Neap

Trial Examination 2022

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	16	16	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 33 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

The term(s) for the transfer of thermal energy through a liquid or gas through flow is

A. conduction.

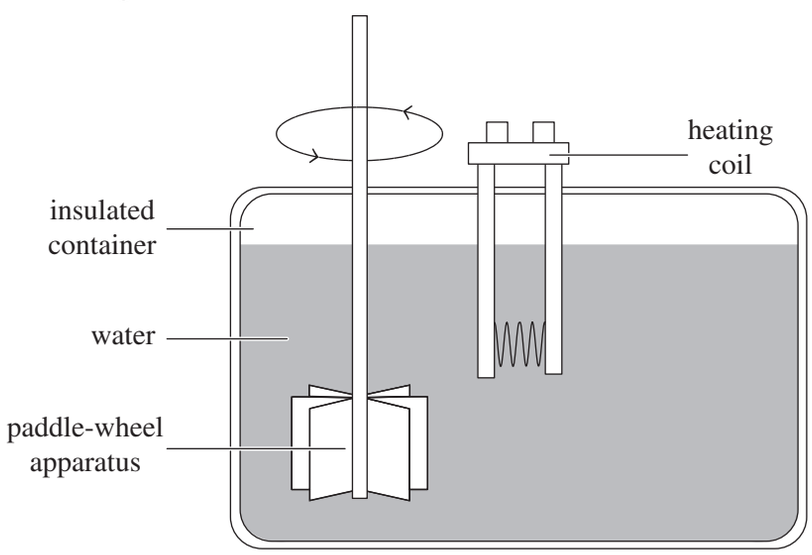
B. convection.

C. radiation.

D. convection and radiation.

Question 2

A student places a heating element and a paddle-wheel apparatus in an insulated container of water, as shown in the diagram below.



The internal energy of this system increased by 1125 J when it absorbed 840 J of heat.

Which one of the following statements is correct?

A. 285 J of work was done on the system.

B. 285 J of work was done by the system.

C. 1965 J of work was done on the system.

D. 1965 J of work was done by the system.

Question 3

The Sun is a yellow-white star with a peak intensity of about 0.5 μm. It is known that $\sigma_{\text{Wien}} = 2.9 \times 10^{-3}$ m K.

Using Wien's Law, what is the temperature of the surface of the Sun?

A. 5.8×10^{3}°C

B. 5.5×10^{3}°C

C. 5.8×10^{-3}°C

D. -2.7×10^{3}°C

Question 4

The charge of one electron is -1.6×10^{-19} coulombs.

The number of electrons needed to make one coulomb of charge is approximately

A. 1.6×10^{-19}

B. 6.3×10^{-19}

C. 1.6×10^{18}

D. 6.3×10^{18}

Question 5

A current of 4.0 A flows across a heating element for two minutes and 28.8 kJ of heat energy is produced.

The potential difference across the heating element is closest to

A. 0.060 V

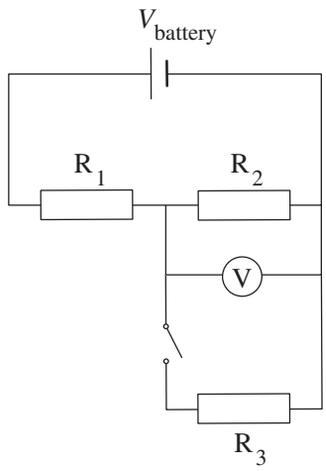
B. 3.6 V

C. 60 V

D. 3600 V

Question 6

A supply voltage, V, is connected to a voltmeter, a switch and three resistors, as shown in the diagram below. The three resistors have the same resistance.



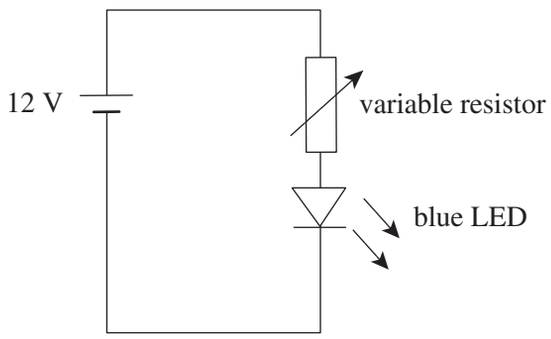
Assume the internal resistance of the battery is negligible.

What are the readings on the voltmeter when the switch is open and when the switch is closed?

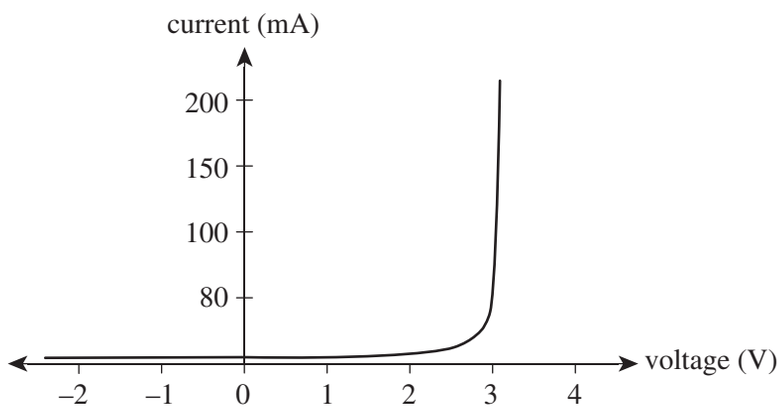
	Voltmeter reading when the switch is open	Voltmeter reading when the switch is closed
A.	0	$\frac{1}{3}$ the voltage of the battery
B.	0	$\frac{1}{2}$ the voltage of the battery
C.	$\frac{1}{2}$ the voltage of the battery	$\frac{1}{3}$ the voltage of the battery
D.	$\frac{1}{2}$ the voltage of the battery	$\frac{1}{2}$ the voltage of the battery

Question 7

A variable resistor and a forward-biased blue LED are connected in series to a 12 V battery, as shown in the diagram below.



The characteristics of the blue LED are shown in the following graph. The blue LED operates at full brightness with a current of 150 mA.



For the blue LED to operate at full brightness, the resistance of the variable resistor must be

A. $6.0 \times 10^{-2}\ \Omega$

B. $8.0 \times 10^{-2}\ \Omega$

C. $6.0 \times 10^{1}\ \Omega$

D. $8.0 \times 10^{1}\ \Omega$

Question 8

A radioactive source has a half-life of 25 s.

How long will it take for approximately $\frac{7}{8}$ of the source to decay?

A. 22 s

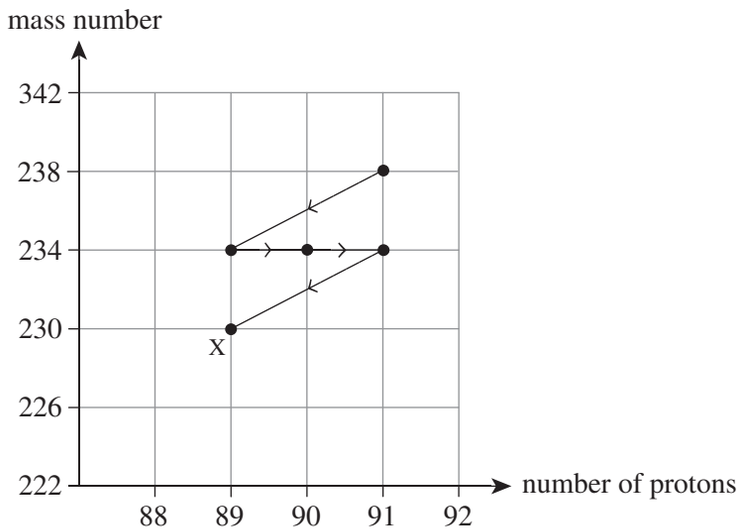
B. 50 s

C. 75 s

D. 200 s

Question 9

A uranium-238 nucleus undergoes a series of decays to produce nucleus X, as shown in the following series decay graph.



Which one of the following correctly shows the final type of decay and the name of nucleus X?

	Final type of decay	Nucleus X
A.	α	thorium-140
B.	α	thorium-230
C.	β	thorium-140
D.	β	thorium-230

Question 10

The following four events occurred in the earliest moments of the universe over 13.8 billion years ago.

1. stable atoms formed
2. nuclear fusion began
3. elementary particles such as quarks formed
4. rapid inflation occurred

Which one of the following correctly orders the events from earliest to latest?

A. 3, 4, 2, 1

B. 4, 3, 2, 1

C. 1, 2, 3, 4

D. 2, 3, 1, 4

Question 11

A car is travelling at 72 km h^{-1} due east. A short time later, the car travels 36 km h^{-1} due north.

Which one of the following gives the car's change in velocity?

A. 22 m s^{-1} N63°W

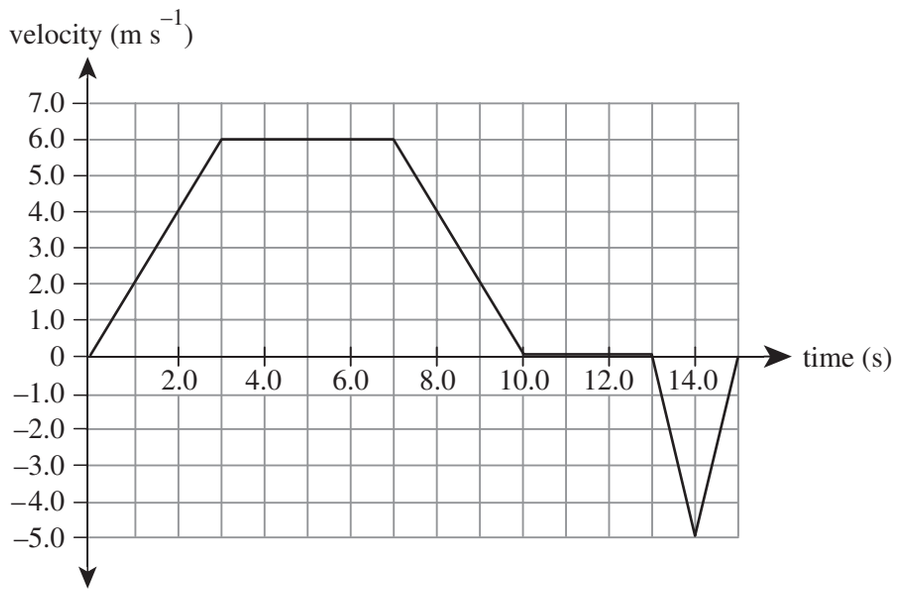
B. 22 m s^{-1} N63°E

C. 80 m s^{-1} N63°W

D. 80 m s^{-1} N63°E

Question 12

The graph below shows how velocity varies over time for an object in motion that travels in a straight line.



For the 15 seconds shown, what is the average velocity of the object's motion?

A. 0.9 m s^{-1}

B. 2.5 m s^{-1}

C. 3.1 m s^{-1}

D. 3.9 m s^{-1}

Question 13

A race car enters the straight home stretch of a track at 144 km h^{-1}. It accelerates uniformly and reaches a speed of 252 km h^{-1} in 10 seconds.

Which one of the following gives the acceleration of the race car?

A. 3 m s^{-2}

B. 11 m s^{-2}

C. 13 m s^{-2}

D. 40 m s^{-2}

Question 14

Akosua has a mass of 80.0 kg.

Which one of the following gives Akosua's weight on the Earth's surface?

A. 80.0 kg

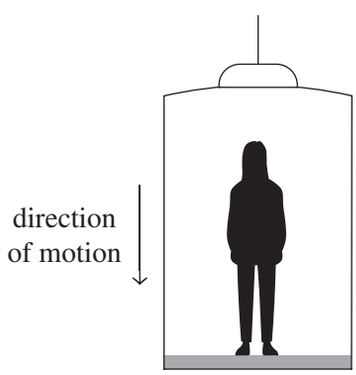
B. 80.0 N

C. 784 kg

D. 784 N

Question 15

Sung-Hoon is standing in an elevator in a department store. The elevator is travelling downwards and slows as it reaches a lower floor of the store.



The force exerted by the floor of the elevator on Sung-Hoon is

A. equal to Sung-Hoon's weight.

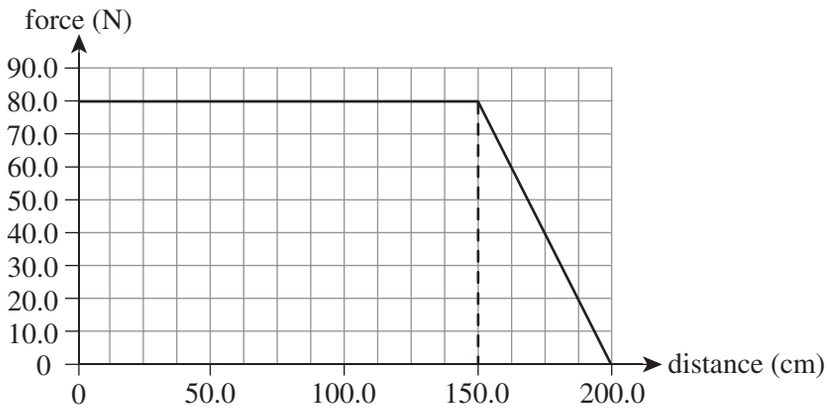
B. less than Sung-Hoon's weight.

C. more than Sung-Hoon's weight.

D. more than the force exerted by Sung-Hoon on the floor of the elevator.

Question 16

The following force versus displacement graph represents the movement of a 5.0 kg object.



If the object was initially travelling at 10.0 m s^{-1}, what is the final velocity of the object?

A. 0.0 m s^{-1}

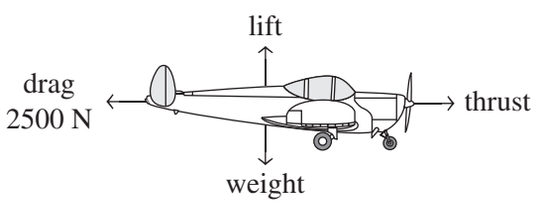
B. 2.2 m s^{-1}

C. 8.0 m s^{-1}

D. 12.5 m s^{-1}

Question 17

The diagram below shows an aircraft that is travelling at a constant speed of 360 km h^{-1} in a straight line with constant altitude. The drag acting on the aircraft is constant at 2500 N.



Which one of the following gives the power produced by the aircraft's thrust force?

A. 9.0×10^5 W

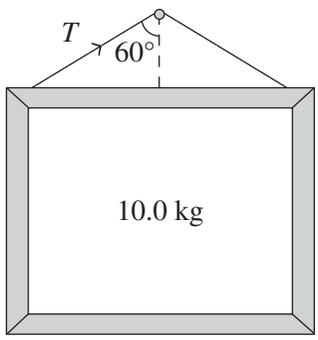
B. 2.5×10^5 W

C. 3.2×10^6 W

D. 2.5×10^1 W

Question 18

A mirror with a mass of 10.0 kg hangs on a wall, as shown in the diagram. The mirror is suspended by two wires, each at an angle of 60° to the vertical.



Which one of the following gives the tension in one of the wires, T?

A. 50.0 N

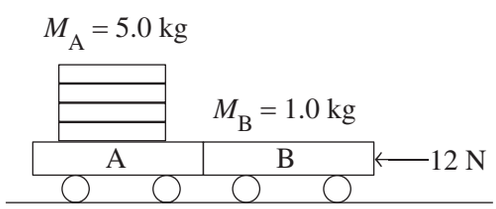
B. 98.0 N

C. 196.0 N

D. 392.0 N

Question 19

Two carts, A and B, are being pushed to the left on a smooth, frictionless surface by a 12 N force, as shown in the diagram below. Cart A has a mass of 5.0 kg and cart B has a mass of 1.0 kg.



The magnitude of the force exerted on cart B by cart A ($F_{\text{A on B}}$) is

A. 2.0 N

B. 2.4 N

C. 10 N

D. 12 N

Question 20

A Year 12 Physics student undertakes a practical investigation in the school laboratory.

In this investigation, an independent variable is one that is

A. independent of the investigation.

B. varied by the student.

C. fixed throughout the investigation.

D. measured by the student in the investigation.

END OF SECTION A

SECTION B

Instructions for Section B

Answer **all** questions in the spaces provided.
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 (8 marks)
A 250 g sample of an unknown substance was heated. The sample was initially a solid. Figure 1 shows the temperature versus heat added graph for the sample.

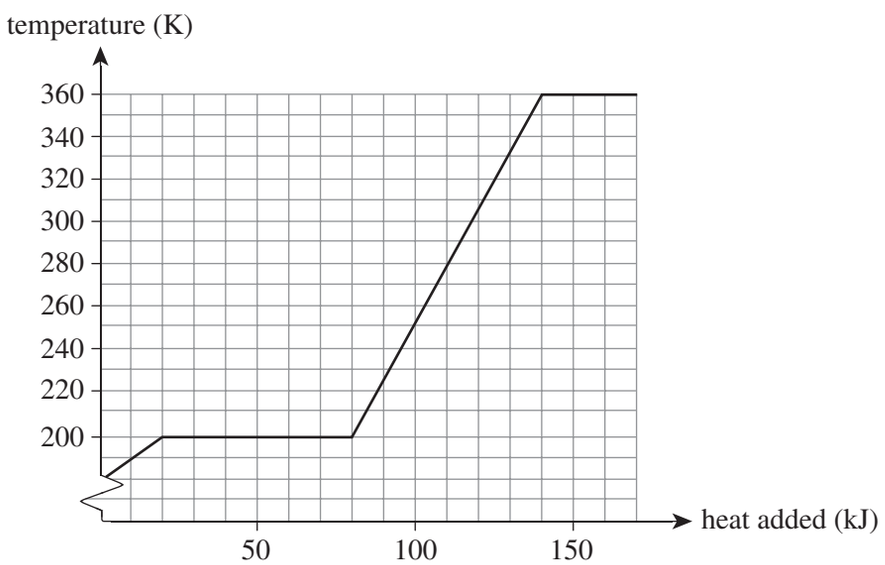


Figure 1

a. What is the melting point for the sample in degrees Celsius? Show your working. 2 marks

°C

b. What happened to the substance when it reached 360 K? 2 marks

c. Calculate the latent heat of fusion for the sample. Show your working. 2 marks

J kg^{-1}

d. Calculate the specific heat capacity of the substance when it is a liquid. Show your working. 2 marks

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

Question 2 (6 marks)

A Bunsen burner is used to convert a 500 g sample of liquid ethanol into a gas at 78°C. The ethanol sample is initially at room temperature (25°C). The following data for ethanol is known.

Data

specific heat capacity	2.5×10^3 J kg^{-1} K^{-1}
latent heat of fusion	1.1×10^5 J kg^{-1}
latent heat of vaporisation	8.5×10^5 J kg^{-1}
melting point	–114°C
boiling point	78°C

Assume that the heat contributed from the surroundings is negligible.

a. Calculate the minimum amount of heat energy required by the Bunsen burner to change the temperature. Show your working. 2 marks

J

b. Calculate the minimum amount of heat energy required to change the state of the ethanol liquid. Show your working. 2 marks

J

c. Calculate the total minimum amount of heat energy required to convert the ethanol liquid at 25°C to ethanol gas at 78°C. Show your working. 2 marks

J

Question 3 (4 marks)

In an experiment, an iron cube of very high purity was heated to 85.0°C. It was then dropped into 200 g of water at 25.0°C. The final temperature of the mixture is 26.6°C. The following data is known.

Data

c_{water}	4.2×10^3 J kg^{-1} K^{-1}
c_{iron}	4.5×10^2 J kg^{-1} K^{-1}

Calculate the mass of the iron cube, correct to the nearest gram. Show your working.

g

Question 4 (10 marks)

An ammeter and voltmeter are connected across a variable supply. Figure 2 shows the current versus voltage graph for resistors A and B.

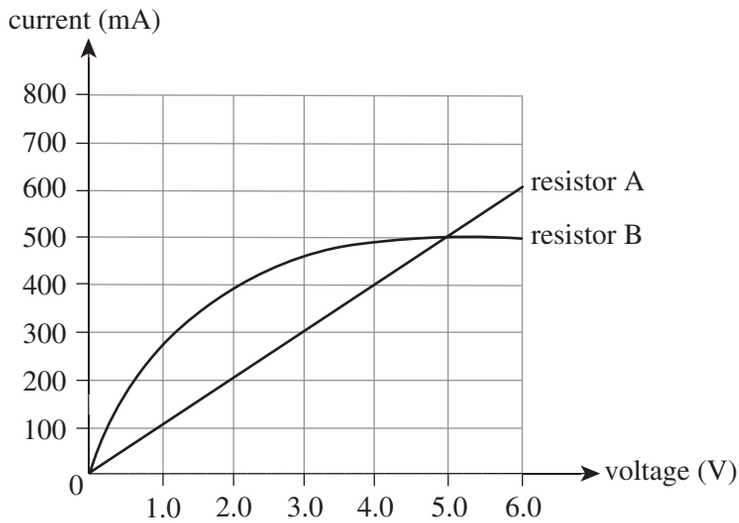


Figure 2

a. Is resistor A or resistor B ohmic? Explain your answer. 2 marks

Resistors A and B are connected to a variable DC supply, as shown in Figure 3. The two resistors are connected in series. The voltage drop across resistor A is 2.0 V.

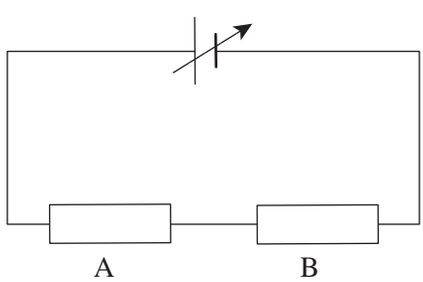


Figure 3

b. What is the magnitude of the current flowing through resistor B? Explain your answer. 2 marks

mA

Resistors A and B are then connected in parallel, as shown in Figure 4. The potential difference across resistor A is 2.0 V.

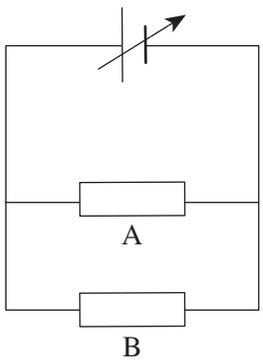


Figure 4

c. Calculate the current flowing through the variable DC supply. Show your working. 3 marks

mA

d. Calculate the total resistance of the circuit. Show your working. 3 marks

Ω

Question 5 (7 marks)

A school staffroom has a kettle rated 240 V, 1600 W. It is used for approximately 90 minutes a day, five days a week.

a. How many kilowatt hours of energy are being transferred each week? Show your working. 2 marks

kWh

b. The electricity bill for the kettle was $32.51. The tariff per kilowatt hour is 25 cents.

How many weeks was the bill charging for? Show your working. 2 marks

weeks

c. The circuit supplying the kettle has a 10.0 A fuse.

Will the kettle blow the fuse when operating normally? Support your answer with calculations. 3 marks

Question 6 (3 marks)

A radioactive nucleus decays to form plutonium-239 and a beta particle, as shown in the following decay equation.

$$^{A}_{Z}X \rightarrow {}^{239}_{94}Pu + {}^{0}_{-1}\beta$$

a. What are the values of A and Z? 2 marks

A =
Z =

b. Identify element X in this equation. 1 mark

Question 7 (9 marks)

A typical stimulated nuclear fission reaction is shown in the equation below.

$$^{235}_{92}\text{U} + {}^{1}_{0}\text{n} \rightarrow {}^{236}_{92}\text{U} \rightarrow {}^{144}_{56}\text{Ba} + {}^{89}_{Z}\text{X} + \text{Y}\,{}^{1}_{0}\text{n}$$

a. What are the values of Y and Z? Show your working. 4 marks

Y =
Z =

b. Identify element X in this equation. 1 mark

c. Assume that 160 MeV is released in the fission reaction.
Calculate the mass defect. Show your working. 4 marks

kg

Question 8 (8 marks)
The energy levels of a hydrogen atom are shown in Figure 5.

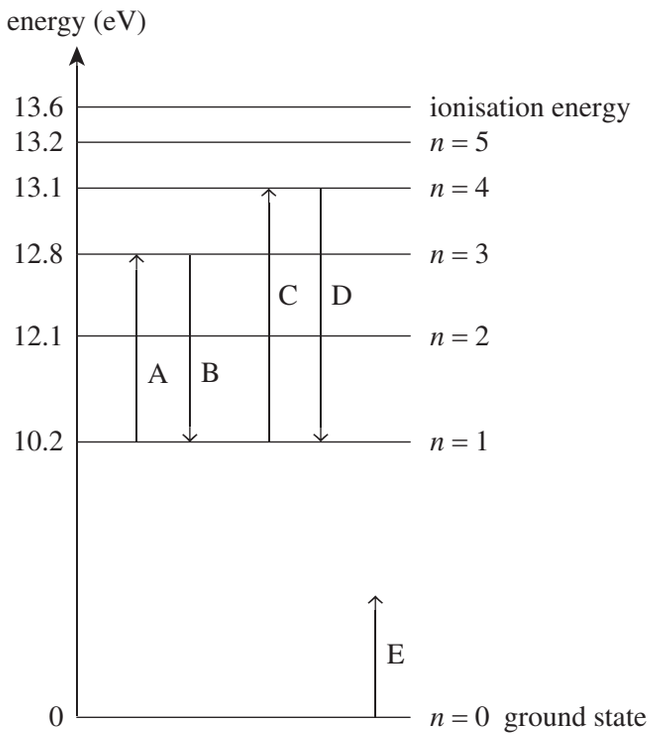


Figure 5

a. **i.** Which arrow (A–E) corresponds to an absorption of a photon of energy 2.6 eV?
Use a calculation to support your answer. 2 marks

ii. Which arrow (A–E) corresponds to an emission of photon energy of 4.64×10^{-19} J?
Use calculations to support your answer. 3 marks

b. Is arrow E possible? Explain your answer. 3 marks

Question 9 (9 marks)

Figure 6 shows the displacement versus time graph of an object.

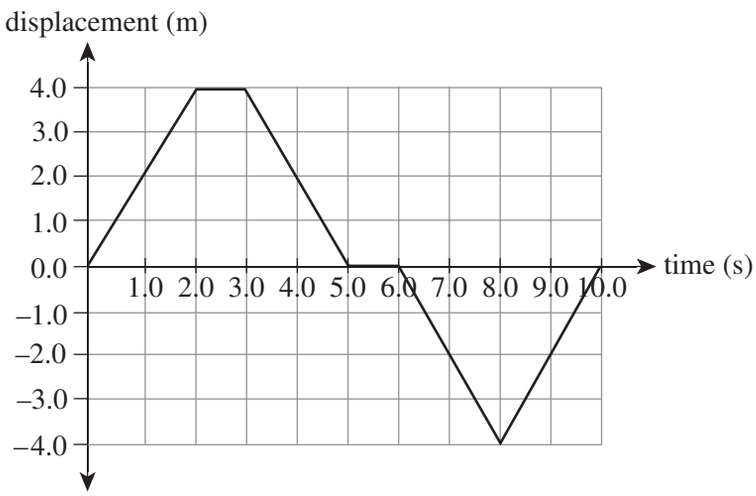


Figure 6

a. Calculate the total distance travelled by the object. Show your working. 2 marks

m

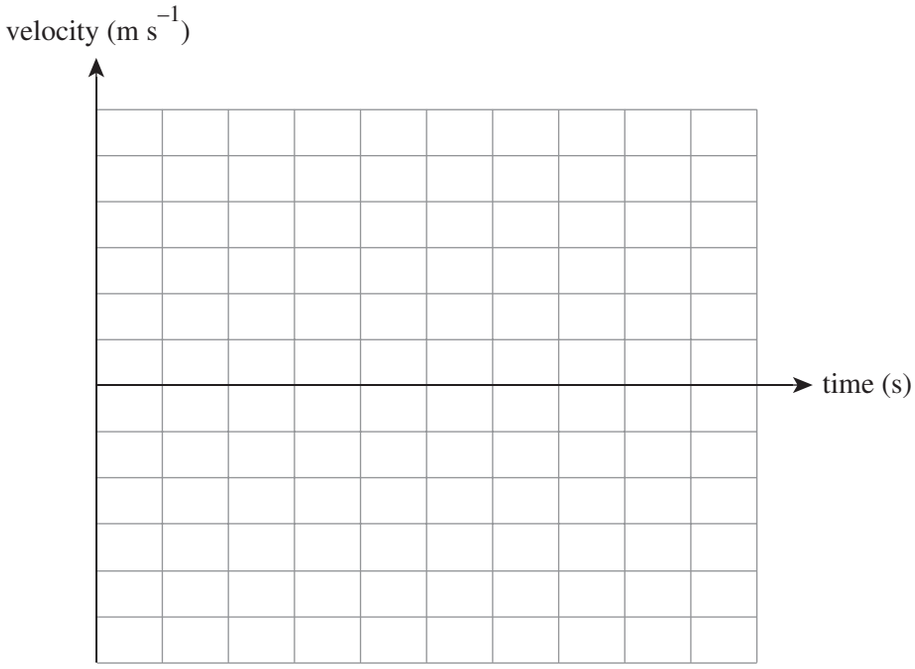
b. Identify the times at which the object is stationary. 2 marks

s s

c. Identify the times at which the object is moving towards the origin. 2 marks

s s

d. On the grid below, sketch the velocity versus time graph for the object's motion. Include appropriate scales for each axis. 3 marks



Question 10 (6 marks)

Four children are pulling ropes in a four-person game of tug-of-war. The magnitude of the forces exerted by the children is shown in Figure 7.

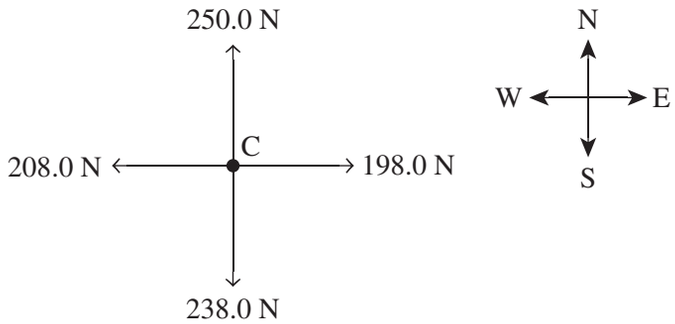


Figure 7

Calculate the magnitude and indicate the direction of the net force acting at the centre, C. Show your working.

N	

Question 11 (5 marks)

Cart A has a mass of 3.0 kg and is moving to the right along a horizontal, frictionless surface at a speed of 4.0 m s^{-1}. Cart B has a mass of 1.0 kg and is moving to the left on the same surface, towards cart A, at a speed of 2.5 m s^{-1}. The two carts collide. After the collision, cart A is still moving to the right with a reduced speed of 1.0 m s^{-1}.

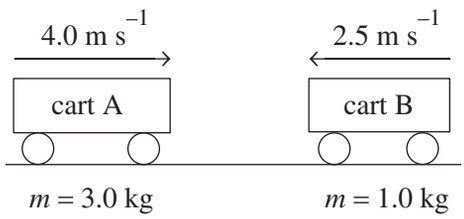


Figure 8

a. What is the speed of cart B after the collision? Show your working. 2 marks

m s^{-1}

b. The collision between the two carts takes 50 milliseconds.

Calculate the magnitude and indicate the direction of the average force exerted on cart A by cart B. Show your working. 3 marks

N

Question 12 (6 marks)
A 5.0 kg box rests on a smooth horizontal table and is attached to a 3.0 kg mass by a light string via a frictionless pulley, as shown in Figure 9.

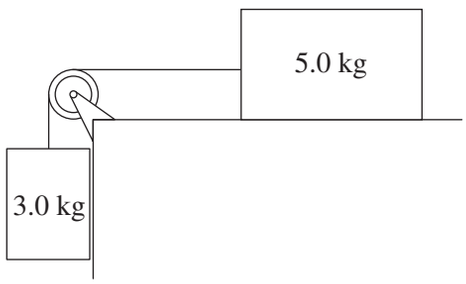


Figure 9

a. Determine the magnitude of the acceleration of the 3.0 kg box. Show your working. 4 marks

m s^{-2}

b. If the 3.0 kg box was initially at rest 1.0 m above the ground, how long would it take for the box to reach the ground? Show your working. 2 marks

s

Question 13 (8 marks)

A roller coaster cart with a mass of 1.00 tonne is moving along a horizontal section of the track at a speed of 5.00 m s^{-1}, as shown in Figure 10.

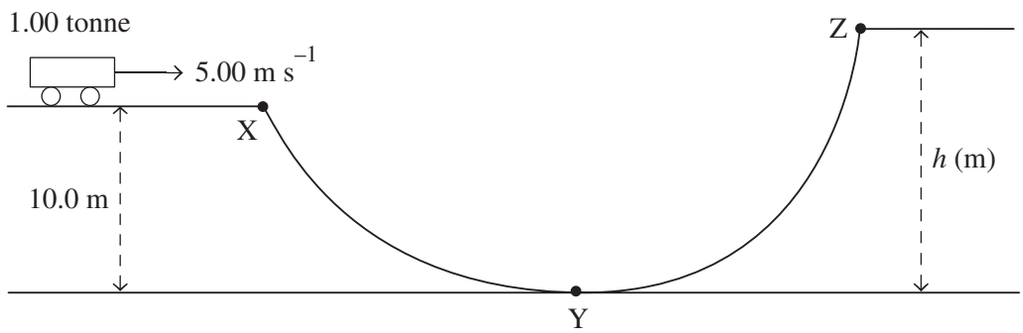


Figure 10

Point X is at the edge of the horizontal section of the track and has a height of 10.0 m. Point Y is the lowest point of the track. The track is designed so that the roller coaster cart will come to rest at point Z. Ignore the effects of friction.

a. What is the kinetic energy of the roller coaster cart at point X? Show your working. 2 marks

J

b. What is the speed of the cart at point Y? Show your working. 3 marks

m s^{-1}

c. What is the vertical height, h, of point Z above point Y? Show your working. 3 marks

m

Question 14 (6 marks)

A spring rests horizontally against a wall. Estefanía holds a block of mass 1.0 kg stationary against the spring, compressing it by 10.0 cm, as shown in Figure 11a.

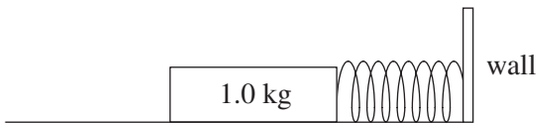


Figure 11a

Estefanía releases the block and it leaves the spring with a kinetic energy of 2.0 J, as shown in Figure 11b.

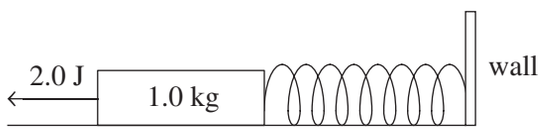


Figure 11b

a. Calculate the speed of the block as it leaves the spring. Ignore the effects of friction.
Show your working. 2 marks

m s^{-1}

b. Calculate the work done on the block by the spring. Ignore the effects of friction.
Show your working. 1 mark

J

c. Calculate the spring constant, k, of the spring. Assume that the spring obeys Hooke's law. Show your working. 3 marks

$\mathrm{N\ m^{-1}}$

Question 15 (5 marks)

A student holds a mass of 10.0 kg stationary over a fence using a metre ruler. The mass is suspended from the end of the ruler by a piece of string at a distance of 20.0 cm from the fence, as shown in Figure 12. Assume that the mass of the ruler is negligible.

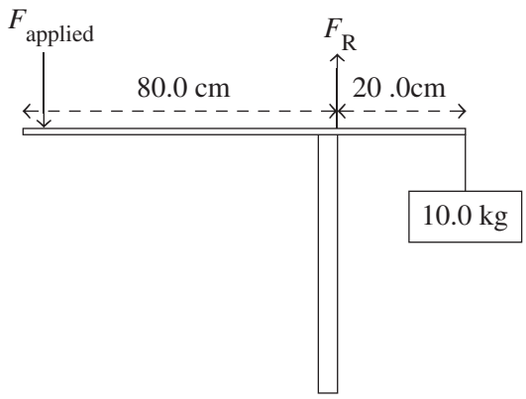


Figure 12

a. Given that the student is standing at a distance of 80.0 cm from the fence, what is the magnitude of the force that the student must apply to the metre ruler to support the 10.0 kg mass? Show your working. 2 marks

N

b. What is the magnitude and direction of the reaction force, F_R, that the fence exerts on the metre ruler? Show your working. 3 marks

N

Question 16 (10 marks)

Two students conduct an experiment to investigate the relationship between the force applied to and the acceleration of a glider on a frictionless linear air track. Table 1 shows some of the data for the experiment.

Table 1

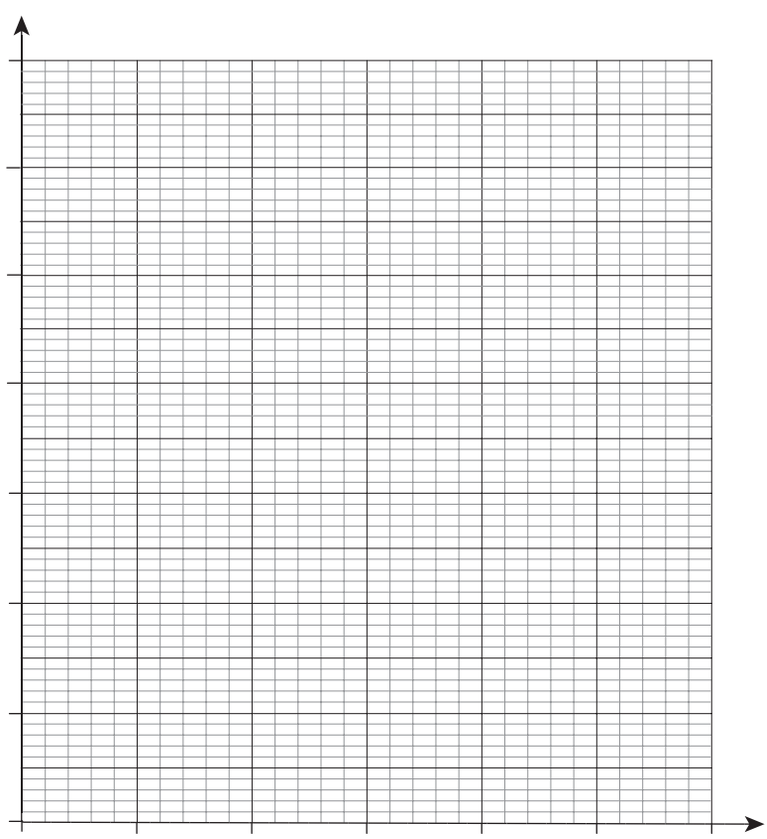
Force (± 0.1 N)	**Acceleration (± 0.1 m s^{-2})**
0.5	1.0
1.0	2.5
1.5	3.5
2.0	4.7
2.5	6.2

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

Classification	**Variable**
independent	
dependent	
controlled	

b. Using the grid provided below, plot an acceleration versus force graph for the data given in Table 1. In your graph:

- include uncertainty bars
- draw a straight line of best fit through the plotted points. 5 marks



c. Using the gradient from the graph plotted in **part b.**, calculate the approximate mass of the glider. Show your working. 2 marks

kg

END OF QUESTION AND ANSWER BOOKLET

Neap

Trial Examination 2022

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.

PHYSICS FORMULAS

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	$P = \sigma T^4$ where Stefan–Boltzmann constant $\sigma = 5.67 \times 10^{-8}$ W m^{-2} K^4
first law of thermodynamics	$\Delta U = Q - W$
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	$R_T = R_1 + R_2$
resistors in parallel	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$
velocity; acceleration	$v = \frac{\Delta s}{\Delta t}; \quad a = \frac{\Delta v}{\Delta t}$
equations for constant acceleration	$v = u + at$ $s = ut + \frac{1}{2}at^2$ $s = vt - \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ $s = \frac{1}{2}(v + u)t$
Newton's second law	$\Sigma F = ma$
gravitational potential energy near the surface of Earth	$mg\Delta h$
kinetic energy	$\frac{1}{2}mv^2$
mechanical work	$W = Fs$

power	$P = \frac{W}{\Delta t} = \frac{\Delta E}{\Delta t}$
Hooke's law	$F = -k\Delta x$
elastic potential energy	$\frac{1}{2}k\left(\Delta x\right)^2$
torque	$\tau = F \times r$
momentum	mv
impulse	$F\Delta t$
efficiency	$\text{efficiency (\%)} = \frac{\text{useful energy output}}{\text{energy input}} \times 100$

Data

speed of light in a vacuum	$c = 3.0 \times 10^8$ m s^{-1}
1 eV	1.6×10^{-19} J
charge on the electron	$e = 1.6 \times 10^{-19}$ C
acceleration due to gravity at Earth's surface	$g = 9.8$ m s^{-2}

Prefixes/Units

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

Periodic table of the elements

Key: atomic number — 79; symbol of element — Au; relative atomic mass — 197.0; name of elecment — gold

1 **H** 1.0 hydrogen																	2 **He** 4.00 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** 30.1 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** 45.0 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** 96.0 molybdenum	43 **Tc** (98) 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	**57–71** lanthanoids	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** (210) polonium	85 **At** (210) astatine	86 **Rn** (222) radon
87 **Fr** (223) francium	88 **Ra** (226) radium	**89–103** actinoids	104 **Rf** (261) rutherfordium	105 **Db** (262) dubnium	106 **Sg** (266) seaborgium	107 **Bh** (264) bohrium	108 **Hs** (267) hassium	109 **Mt** (268) meitnerium	110 **Ds** (271) darmstadtium	111 **Rg** (272) roentgenium	112 **Cn** (285) copernicium	113 **Nh** (280) nihonium	114 **Fl** (289) flerovium	115 **Mc** (289) moscovium	116 **Lv** (292) livermorium	117 **Ts** (294) tennessine	118 **Og** (294) oganesson

57 **La** 138.9 lanthanum	58 **Ce** 140.1 cerium	59 **Pr** 140.9 praseodymium	60 **Nd** 144.2 neodymium	61 **Pm** (145) promethium	62 **Sm** 150.4 samarium	63 **Eu** 152.0 europium	64 **Gd** 157.3 gadolinium	65 **Tb** 158.9 terbium	66 **Dy** 162.5 dysprosium	67 **Ho** 164.9 homium	68 **Er** 167.3 erbium	69 **Tm** 168.9 thulium	70 **Yb** 173.1 ytterbium	71 **Lu** 175.0 lutetium
89 **Ac** (227) actinium	90 **Th** 232.0 thorium	91 **Pa** 231.0 protactinium	92 **U** 238.0 uranium	93 **Np** (237) neptunium	94 **Pu** (244) plutonium	95 **Am** (243) americium	96 **Cm** (247) 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** (262) lawrencium

The value in the brackets indicates the mass number of the longest-lived isotope.

END OF FORMULA SHEET

PhyU1&2_FS_2022

Neap

Trial Examination 2022

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