Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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3218157755

PHYSICS **0625/32**

Paper 3 Theory (Core) **October/November 2018**

1 hour 15 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
Take the weight of 1.0 kg to be 10 N (acceleration of free fall = 10 m/s^2).

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.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **16** printed pages.

CAMBRIDGE International Examinations

1 A person on roller skates makes a journey. Fig. 1.1 shows the speed-time graph for the journey.

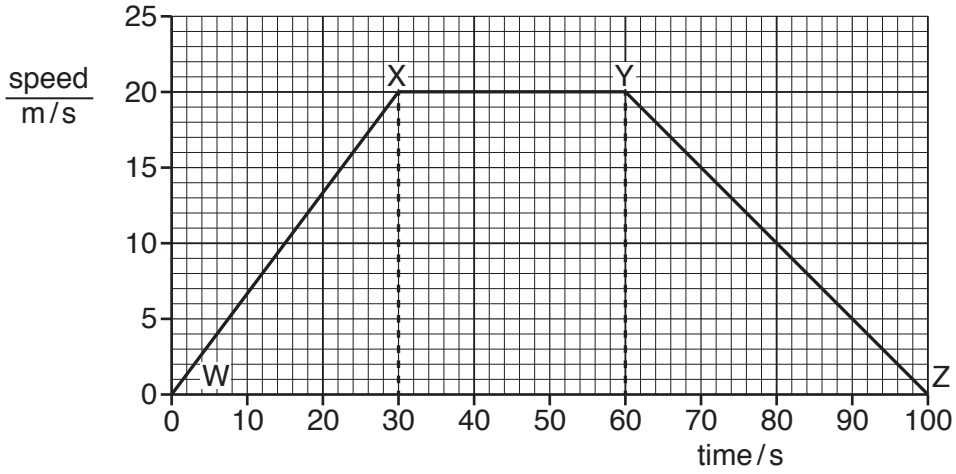


Fig. 1.1

(a) The graph shows three types of motion.

Complete the table to show when each type of motion occurs. Use the letters shown on Fig. 1.1. Add a letter to each of the blank spaces.
The first row is done for you.

motion	start of motion	end of motion
acceleration	W	X
deceleration		
constant speed		

[2]

(b) Calculate the distance travelled between 60 s and 100 s.

distance = ... m [3]

(c) The size of the acceleration is greater than the deceleration.

Describe how Fig. 1.1 shows this.

.....

..... [1]

[Total: 6]

2 A student is studying elephants. Fig. 2.1 shows an elephant.

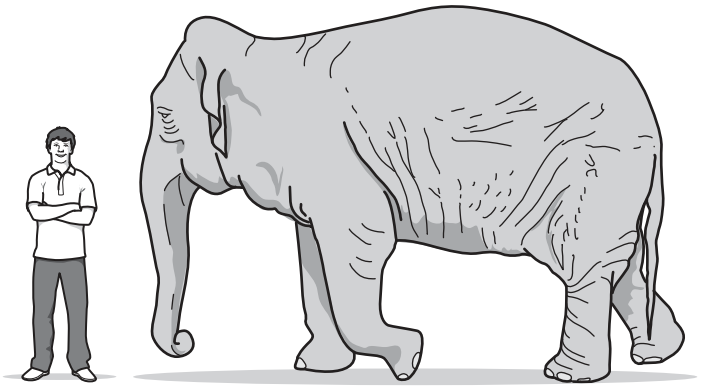


Fig. 2.1

(a) The student measures the elephant and records the values, as shown in the table.

Complete the table by adding a suitable unit for each measurement. Choose the units from those shown in the box.

m^2	kg	cm	mm^2	g	m	cm^2	mg	mm

measurements	value	unit
mass of elephant	4000	
height of elephant	3.0	
average area of an elephant's foot	0.125	

[2]

(b) Using information from the table in **(a)**:

(i) Calculate the weight of the elephant.

weight = ... N [3]

(ii) Calculate the pressure the elephant exerts on the ground when it is standing on four feet. Include a unit.

pressure = ... [4]

[Total: 9]

3 A flask contains gas with a pressure lower than atmospheric pressure.

Fig. 3.1 shows equipment being used to measure the pressure of the gas in the flask.

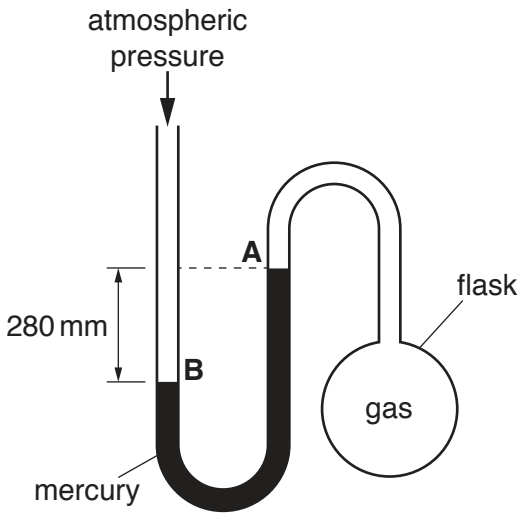


Fig. 3.1

(a) State the name of the equipment shown in Fig. 3.1 that is used to measure the pressure of the gas.

..... [1]

(b) The atmospheric pressure is equal to 760 mm Hg.

The distance between mercury level A and mercury level B is 280 mm.

Determine the pressure of the gas inside the flask.

pressure = ... mm Hg [2]

(c) The flask is cooled. Describe the effect, if any, the cooling has on

mercury level A .....

mercury level B .....
[1]

[Total: 4]

4 A drone is a machine that can fly. Fig. 4.1 shows a drone rising into the air, lifting a camera.

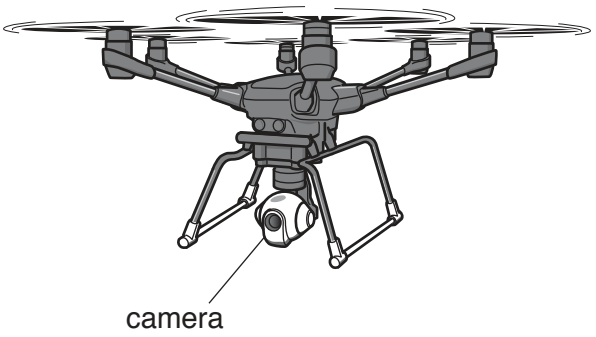


Fig. 4.1

The drone obtains energy from a battery of cells.

(a) Complete the sequence of useful energy transfers as the drone rises into the air. One part is done for you.

..... → electrical energy → ..... [2]

(b) The drone can move in any direction up or down, backwards or forwards, left or right. It can also remain stationary above the ground.

Describe the motion and position of the drone when it has both a **large** quantity of potential energy and a **small** quantity of kinetic energy.

.....

..... [2]

(c) When the drone moves, it wastes some energy. State the form of wasted energy and describe what happens to this energy.

form of energy .....

description .....

..... [2]

[Total: 6]

5 **(a)** State the meaning of the term *thermal capacity*.

.....

..... [1]

(b) When a material is cooled or heated there may be a change of state.

Complete each statement by using words from the box. Each word can be used once, more than once or not at all.

condensation	evaporation	freezing	melting

The change from solid to liquid is called .....

The change from liquid to gas is called .....

The change from liquid to solid is called .....

The change from gas to liquid is called ..... .

[4]

(c) A student heats a gas and keeps its volume constant.

State and explain the effect on the pressure of the gas. In your answer, use your ideas about molecules.

.....

.....

.....

..... [3]

[Total: 8]

6 **(a)** Fig. 6.1 shows a ray of red light incident on part of a lens.

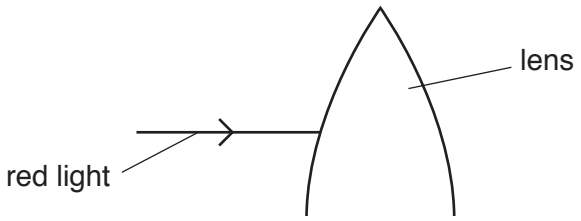


Fig. 6.1

(i) On Fig. 6.1, continue the path of the ray as it passes through the lens and emerges from it. [2]

(ii) State the term used to describe the process as the ray enters and leaves the lens.

..... [1]

(b) Fig. 6.2 shows two parallel rays of light travelling towards another lens.

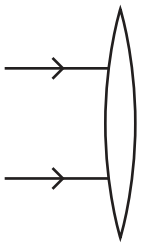


Fig. 6.2

The two rays of light pass through the lens to form an image.

On Fig. 6.2, continue the path of the rays. Extend the rays for at least 5 cm beyond the lens. [2]

[Total: 5]

7 **(a)** A ray of white light is incident on a glass prism. It forms a spectrum that is visible on the screen. Fig. 7.1 shows the arrangement.

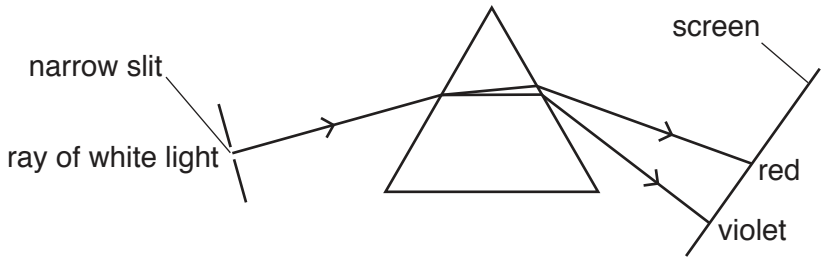


Fig. 7.1

Two of the colours in the visible spectrum are listed in the box below.

Complete the box. List the five missing colours of the visible spectrum, in the correct order.

red	.....	.....	.....	.....	.....	violet

[2]

(b) Electromagnetic radiation has many uses.

(i) Draw a line from each use to the type of radiation it requires.

use	type of radiation
	radio waves
detecting an intruder at night	microwaves
	infra-red
communicating by satellite for a telephone	visible light
	ultraviolet
detecting broken bones in the body	X-rays
	gamma rays

[3]

(ii) The types of radiation listed in **(b)(i)** form the electromagnetic spectrum.

amplitude	frequency	velocity

Complete the sentence. Choose a word from the box.

The position of each type of radiation in the electromagnetic spectrum depends on its

..... . [1]

[Total: 6]

8 **(a)** A healthy human ear can hear a range of frequencies.

Three frequency ranges are shown.

Draw a ring around the range for a healthy human ear.

0 Hz – 20 Hz 10 Hz – 10 000 Hz 20 Hz – 20 000 Hz

[1]

(b) Explain the meaning of the term *ultrasound*.

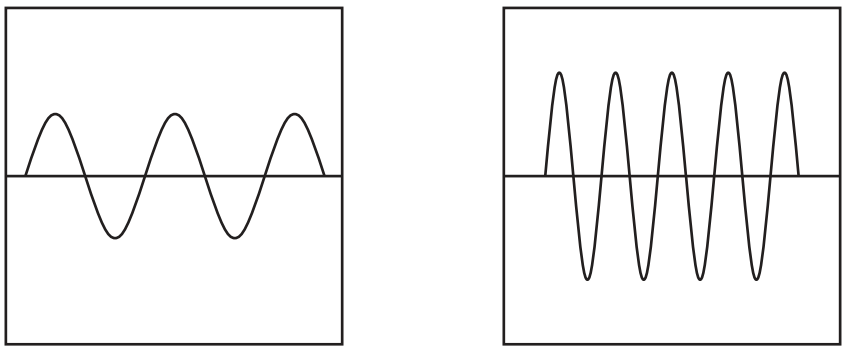
.....

..... [2]

(c) A student listens to two different sounds, P and Q.

The two different sounds are represented on a computer screen on the same scale.

Fig. 8.1 shows the screens.



sound P sound Q

Fig. 8.1

State and explain how sound P is different from sound Q.

.....

.....

.....

..... [3]

[Total: 6]

9 A student fits an electrical generator to a bicycle. When the front wheel turns, a magnet rotates between two coils of wire.

A lamp is connected to the coils of wire. When the magnet is rotating, the lamp is lit.

Fig. 9.1 shows the magnet, the coils of wire and the lamp.

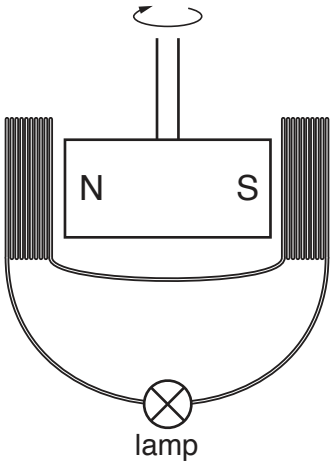


Fig. 9.1

(a) Describe and explain how rotating the magnet causes the lamp to light.

.....

.....

.....

..... [3]

(b) State three ways of increasing the brightness of the bicycle lamp.

1. .....

2. .....

3. ..... [3]

(c) The generator provides an a.c. supply for the lamp.

(i) State the meaning of the term *a.c.*

..... [1]

(ii) Describe how a.c. differs from d.c.

.....

..... [1]

[Total: 8]

10 Fig. 10.1 shows a circuit used by a student to test a metal wire made of nichrome.

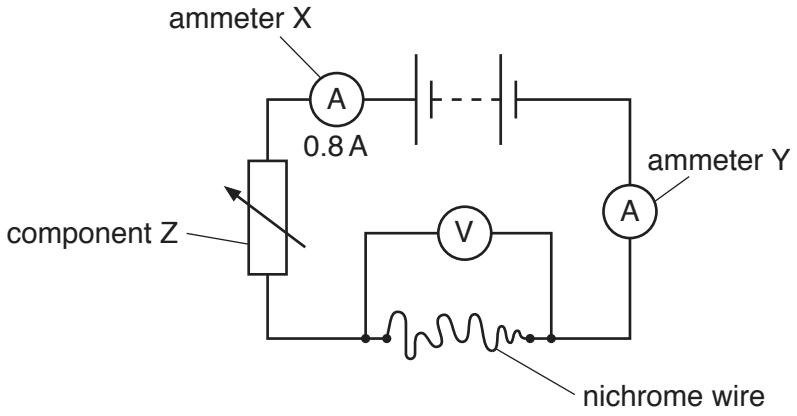


Fig. 10.1

(a) State the name of component Z.

..... [1]

(b) The current reading on ammeter X is 0.8 A. State the reading on ammeter Y.

..... [1]

(c) The current in the nichrome wire is 0.8 A. The potential difference (p.d.) across the nichrome wire is 4.5 V.

Calculate the resistance of the nichrome wire.

resistance = ... Ω [3]

(d) The student tests a different nichrome wire, which is thicker than the wire in **(c)**, but of the same length. When testing this wire, the current in the wire is different from the value given in **(c)**.

State and explain the difference in current.

.....

.....

..... [2]

[Total: 7]

11 (a) A long straight wire passes through a piece of card. There is a current in the wire, as shown in Fig. 11.1.

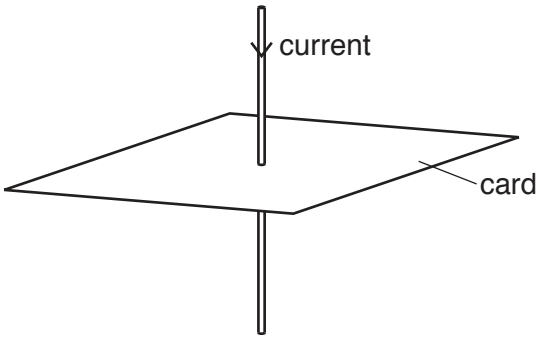


Fig. 11.1

Fig. 11.2 shows the view of the card from above. The current is into the page.

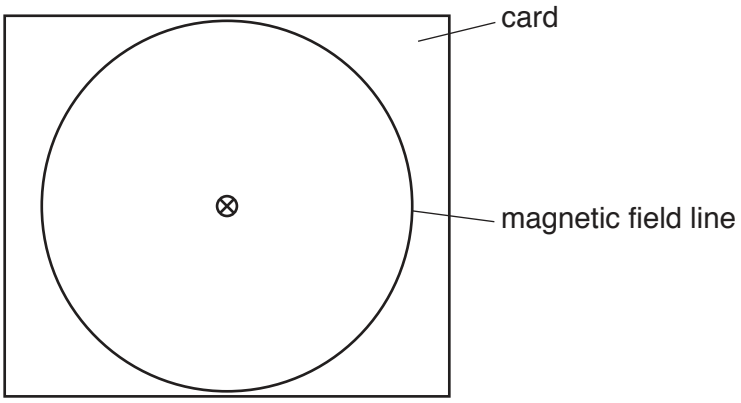


Fig. 11.2

The current in the wire produces a magnetic field around the wire. One magnetic field line is drawn.

On Fig. 11.2, draw **two** more magnetic field lines around the wire. Show the direction of the magnetic field by drawing an arrow on each field line. [2]

(b) Fig. 11.3 shows the circuit for an electric bell.

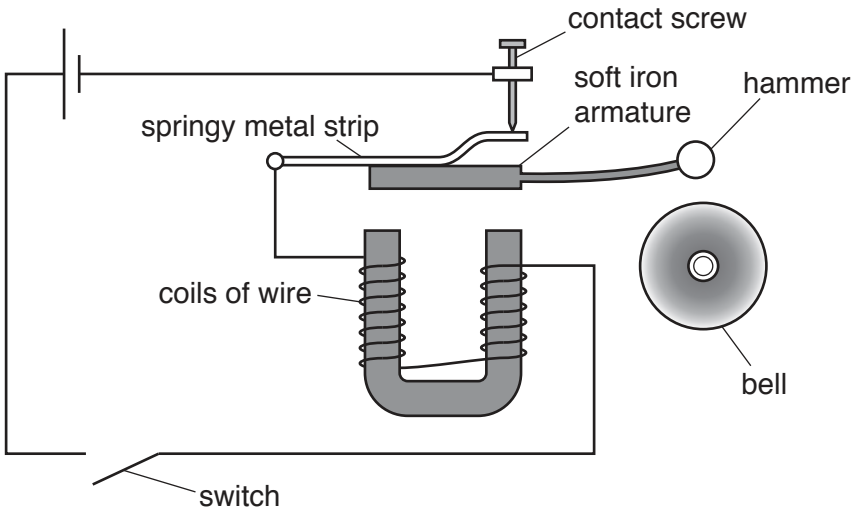


Fig. 11.3

Explain how the circuit causes the hammer to hit the bell repeatedly when the switch is closed.

Use your ideas about circuits and electromagnets.

.....

.....

.....

.....

.....

.....

..... [5]

[Total: 7]

12 **(a)** Draw a line from each part of the atom to its description.

part of the atom	description
nucleus	is an electromagnetic wave
electron	is the centre of the atom
neutron	has no electric charge
	orbits the centre of an atom

[3]

(b) Tritium is an isotope of hydrogen. It can be represented by $^{3}_{1}H$.

(i) Explain the meaning of the term *isotope*.

.....

.....

..... [2]

(ii) Fig. 12.1 shows how the activity of a sample of tritium varies with time.

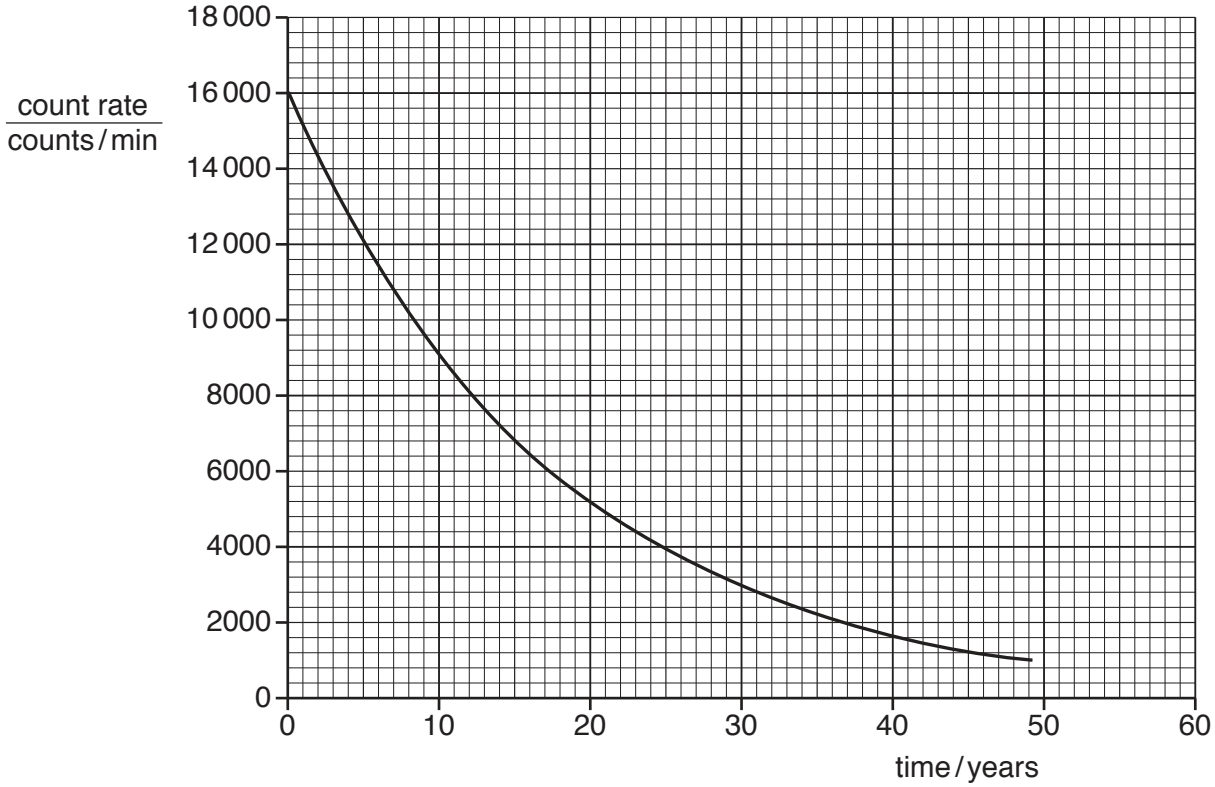


Fig. 12.1

Use Fig. 12.1 to calculate the half-life of tritium. Show clearly how you used the graph.

half-life = ... years [3]

[Total: 8]