

Centre Number										Examination Number									



EXAMINATIONS COUNCIL OF ZAMBIA

Examination for General Certificate of Education Ordinary Level



Science

5124/1

Paper 1

Tuesday

14 JULY 2026

Additional Materials:

Electronic calculator (non programmable) and / or Mathematical tables

Soft clean eraser

Soft pencil (type B or HB is recommended)

Time: 2 hours

Marks: 85

Instructions to Candidates

- 1 Write the **centre number** and your **examination number** in the spaces provided on this page.
- 2 Write your **examination number** in the spaces provided on **every page** of this question paper.
- 3 There are **three** sections in this paper; Section **A**, **B** and **C**.
- 4 **Section A:** Answer **all** questions. For each question, four suggested answers, **A**, **B**, **C** and **D** are given. Mark the letter of your answer with a cross (X) on the **Answer Grid provided** in this question paper.
- 5 **Section B:** Answer **all** questions. Write your answers in the **spaces provided** within this question paper.
- 6 **Section C:**
 - (i) There are **three** questions in this section. Answer any **two** questions.
 - (ii) Write your answers in the spaces provided in this question paper.
 - (iii) Enter the numbers for the questions you have answered on the grid under the column '**For Candidate's Use**'.

Information for Candidates

- 1 Any rough working should be done in this question paper.
- 2 Cell phones are **not allowed** in the examination room.

For Examiners' Use		
For Candidate's Use	Marks Obtained	Examiner's Initials
Section A		
Section B		
1		
2		
3		
4		
5		
6		
7		
8		
9		
Section C		
Total		

Examination Number														

SECTION A: [20 MARKS]

Answer **all** the questions in this section on the answer grid provided. Mark the letter of your answer with a cross (**X**).

For example, if the answer is **B**, it is shown as:

A	B	C	D
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ANSWER GRID

1	A	B	C	D
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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
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9	A	B	C	D
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19	A	B	C	D
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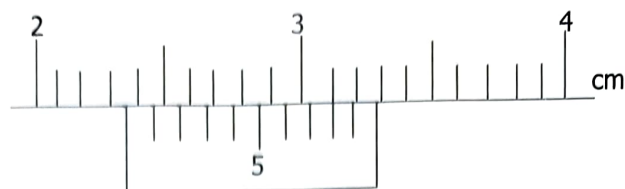
10	A	B	C	D
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20	A	B	C	D
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Total Marks	
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Examination Number																			

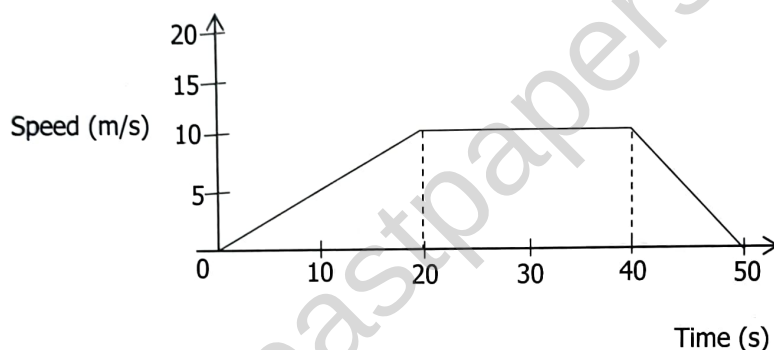
A1 The diagram shows readings on the Vernier Caliper.



What is the reading of the instrument?

- A** 2.30cm
- B** 2.35cm
- C** 2.38cm
- D** 2.39cm

A2 The diagram is a graph showing the movement of a car over a period of 50 seconds.



What distance was covered by the car when its speed was increasing and decreasing?

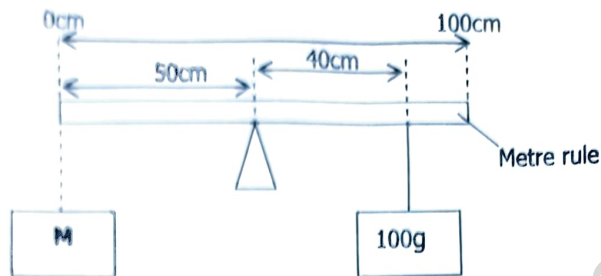
- A** 200m
- B** 150m
- C** 100m
- D** 50m

A3 A train initially moving at a velocity of 9m/s slows down to 5m/s in 10s. How far does it move during the retardation?

- A** 40m
- B** 50m
- C** 70m
- D** 110m

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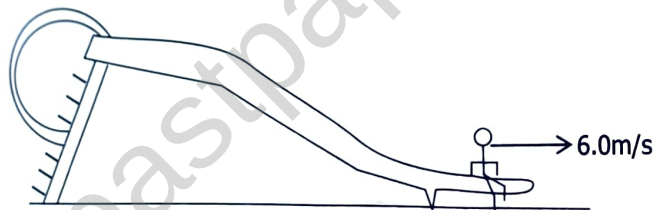
- A4** The diagram shows a metre rule pivoted at its centre. A 100g mass is hang on one side of the pivot while another mass **M** is hang on the opposite side to bring the metre rule to equilibrium.



What is the size of mass **M**?

- A** 20g
- B** 50g
- C** 80g
- D** 100g

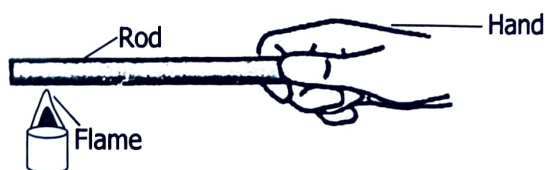
- A5** A learner of mass 20kg attains a velocity of 6.0m/s as she reaches the bottom of a slide.



What is the kinetic energy of the learner as she reaches at the bottom of the slide?

- A** 120J
- B** 200J
- C** 360J
- D** 720J

- A6** The diagram shows a metal rod being heated on one end by a flame.



By what process or processes does the heat reach the hand holding the metal rod?

- A** Conduction
- B** Conduction and convection
- C** Conduction and radiation
- D** Radiation only

- A7** Which of the following statements is **not** true? Absolute zero is ...
- A** equal to zero Kelvin on the absolute temperature scale.
 - B** equivalent to -273°C on the absolute temperature scale.
 - C** represented by $^{\circ}\text{C}$.
 - D** the lowest possible temperature at which the volume of a gas is assumed to be zero.

- A8** A wave source of frequency 500Hz emits waves of wavelength 0.05m.

How long does it take for the waves to travel 1 250m?

- A** 5s
- B** 8s
- C** 50s
- D** 200s

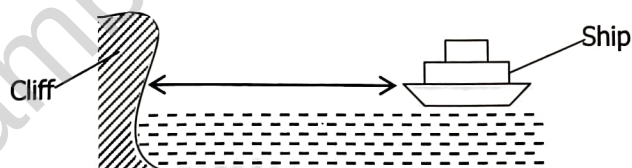
- A9** The table shows part of the electromagnetic spectrum.

Gamma rays	X-rays	Ultra-violet	Light	Infra-red	Radio waves
------------	--------	--------------	-------	-----------	-------------

Calculate the frequency of red light that has a wavelength of $7.5 \times 10^{-7}\text{m}$?

- A** $4.0 \times 10^1\text{Hz}$
- B** $4.0 \times 10^{14}\text{Hz}$
- C** $22.5 \times 10^1\text{Hz}$
- D** $22.5 \times 10^{14}\text{Hz}$

- A10** The diagram shows a ship moving towards a cliff. The sound from the siren of the ship is reflected by the cliff and heard 6.0s later by the sailor on the ship.



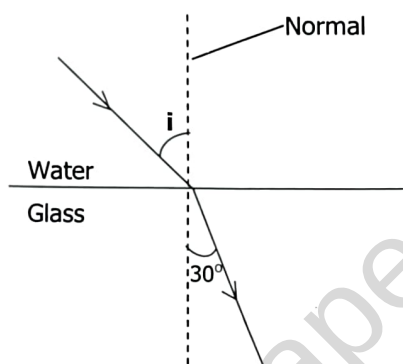
How far from the cliff is the ship, taking the speed of sound in air to be 330m/s?

- A** 53m
- B** 160m
- C** 990m
- D** 1 920m

A11 Which one of the following is **not** a characteristic of an image formed by a plane mirror?

- A** Diminished
- B** Same size as object
- C** Upright
- D** Virtual

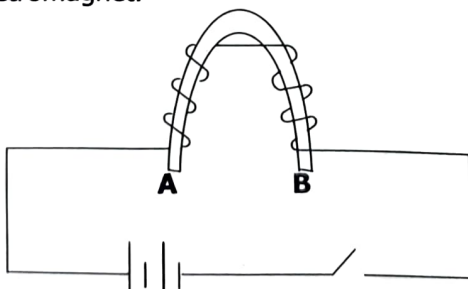
A12 The diagram shows a ray of light moving from water at a speed of $2.26 \times 10^8 \text{ m/s}$ to glass at a speed of $2.0 \times 10^8 \text{ m/s}$.



Calculate the angle of incidence (**i**) above.

- A** 1.2°
- B** 2.3°
- C** 30.0°
- D** 34.4°

A13 The diagram shows a coil of insulated wire wound around a U-shaped core **AB** connected to a battery to make an electromagnet.

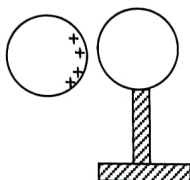


What are the polarities of **A** and **B** when the switch is closed?

	A	B
A	North	South
B	South	South
C	South	North
D	North	North

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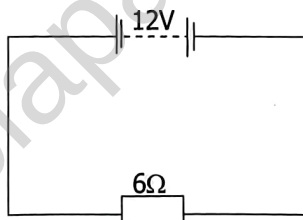
- A14** The diagram shows a positively charged insulated metal sphere close to, but does not touch, a similar uncharged insulated metal sphere.



Which diagram shows the correct charge distribution on the spheres?

- A**
- B**
- C**
- D**

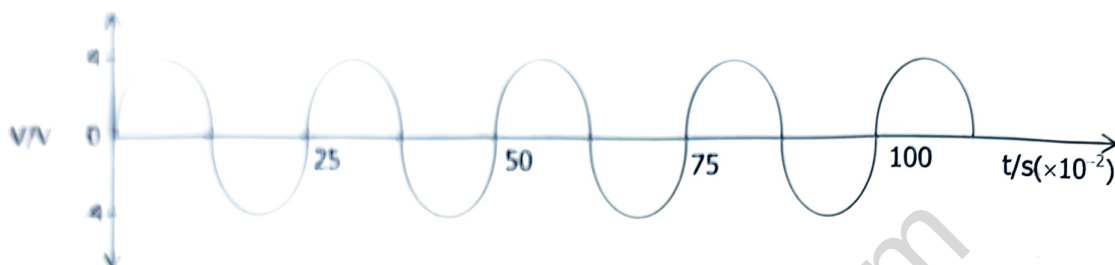
- A15** A 12V battery is connected to a 6Ω resistor as shown.



How much charge flows through the resistor in 40s?

- A** 80C
- B** 136C
- C** 160C
- D** 240C
- A16** A heater is rated 2.5kW and its voltage is 250V. What is the resistance of the wire?
- A** 10Ω
- B** 15Ω
- C** 20Ω
- D** 25Ω

A17 The diagram shows a graph of potential difference (p.d) produced by an electric generator.



What is the maximum voltage and frequency of the generator?

	Voltage/V	Frequency/Hz
A	4	0.25
B	8	4.0
C	8	0.50
D	4	4.0

A18 The diagram shows a left hand being used to determine the direction of the force when a current carrying conductor is perpendicular to a magnetic field.



Which quantities are represented by the direction of fingers **P**, **Q** and **R**?

	P	Q	R
A	Current	Field	Force
B	Field	Force	Current
C	Force	Current	Field
D	Force	Field	Current

A19 Which nucleus is produced when Americium-241 ($^{241}_{95}\text{Am}$) emits an alpha particle?

- A** $^{237}_{93}\text{Np}$
- B** $^{237}_{97}\text{Bk}$
- C** $^{245}_{93}\text{Np}$
- D** $^{245}_{95}\text{Bk}$

A20 Which of the following equations shows a fusion reaction?

- A** ${}^1_1\text{H} + {}^0_{-1}\text{e} \rightarrow {}^0_1\text{n} + \text{Energy}$
- B** ${}^4_2\text{He} + {}^{14}_7\text{N} \rightarrow {}^{17}_8\text{O} + {}^1_1\text{H} + \text{Energy}$
- C** ${}^{23}_{12}\text{Mg} + {}^0_{-1}\text{e} \rightarrow {}^{23}_{11}\text{Na} + \text{Energy}$
- D** ${}^{238}_{92}\text{U} \rightarrow {}^{234}_{90}\text{Th} + {}^4_2\text{He} + \text{Energy}$

SECTION B: [45 MARKS]

Answer **all** questions in this section. Write your answers in the spaces provided for each question.

B1 **Table B1.1** shows different instruments used to measure different physical quantities.

Complete the table by filling in the physical quantity it measures and its S.I. units.

Table B1.1

Instrument	Quantity	S.I. Unit
Voltmeter		
Vernier calliper		
Thermometer		
Spring balance		

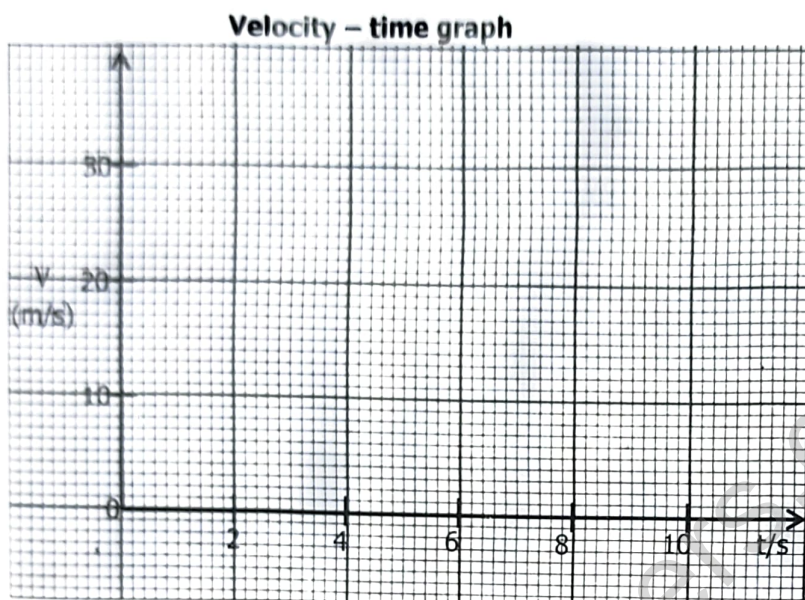
[Total: 4 marks]

B2 **Table B2.1** shows readings obtained by a group of learners performing an experiment to determine variation of velocity with time for a car starting from rest. The car had a mass of 2 tonnes.

Table B2.1

Velocity (m/s)	0	10	20	20	20	20
Time (s)	0	2	4	6	8	10

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(a) On the axes on the graph, draw the velocity-time graph. [2]

(b) Calculate the acceleration of the car for the first 4 seconds of the journey.

Acceleration [2]

(c) Calculate the force acting on the car giving it the acceleration in (b).

Force [2]

[Total: 6 marks]

- B3** Figure B3.1 shows two boys playing on a see-saw. A small dog is placed at distance X from the pivot on one side of the see-saw to bring the see-saw to equilibrium. Neglect the weight of the see-saw.

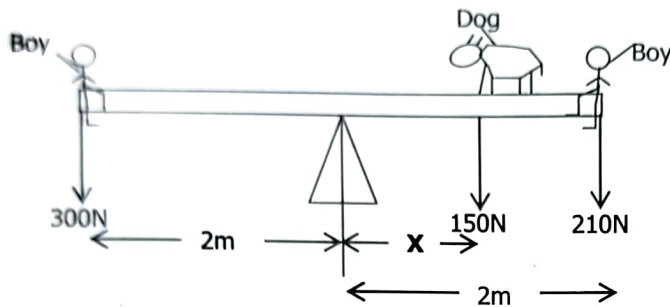


Figure B3.1

- (a) State the principle of moments.

.....
 [1]

- (b) Find the distance X (distance between the pivot and where the dog is placed).

Distance X [2]

- (c) Determine the force acting vertically upwards at the pivot.

Force [2]

[Total: 5 marks]

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B4 (a) Figure B4.1 shows a bimetallic strip at standard temperature and pressure.



Figure B4.1

Knowing that copper expands more than iron, draw the shape of the same bimetallic strip after being heated.

[1]

- (b)** A bicycle pump contains 50cm^3 of air at 17°C and at 1.0 atmosphere. Find the pressure when the air is compressed to 10cm^3 and its temperature rises to 27°C .

Pressure [2]

[Total: 3 marks]

B5

Figure B5.1 shows a learner standing in the middle of a large rectangular school hall which is 34m wide. When the learner produces a sound by clapping, two echoes are heard after 0.1s and 0.16s respectively.

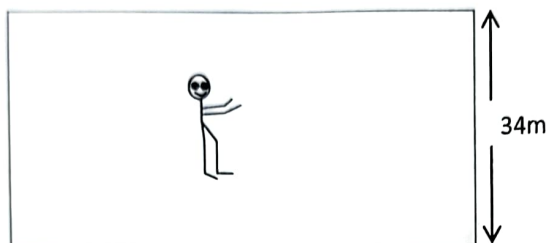


Figure B5.1

- (a) Define the longitudinal wave.

[1]

- (b) Assuming that there is no echo from the ceiling, calculate the

- (i) speed of sound in air,

Speed of sound [2]

- (ii) length of the hall.

Length of the hall [2]

[Total: 5 marks]

- B6** Figure B6.1 shows an object **A** near a converging lens but beyond $2F$. The principal foci of the lens are at F and $2F$.

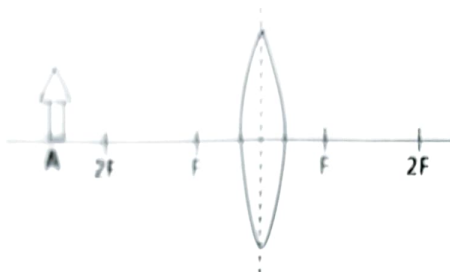


Figure B6.1

- (a) On Figure 6.1, draw rays to find the position of the image.
 [1]
- (b) The image of object **A** is real.
 State **two** other characteristics of the image.
 [2]

- (c) State the name of an optical device that uses a lens to form a real image of an object.
 [1]

[Total: 4 marks]

- B7** Figure B7.1 shows a freely suspended unknown metal bar that was brought near a bar magnet. The magnet moved in the direction shown.

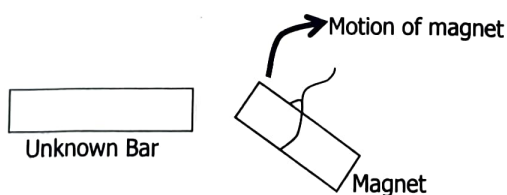


Figure B7.1

- (a) Identify this type of metal bar.
 [1]
- (b) State **one** possible material from which the metal bar is made.
 [1]

(c) The metal bar in **Figure B7.1** was replaced by a current carrying solenoid that is connected to a direct current (d.c.) power supply. The solenoid also caused the magnet to move in the direction shown on **Figure B 7.1**.

(i) Explain why the solenoid was able to cause motion on the magnet.

.....
 [1]

(ii) What adjustment can be made on the solenoid circuit to enable the magnet to move towards the solenoid?

.....
 [1]

(d) What **two** adjustments can be made on the solenoid circuit to make the magnet experience greater motion?

.....
 [2]

[Total: 6 marks]

B8 **Figure B8.1** shows a circuit with a battery of e.m.f 12V and internal resistance (**r**) of 1Ω . Two external resistors of 2Ω and 3Ω are connected in series.

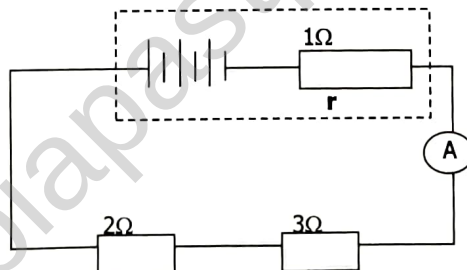


Figure B8.1

(a) Calculate the total resistance in the circuit.

Resistance [2]

(b) Determine the ammeter reading in the circuit.

Ammeter reading [2]

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- (c) Calculate the power lost by the battery when current flows through it. $\uparrow$

Power [2]

[Total: 6 marks]

- B9 (a)** Define the following terms;

(i) Radioactivity

..... [1]

(ii) Nuclear fission

..... [1]

- (b) State **one** similarity and **one** difference between nuclear fission and nuclear fusion.

Similarity [1]

Difference [1]

- (c) An atom is represented by ${}^3_1\text{H}$.

How many protons and neutrons are in this atom?

Protons:

Neutrons: [2]

[Total: 6 marks]

SECTION C: [20 MARKS]

Answer any **two (2)** questions from this section in the spaces provided in this question paper from page 18 to 22.

- C1** **Table C1.1** shows results of load (N) and effort (N) obtained by a learner at some school after carrying out an experiment to investigate the performance of a simple machine.

Table C1.1

Load (N)	50	100	200	300	400	500	600
Effort (N)	35	45	65	85	105	125	145

- (a) Define a simple machine. [1]
- (b) Plot a graph of load (N) against effort (N), on the graph provided on page 20. [4]
- (c) Determine the slope of the graph. [2]
- (d) What does the gradient of the graph represent? [1]
- (e) Determine the efficiency of the machine if it has a velocity ratio of 6. [2]

[Total: 10 marks]

- C2** (a) Define the following terms:

- (i) Work [1]
- (ii) Energy [1]

- (b) The useful power output of a small d.c motor is used to raise a load of 1.50kg through a vertical distance of 0.6m in 9s. The voltage across the motor and the current through it are constant at 12.0V and 0.6A respectively. Taking 'g' as 10N/kg, calculate the

- (i) power input to the motor. [2]
- (ii) work done in raising the load. [2]
- (iii) useful power output developed by the motor. [2]
- (iv) efficiency of this operation. [2]

[Total: 10 marks]

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C3 Table C3.1 shows how the activity of a sample of iodine-128 varies with time. The activity recorded included a background count of 5 counts per second.

Table C3.1

Time (minutes)	0	10	20	30	40	50	60	70	80
Activity (disintegrations/sec)	81	62	49	38	30	24	19	16	13
Activity due to iodine-128 alone (disintegrations/sec)									

- (a) Copy and complete the table for the missing value of the activity due to iodine-128 alone. [2]
- (b) Plot a graph of activity due to iodine-128 alone against time in minutes, on the graph provided on page 21. [4]
- (c) Determine the half-life of iodine-128. [2]
- (d) How long would the activity of a sample of iodine-128 take to drop from 1 200 to 75 disintegrations per second? [2]

[Total: 10 marks]

Write the numbers for the questions you have chosen at the beginning of each answer.

is also known as voltage

$$\eta = \frac{W_{out}}{V \cdot R} \times 100\%$$

$$\eta = \frac{9.1}{6} \times 100\%$$

$$\eta = 85.2$$

$$(c) \quad m = \frac{480 - 70}{120 - 89}$$

$$m = \frac{410}{31}$$

$$m = 5.1$$

