Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

For Examiner's Use

General Certificate of Secondary Education
June 2007

SCIENCE B **PHY1F**
Unit Physics P1

F

PHYSICS
Unit Physics P1

Foundation Tier

Monday 25 June 2007 9.00 am to 9.45 am

For this paper you must have:
- a ruler.

You may use a calculator.

Time allowed: 45 minutes

Instructions
- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

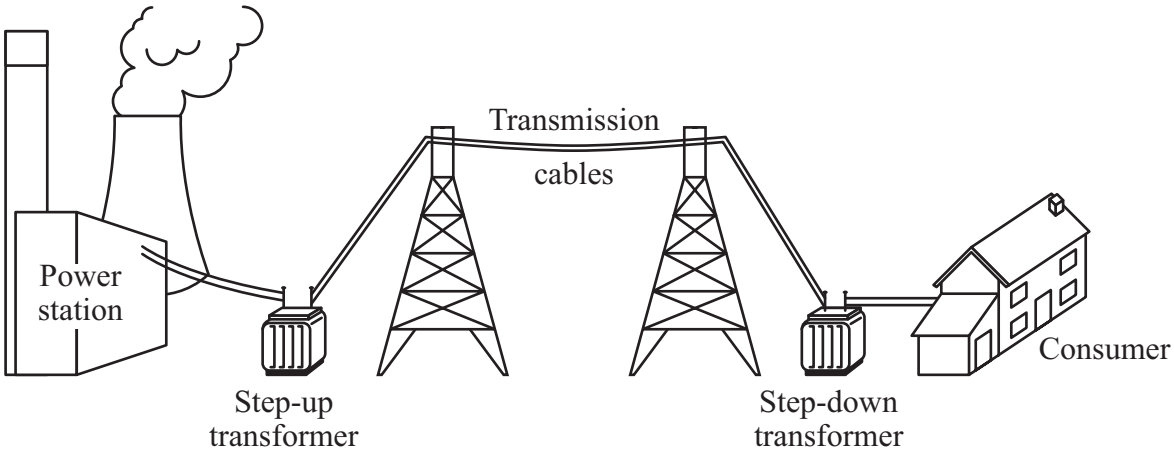
Information
- The maximum mark for this paper is 45.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice
- In all calculations show clearly how you work out your answer.

For Examiner's Use			
Question	Mark	Question	Mark
1		6	
2		7	
3			
4			
5			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

Answer **all** questions in the spaces provided.

1 The diagram shows how electricity gets from power stations to consumers.



(a) Complete the following sentences by drawing a ring around the correct line in each box.

(i) The network of cables and transformers linking power stations to consumers is called the national [grid / line / network] .

(1 mark)

(ii) A step-up transformer [decreases voltage / increases current / increases voltage] .

(1 mark)

(iii) Electricity is supplied to consumers' homes at [230 V / 25 000 V / 400 000 V] .

(1 mark)

(iv) Making the current in the cables smaller will [increase / make no difference to / reduce] the energy lost in the cables.

(1 mark)

(b) Transformers always waste some energy.

(i) What effect does the waste energy from a transformer have on the air around the transformer?

.....

(1 mark)

(ii) Which **one** of the following describes the efficiency of a transformer?

Draw a ring around your answer.

always 100 % **less than 100 %** **more than 100 %**

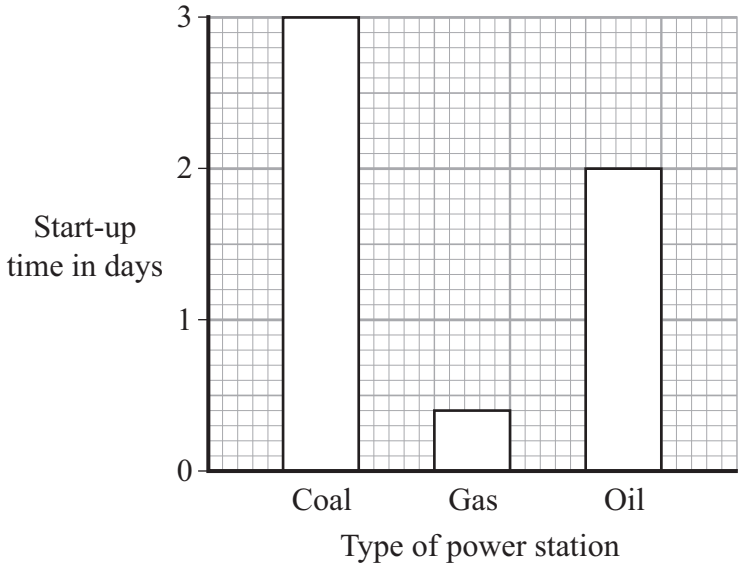
(1 mark)

6

Turn over for the next question

2 Much of the world's electricity is generated in power stations that burn fossil fuels.

(a) The bar chart shows the start-up times for the three types of fossil fuel power station.



Which of these power stations would take the longest to start generating electricity?

.....

(1 mark)

(b) Which **two** of the following statements are good reasons for using fossil fuels to generate electricity?

Put a tick (✓) in the box next to each of your choices.

Supplies of fossil fuels are limited. ☐

Fossil fuels can be used to generate electricity at any time. ☐

Fossil fuels are non-renewable. ☐

A few large power stations can generate the electricity for a million homes. ☐

Burning fossil fuels produces carbon dioxide. ☐

(2 marks)

(c) Electricity can be generated using energy from the wind.

(i) Why does a wind-powered generator **not** produce carbon dioxide?

.....

.....

(1 mark)

(ii) Which form of energy is transferred from the wind to generate electricity?

Draw a ring around your answer.

heat **kinetic** **light** **sound**

(1 mark)

(iii) Many people say that wind-powered generators are a good idea because:

"**when the wind blows they generate electricity"**
"they produce no pollution"
"they generate electricity cheaply"

But not everyone wants more wind-powered generators to be built.

What reasons may be given by the people who think that wind-powered generators are **not** a good idea?

.....

.....

.....

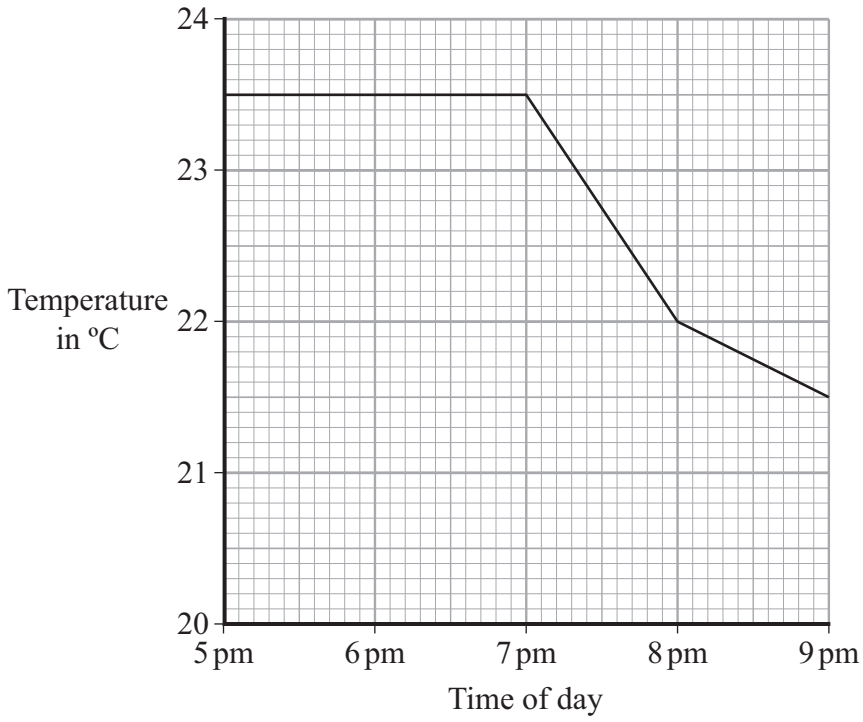
.....

(2 marks)

7

Turn over ▶

3 (a) The graph shows the temperature inside a flat between 5 pm and 9 pm.
The central heating was on at 5 pm.



(i) What time did the central heating switch off?

.....

(1 mark)

(ii) Closing the curtains reduces heat loss from the flat.

What time do you think the curtains were closed?

.....

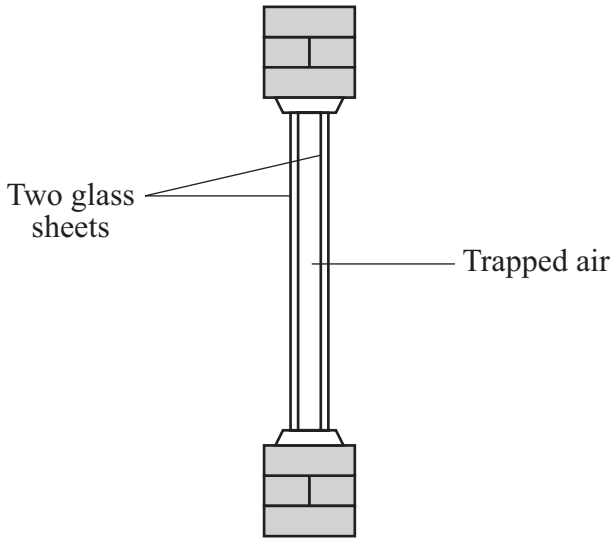
Give a reason for your answer.

.....

.....

(2 marks)

(b) Less heat is lost through double-glazed windows than through single-glazed windows.



A double-glazed window

Complete the following sentences by choosing the correct words from the box.
Each word may be used once or not at all.

conduction	**conductor**	**convection**	**evaporation**	**insulator**	**radiation**

Air is a good ..... . When trapped between two sheets of glass it reduces heat loss by ..... and ..... .

(3 marks)

(c) The table gives information about three types of house insulation.

Type of insulation	**Cost to install**	**Money saved each year on heating bills**	**Payback time**
Double glazing	£4000	£200	20 years
Loft insulation	£300	£100	3 years
Cavity wall insulation	£600	£150	

(i) Use the information in the table to calculate the payback time for cavity wall insulation.

.....

(1 mark)

Question 3 continues on the next page

(ii) Explain why people often install loft insulation before installing double glazing or cavity wall insulation.

.....

.....

.....

.....

(2 marks)

9

4 (a) Ultraviolet and visible light are both electromagnetic waves.

(i) Name **one** other type of electromagnetic wave.

.....

(1 mark)

(ii) Which **one** of the following statements is true for electromagnetic waves travelling through a vacuum?

Put a tick (✓) in the box next to your answer.

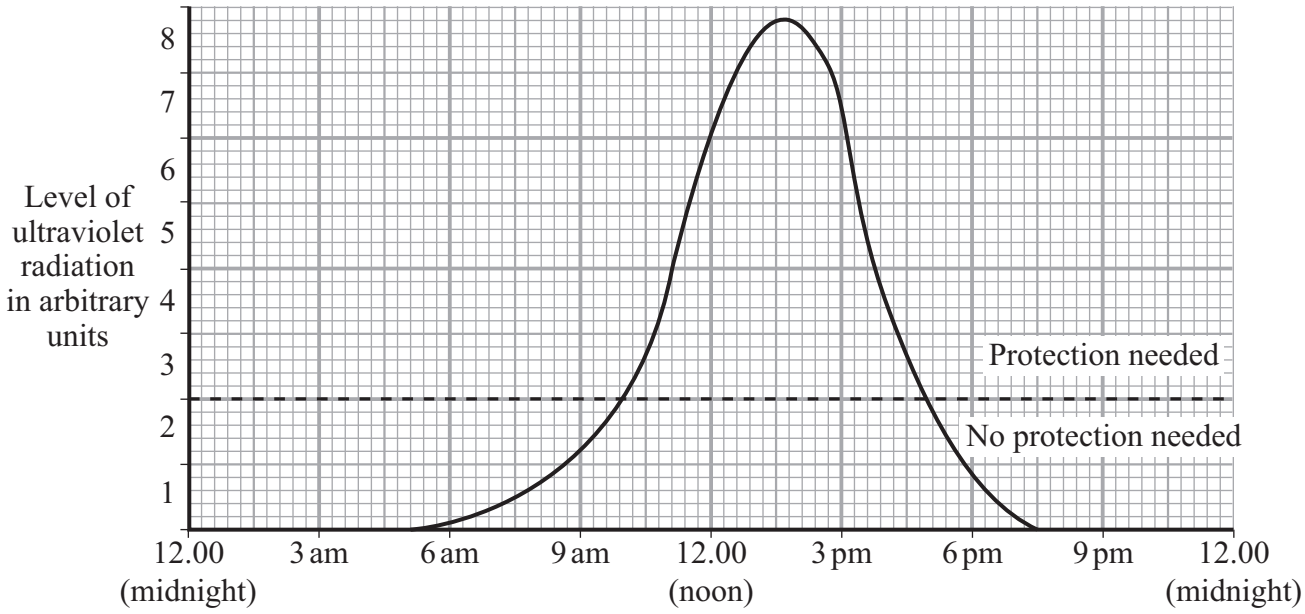
All the waves have the same frequency. ☐

All the waves have the same wavelength. ☐

All the waves travel at the same speed. ☐

(1mark)

(b) The graph shows how the level of ultraviolet radiation changed during a summer day in England.



(i) What serious health problem can be caused by exposure to the ultraviolet radiation from the Sun?

.....

(1 mark)

(ii) Explain why it would be sensible to stay out of the Sun between 10 am and 4 pm in the summer.

.....

.....

.....

.....

(2 marks)

5

Turn over for the next question

5 (a) Scientists have a theory that the universe began with a massive explosion.

What do you think scientists would do if new evidence were found that did not support this theory?

Put a tick (✓) in the box next to your answer.

A – ignore the evidence ☐

B – change the theory straight away ☐

C – check the evidence to make sure it is reliable ☐

(1 mark)

(b) Scientists look at the Universe using telescopes on Earth and in space.

(i) Give **one** advantage of having the telescope on Earth.

.....

.....

(1 mark)

(ii) Give **one** advantage of having the telescope in space.

.....

.....

(1 mark)

3

6 Some types of food are treated with *gamma* radiation. Low doses of radiation slow down the ripening of fresh fruit and vegetables while higher doses of radiation kill the bacteria that make the food go off.

(a) (i) What is *gamma* radiation?

.....

(1 mark)

(ii) Food packed in crates or boxes can be treated using this method.

Why must a source that emits *gamma* radiation be used?

.....

.....

(1 mark)

(iii) A suitable source of gamma radiation is the isotope caesium 137.

Complete the following sentence by choosing the correct word from the box.

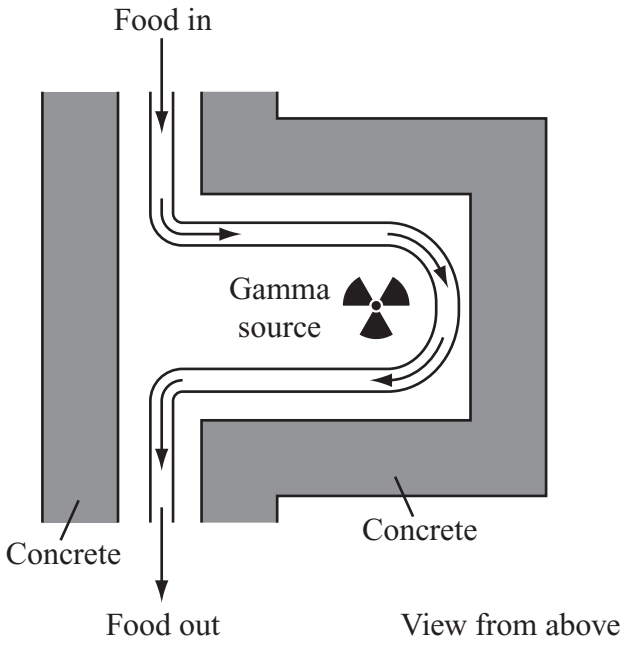
electrons	**neutrons**	**protons**

An atom of caesium 137 has two more ..... than an atom of caesium 135.

(1 mark)

Question 6 continues on the next page

(b) The diagram shows how a conveyor belt can be used to move food past the radioactive source.



(i) How do the concrete walls reduce the radiation hazard to workers outside the food treatment area?

.....

.....

(1 mark)

(ii) Suggest **one** way that the dose of radiation received by the food could be increased other than by changing the radioactive source.

.....

.....

(1 mark)

(c) Some people may not like the idea of eating food treated with radiation.

(i) What evidence could a food scientist produce to show that food treated with radiation is safe to eat?

.....

.....

.....

.....

(2 marks)

(ii) The diagram shows the sign displayed on food treated with radiation.

Why is it important for people to know which foods have been treated with radiation?

.....

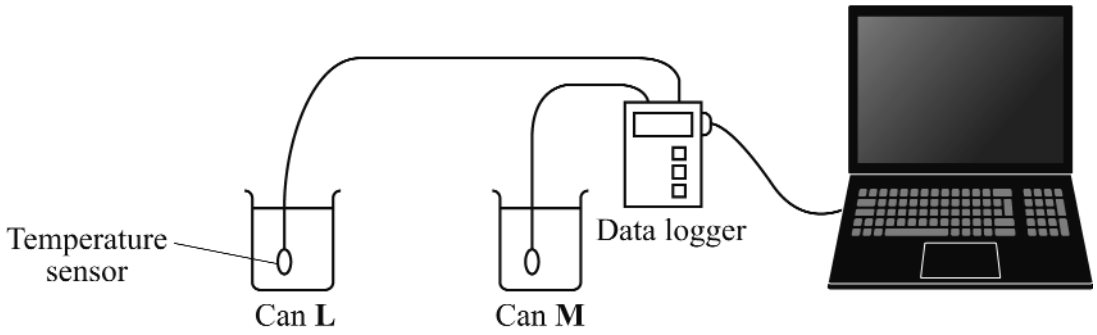
.....

(1 mark)

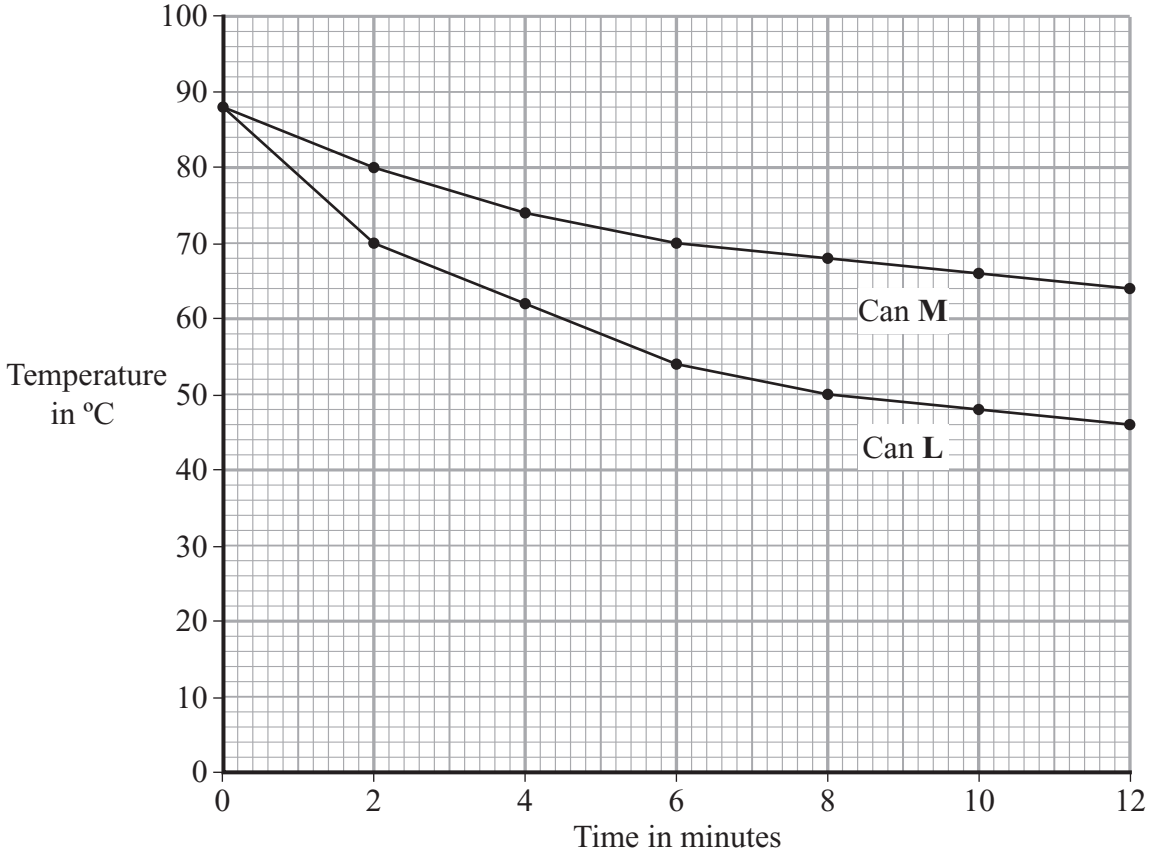
8

Turn over for the next question

7 A student was asked to investigate the heat loss from two metal cans, **L** and **M**. The cans were identical except for the outside colour.



The student filled the two cans with equal volumes of hot water. He then placed the temperature sensors in the water and started the data logger. The computer used the data to draw the graph below.



(a) Which **one** of the following is a categoric variable?

Put a tick (✓) in the box next to your answer.

the outside colour of the cans ☐

the starting temperature of the hot water ☐

the time ☐

the volume of hot water ☐

(1 mark)

(b) For can **L**, state the temperature drop of the water:

(i) in the **first** two-minute interval

.....

(1 mark)

(ii) in the **second** two-minute interval.

.....

(1 mark)

(c) In both cans the water cooled faster at the start of the investigation than at the end of the investigation. Why?

.....

.....

(1 mark)

(d) One can was black on the outside and the other can was white on the outside.

What colour was can **L**? .....

Explain the reason for your answer.

.....

.....

.....

(3 marks)

7

END OF QUESTIONS

There are no questions printed on this page