

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
GATEWAY SCIENCE  
PHYSICS B**

**B652/01**

Unit 2 Modules P4 P5 P6  
(Foundation Tier)

**Tuesday 27 January 2009  
Afternoon**

**Duration: 1 hour**

Candidates answer on the question paper  
A calculator may be used for this paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**

- Pencil
- Ruler (cm/mm)



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- A list of physics equations is printed on page two.
- The total number of marks for this paper is **60**.
- This document consists of **20** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Section	Max.	Mark
A	20	
B	20	
C	20	
<b>TOTAL</b>	<b>60</b>	

## 2

### EQUATIONS

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

$$v = u + at$$

$$s = \frac{(u + v)}{2} t$$

$$\text{momentum} = \text{mass} \times \text{velocity}$$

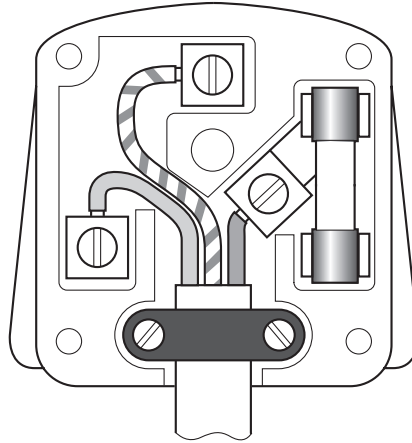
$$\frac{V_p}{V_s} = \frac{N_p}{N_s}$$

Answer **all** the questions.

**Section A – Module P4**

1 This question is about electricity.

(a) Look at the diagram of a plug.



(i) Which wire should be coloured **blue**?

Choose from: **earth** **live** **neutral**

answer ..... [1]

(ii) Which wire should be coloured green and yellow?

Choose from: **earth** **live** **neutral**

answer ..... [1]

(b) Sally's electric hairdryer is double insulated.

It has only two wires.

Which two wires are connected to the hairdryer?

Choose from the list.

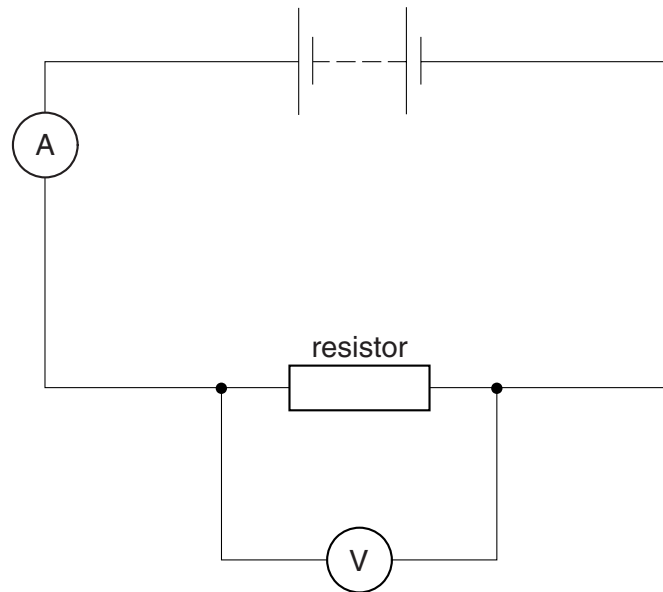
**live and earth**

**neutral and earth**

**live and neutral**

answer ..... [1]

(c) Phil makes the following circuit.



An electric current flows through the resistor.

The voltmeter reading is 10V.

The ammeter reading is 3 A.

Calculate the **resistance** of the resistor.

The equations on page 2 may help you.

.....

.....

.....

answer ..... ohms

[2]

[Total: 5]

2 (a) There are **two** types of wave.

Light is an example of a **transverse** wave.

Complete the sentence about ultrasound.

Ultrasound is an example of a ..... wave. [1]

(b) Ultrasound is used in medicine.

Write down two different uses of ultrasound in medicine.

1 .....

2 ..... [2]

[Total: 3]

3 This question is about nuclear radiation.

(a) There is radiation in the environment.

This radiation is around us all the time.

Complete the sentence.

The radiation around us all the time is called ..... radiation. [1]

(b) There are three types of radiation.

These are alpha, beta and gamma radiation.

Which type of radiation is used in smoke detectors?

Choose from:     **alpha**     **beta**     **gamma**

answer ..... [1]

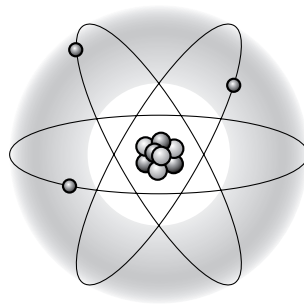
(c) Tom experiments with radioactive sources.

He checks the radioactivity of a source every year.

What will happen to the radioactivity of the source after a few years?

..... [1]

(d) Radiation comes from the centre of an atom.



What do we call the centre of an atom?

..... [1]

(e) Scientists can make substances radioactive.

Where do they put substances to make them radioactive?

..... [1]

[Total: 5]

4 Gamma radiation and X-rays are used in hospitals.

(a) What do we call the person in a hospital who takes X-ray photographs and uses gamma radiation?

..... [1]

(b) The person using X-rays and gamma radiation has to wear protective clothing.

The X-rays and gamma radiation can be dangerous.

How are these dangerous to humans?

.....

..... [1]

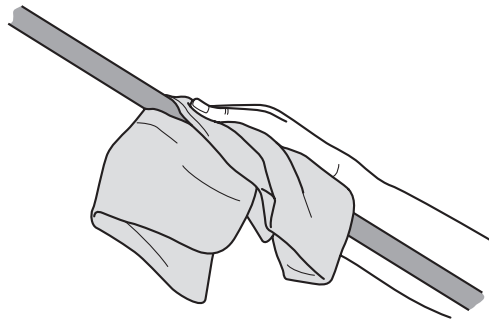
(c) Gamma rays can be used to treat cancer patients in hospital.

Write down one **other** use of gamma rays in hospitals.

..... [1]

[Total: 3]

- 5 (a) Nita rubs a rod with a duster.



The rod is made from an insulating material.

The rod becomes charged with a negative charge.

Which statement, **A**, **B**, **C** or **D**, is true?

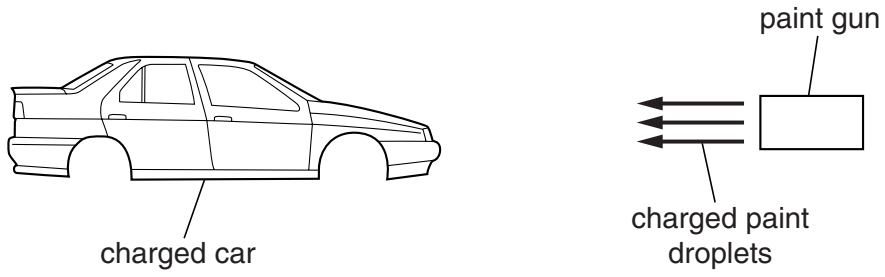
- A** The rod has **gained neutrons** from the cloth.
- B** The rod has **gained electrons** from the cloth.
- C** The rod has **gained protons** from the cloth.
- D** The rod has **lost electrons** to the cloth.

answer .....

[1]



(b) Oliver uses electrostatics to help him spray paint a car.



Describe how electrostatics help him spray paint the car.

In your answer write about

- electrostatic charges
- the paint droplets
- the reasons for using electrostatics in paint spraying.

.....

.....

.....

.....

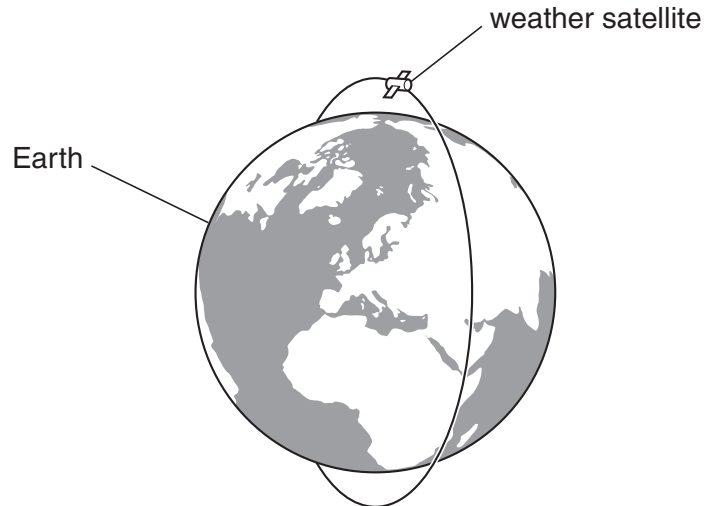
..... [3]

[Total: 4]

## Section B – Module P5

6 This question is about satellites.

Look at the diagram.



A weather satellite is used for weather forecasting.

It is an example of an **artificial** satellite.

Complete these sentences about satellites.

Choose from the list.

**height**

**Moon**

**military**

**placed**

**planet Mars**

**naturally**

**strength**

The ..... is a natural satellite of the Earth.

Artificial satellites are ..... in orbit.

An example of this is for ..... use.

The ..... of the orbit determines the use of the artificial satellite. [3]

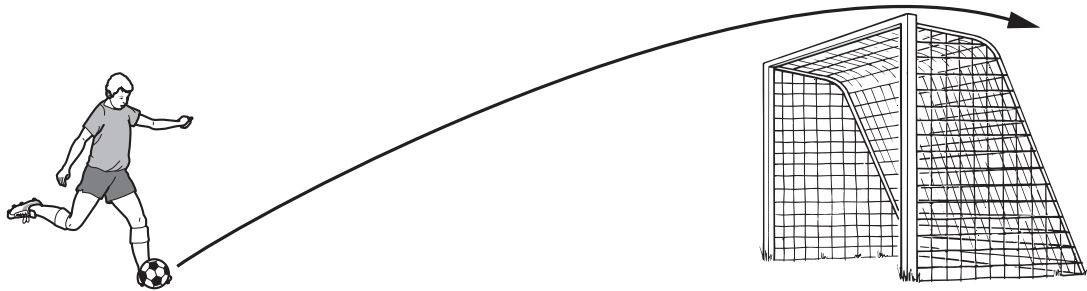
[Total: 3]



8 (a) James kicks the football in the air.

It travels in a curve.

Look at the diagram.



This is an example of a **projectile**.

Give two **other** examples of projectiles in **sport**.

- 1 .....
- 2 ..... [2]

(b) Complete this sentence about James kicking the football.

His foot **strikes** the football.

This is an example of a ..... between two objects. [1]

(c) James kicks the football. It travels at a velocity of 20 metres per second.

The mass of the football is 0.5 kilograms.

Calculate the **momentum** of the football.

The equations on page 2 may help you.

.....  
.....  
.....

answer ..... kg m/s [2]

[Total: 5]

9 This question is about waves.

Look at the sentences about waves.

Put a tick (✓) in the box beside the sentence if the statement is **true**.

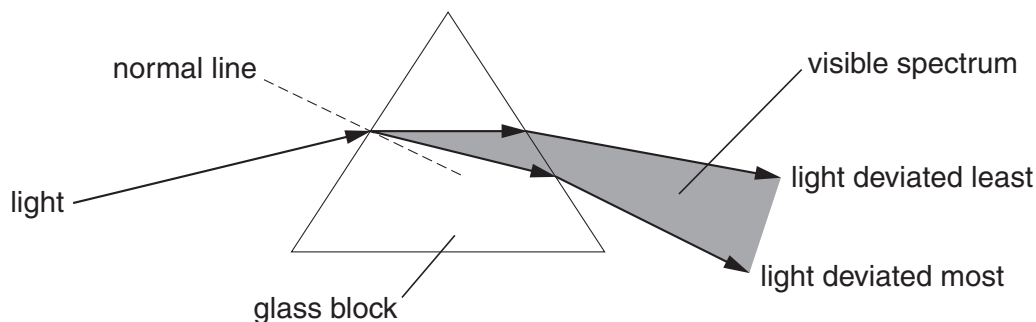
Put a cross (X) in the box beside the sentence if the sentence is **false**.

	✓ or X
Light travels in straight lines.	<input type="checkbox"/>
Interference of light produces loud and quiet areas.	<input type="checkbox"/>
An aerial is used to pick up radio signals.	<input type="checkbox"/>
A dish is needed to pick up satellite TV signals.	<input type="checkbox"/>

[2]

[Total: 2]

10 This question is about deviation of light.



(a) When the light hits the glass block the light is deviated.

The light is split up into the colours of the visible spectrum.

(i) What name is given to the deviation of the light?

..... [1]

(ii) Which colour changes direction (is deviated) the most?

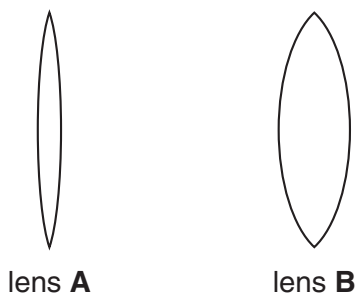
..... [1]

(iii) What do we call substances, like glass, that light can travel through?

..... [1]

(b) Lenses can be made from the same type of glass as the glass block.

The lenses below are **convex** lenses.



lens A

lens B

Complete these sentences.

(i) Convex lenses are **also** known as ..... lenses. [1]

(ii) Lens B has a shorter .....length than lens A. [1]

[Total: 5]

Section C – Module P6

11 Sally does some experiments with electricity.

(a) Look at the list of electrical components she uses.

capacitor

diode

generator

LDR

thermistor

transformer

variable resistor

Answer the questions.

Choose your answers from the list.

(i) Which component allows current to pass in **one direction** only?

..... [1]

(ii) Which component changes resistance when the **light level** changes?

..... [1]

(iii) Which component changes resistance when the **temperature** changes?

..... [1]

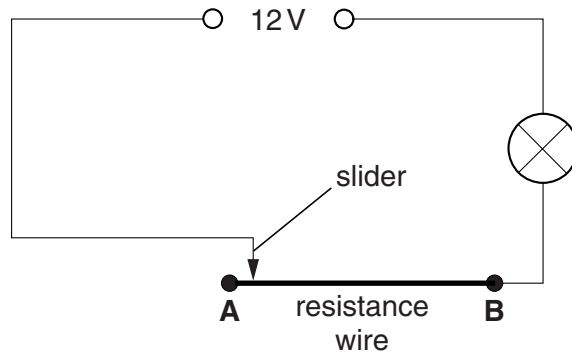
(iv) Which component can step-up or step-down **voltages**?

..... [1]

(v) Which component can **store charge** and discharge it later?

..... [1]

(b) Look at the diagram. The resistance wire is used to control the bulb.



Sally puts the slider at position **A**. The bulb lights up.

She moves the slider from position **A** to position **B**.

(i) What happens to the length of resistance wire **in the circuit**?

..... [1]

(ii) What happens to the **resistance** of the circuit?

..... [1]

(iii) What happens to the **brightness** of the bulb?

..... [1]

[Total: 8]

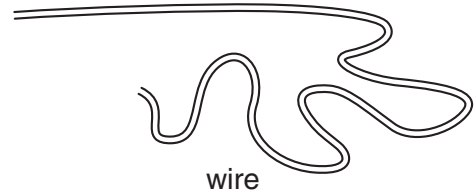
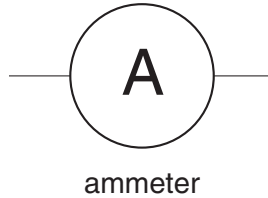
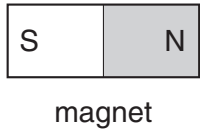


12 This question is about generating electricity.

(a) Dave has some scientific equipment.

He wants to generate electricity.

Look at the equipment.



Explain how he can use this equipment to generate electricity.

You may draw a diagram as part of your answer.

.....

.....

..... [2]

(b) Electricity is generated in power stations.

It is sent to homes through cables and transformers in the National Grid.

(i) What is the **frequency** of this electricity in the UK?

..... Hz [1]

(ii) Why is DC electricity **not** used with transformers?

..... [1]

[Total: 4]

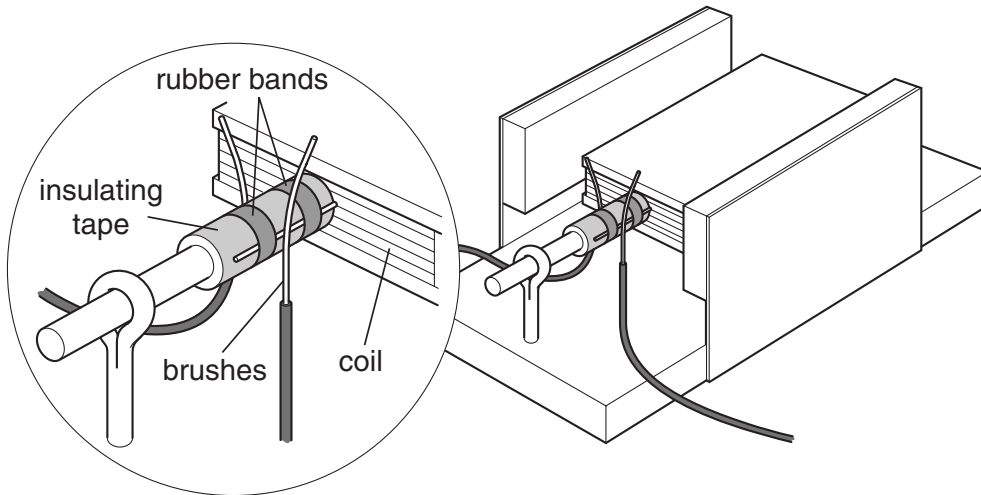
13 Declan has electrical appliances in his kitchen.

Some electrical appliances contain an electric motor.

(a) Name one kitchen appliance that contains an electric motor.

..... [1]

(b) Look at the diagram of an electric motor.



Declan connects the motor to the power supply. It spins round.

(i) Declan passes **more current** through the motor.

What happens to the motor?

..... [1]

(ii) He puts **stronger magnets** in the motor.

What happens to the motor?

..... [1]

(iii) Declan now uses a coil with **fewer turns**.

What happens to the motor?

..... [1]

(iv) He changes the direction of the **current**.

What happens to the motor?

..... [1]

[Total: 5]

14 Gates are used to control electronic devices.

(a) The input to a NOT gate is either 0 or 1.

(i) Complete the table for a **NOT** gate.

For each box use either 0 or 1.

input	output
0	
1	

[1]

(ii) What is meant by 0 and 1?

0 means .....

1 means ..... [1]

(b) The output from the NOT gate is too **small** to light a 12V bulb.

What else can we use to help the NOT gate control a bulb?

..... [1]

[Total: 3]

**END OF QUESTION PAPER**

**PLEASE DO NOT WRITE ON THIS PAGE**