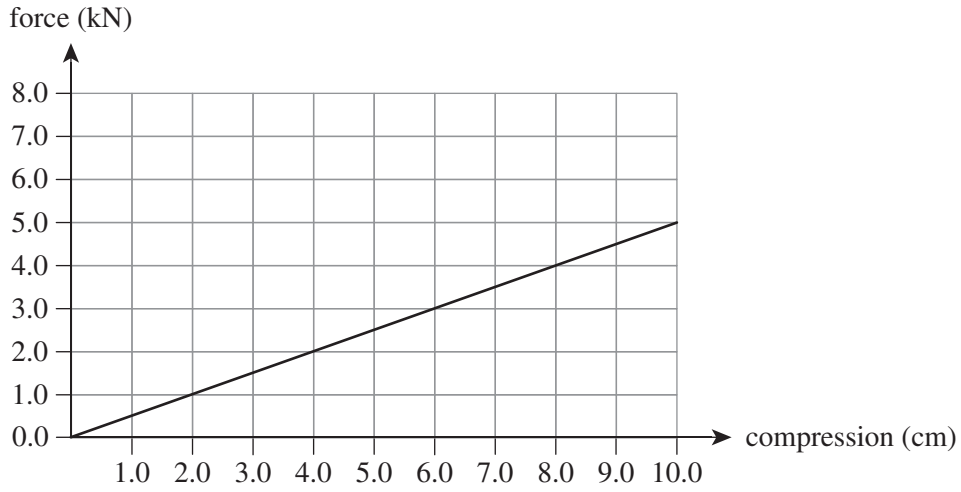


Figure 11

a. Show that the spring constant is 50 000 N m^{-1}. 2 marks

_____

_____

_____

_____

b. Calculate the elastic potential energy stored in the sprung floor when it is compressed by 5.0 cm. 2 marks

_____

_____

_____

_____

J

Question 18 (12 marks)

Kelly and Samasidh are investigating Newton's second law. In their experiment, a falling mass pulls a cart that is connected to it via a pulley, as shown in Figure 12. The total mass of the cart and falling mass is recorded with its corresponding acceleration. A motion sensor is used to record the cart's acceleration. The experiment is repeated several times; the falling mass is kept constant.

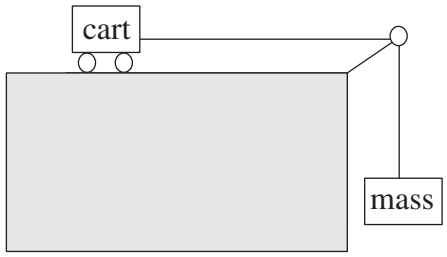


Figure 12

a. The results of Kelly and Samasidh's investigation are shown in the table below.

Fill in the **two** missing entries in the table below. 2 marks

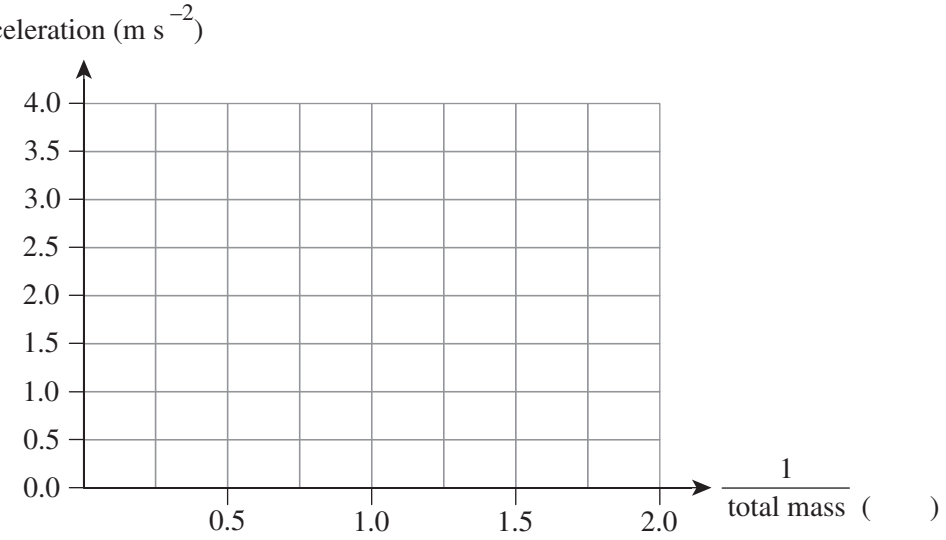
Total mass (kg)	**Acceleration (m s^{-2})**	$\frac{\mathbf{1}}{\textbf{total mass}}$ **( )**
0.500	3.9	2.0
0.750	2.7	
1.000	2.0	1.0
1.250	1.6	0.8
1.500	1.3	0.7
1.750	1.1	0.6

b. In the table below, identify the variables in this experiment. 3 marks

Classification	**Variable**
controlled	
dependent	
independent	

c. Using the data provided in the table in **part a.**: 3 marks

- plot a graph of acceleration versus $\frac{1}{\text{total mass}}$
- draw a line of best fit
- include a unit for the horizontal axis.



d. Find the gradient of the line of best fit. Show your working. 2 marks

_____

_____

_____

_____

e. Given the gradient calculated in **part d.**, what is the magnitude of the constant force applied? Show your working. 2 marks

_____

_____

_____

_____

N

END OF QUESTION AND ANSWER BOOKLET

Neap

Trial Examination 2020

VCE Physics Units 1&2

Written Examination

Formula Sheet

Instructions

This formula sheet is provided for your reference.

A question and answer booklet is provided with this formula sheet.

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the examination room.

FORMULAE

specific heat	$Q = mc\Delta t$
latent heat	$Q = mL$
Wien's law	$\lambda_{\max} T = 2.9 \times 10^{-3}$ mK
Stefan–Boltzmann law	$P = kT^4$
first law of thermodynamics	$Q = \Delta U + W$
mass–energy equation	$E = mc^2$
power	$P = \frac{E}{t}$ or $P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$ or $P = Fv$
electrical charge	$Q = It$
electrical work	$W = QV$
voltage	$V = IR$
power	$P = VI$
resistors in series	$R_T = R_1 + R_2 \ldots$
resistors in parallel	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} \ldots$
velocity; acceleration	$v = \frac{\Delta x}{\Delta t}; \quad a = \frac{\Delta v}{\Delta t}$
equations for constant acceleration	$v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ $s = \frac{1}{2}(v + u)t$
Newton's second law	$\Sigma F = ma$
gravitational potential energy near the surface of Earth	$Eg = mg\Delta h$
kinetic energy	$Ek = \frac{1}{2}mv^2$
mechanical work	$W = Fs$
power	$P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$

Hooke's law for an ideal spring	$F = -k\Delta x$
elastic potential energy	$Es = \frac{1}{2}k\Delta x^2$
torque	$\tau = F \times r$
momentum	$p = mv$
impulse	$I = \Delta p$
efficiency	$\text{efficiency } (\%) = \frac{\text{useful energy output}}{\text{energy input}} \times 100$

DATA

speed of light in vacuum = 3.0×10^8 m s^{-1}

1 eV = 1.6×10^{-19} J

acceleration due to gravity, $g = 9.8$ m s^{-2}

PREFIXES

p = pico = 10^{-12}	n = nano = 10^{-9}	µ = micro = 10^{-6}	m = milli = 10^{-3}
k = kilo = 10^3	M = mega = 10^6	G = giga = 10^9	t = tonne = 10^3 kg

THE PERIODIC TABLE OF THE ELEMENTS

Key: atomic number / symbol of element / relative atomic mass / name of element (e.g. 79, Au, 197.0, gold)

1 **H** 1.0 hydrogen																	2 **He** 4.0 helium
3 **Li** 6.9 lithium	4 **Be** 9.0 beryllium											5 **B** 10.8 boron	6 **C** 12.0 carbon	7 **N** 14.0 nitrogen	8 **O** 16.0 oxygen	9 **F** 19.0 fluorine	10 **Ne** 20.2 neon
11 **Na** 23.0 sodium	12 **Mg** 24.3 magnesium											13 **Al** 27.0 aluminium	14 **Si** 28.1 silicon	15 **P** 31.0 phosphorus	16 **S** 32.1 sulfur	17 **Cl** 35.5 chlorine	18 **Ar** 39.9 argon
19 **K** 39.1 potassium	20 **Ca** 40.1 calcium	21 **Sc** 44.9 scandium	22 **Ti** 47.9 titanium	23 **V** 50.9 vanadium	24 **Cr** 52.0 chromium	25 **Mn** 54.9 manganese	26 **Fe** 55.8 iron	27 **Co** 58.9 cobalt	28 **Ni** 58.7 nickel	29 **Cu** 63.5 copper	30 **Zn** 65.4 zinc	31 **Ga** 69.7 gallium	32 **Ge** 72.6 germanium	33 **As** 74.9 arsenic	34 **Se** 79.0 selenium	35 **Br** 79.9 bromine	36 **Kr** 83.8 krypton
37 **Rb** 85.5 rubidium	38 **Sr** 87.6 strontium	39 **Y** 88.9 yttrium	40 **Zr** 91.2 zirconium	41 **Nb** 92.9 niobium	42 **Mo** 95.9 molybdenum	43 **Tc** 98.1 technetium	44 **Ru** 101.1 ruthenium	45 **Rh** 102.9 rhodium	46 **Pd** 106.4 palladium	47 **Ag** 107.9 silver	48 **Cd** 112.4 cadmium	49 **In** 114.8 indium	50 **Sn** 118.7 tin	51 **Sb** 121.8 antimony	52 **Te** 127.6 tellurium	53 **I** 126.9 iodine	54 **Xe** 131.3 xenon
55 **Cs** 132.9 caesium	56 **Ba** 137.3 barium	57 **La** 138.9 lanthanum	72 **Hf** 178.5 hafnium	73 **Ta** 180.9 tantalum	74 **W** 183.8 tungsten	75 **Re** 186.2 rhenium	76 **Os** 190.2 osmium	77 **Ir** 192.2 iridium	78 **Pt** 195.1 platinum	79 **Au** 197.0 gold	80 **Hg** 200.6 mercury	81 **Tl** 204.4 thallium	82 **Pb** 207.2 lead	83 **Bi** 209.0 bismuth	84 **Po** (209) polonium	85 **At** (210) astatine	86 **Rn** (222) radon
87 **Fr** (223) francium	88 **Ra** (226) radium	89 **Ac** (227) actinium	104 **Rf** (261) rutherfordium	105 **Db** (262) dubnium	106 **Sg** (263) seaborgium	107 **Bh** (264) bohrium	108 **Hs** (265) hassium	109 **Mt** (268) meitnerium	110 **Ds** (271) darmstadtium	111 **Rg** (272) roentgenium	112 **Uub**		114 **Uuq**		116 **Uuh**		118 **Uuo**

58 **Ce** 140.1 cerium	59 **Pr** 140.9 praseodymium	60 **Nd** 144.2 neodymium	61 **Pm** (145) promethium	62 **Sm** 150.3 samarium	63 **Eu** 152.0 europium	64 **Gd** 157.2 gadolinium	65 **Tb** 158.9 terbium	66 **Dy** 162.5 dysprosium	67 **Ho** 164.9 holmium	68 **Er** 167.3 erbium	69 **Tm** 168.9 thulium	70 **Yb** 173.0 ytterbium	71 **Lu** 175.0 lutetium
90 **Th** 232.0 thorium	91 **Pa** 231.0 protactinium	92 **U** 238.0 uranium	93 **Np** 237.1 neptunium	94 **Pu** (244) plutonium	95 **Am** (243) americium	96 **Cm** (251) curium	97 **Bk** (247) berkelium	98 **Cf** (251) californium	99 **Es** (252) einsteinium	100 **Fm** (257) fermium	101 **Md** (258) mendelevium	102 **No** (259) nobelium	103 **Lr** (260) lawrencium

END OF FORMULA SHEET

Neap

Trial Examination 2020

VCE Physics Units 1&2

Written Examination

Multiple-choice Answer Sheet

Student's Name: _____

Teacher's Name: _____

Instructions

Use a **pencil** for **all** entries. If you make a mistake, **erase** the incorrect answer – **do not** cross it out. Marks will **not** be deducted for incorrect answers.
No mark will be given if more than **one** answer is completed for any question.

All answers must be completed like **this** example: A **B** C D

Use pencil only

1	A	B	C	D
2	A	B	C	D
3	A	B	C	D
4	A	B	C	D
5	A	B	C	D
6	A	B	C	D
7	A	B	C	D
8	A	B	C	D
9	A	B	C	D
10	A	B	C	D

11	A	B	C	D
12	A	B	C	D
13	A	B	C	D
14	A	B	C	D
15	A	B	C	D
16	A	B	C	D
17	A	B	C	D
18	A	B	C	D
19	A	B	C	D
20	A	B	C	D