AQA

General Certificate of Secondary Education
Higher Tier
January 2013

Science A
Unit Physics P1

PH1HP

H

Physics
Unit Physics P1

Thursday 17 January 2013   1.30 pm to 2.30 pm

For this paper you must have:
- a ruler
- a calculator
- the Physics Equations Sheet (enclosed).

Time allowed
- 1 hour

Instructions
- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.
- Question 3(b) should be answered in continuous prose. In this question you will be marked on your ability to:
  – use good English
  – organise information clearly
  – use specialist vocabulary where appropriate.

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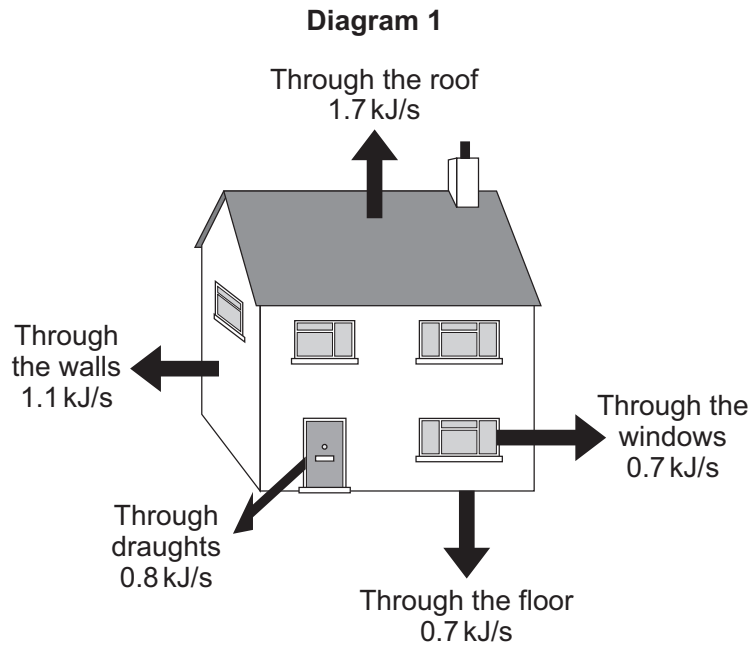- In all calculations, show clearly how you work out your answer.

PH1HP

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

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1   **Diagram 1** shows the energy transferred per second from a badly insulated house on a cold day in winter.

Diagram 1

Through the roof
1.7 kJ/s

Through
the walls
1.1 kJ/s

Through the
windows
0.7 kJ/s

Through
draughts
0.8 kJ/s

Through the floor
0.7 kJ/s

1 (a) (i)   When the inside of the house is at a constant temperature, the energy transferred from the heating system to the inside of the house equals the energy transferred from the house to the outside.

Calculate, in kilowatts, the power of the heating system used to keep the inside of the house in **Diagram 1** at a constant temperature.

1 kilowatt (kW) = 1 kilojoule per second (kJ/s)

....

Power of the heating system = ... kW

(1 mark)

Do not write outside the box

1 (a) (ii) In the winter, the heating system is switched on for a total of 7 hours each day.

Calculate, in kilowatt-hours, the energy transferred each day from the heating system to the inside of the house.

Use the correct equation from the Physics Equations Sheet.

....

....

Energy transferred each day = ... kWh

(2 marks)

1 (a) (iii) Energy costs 15p per kilowatt-hour.

Calculate the cost of heating the house for one day.

....

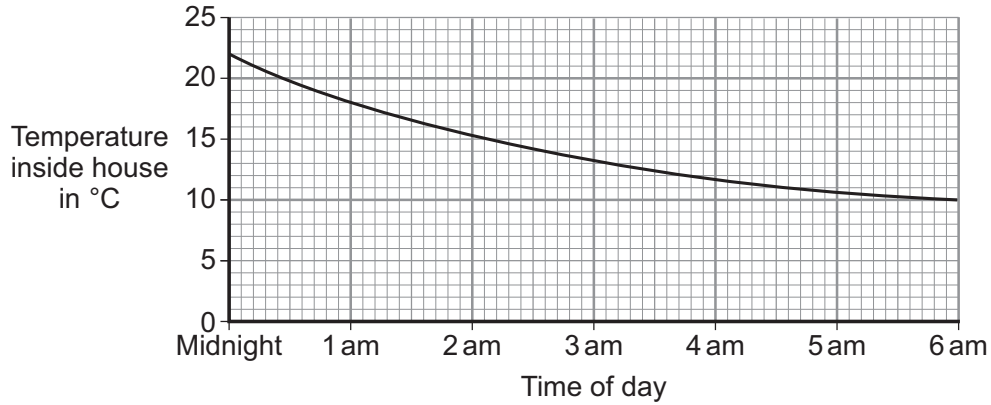Cost = ...

(1 mark)

Question 1 continues on the next page

Turn over ▶

1 (a) (iv) The heating system is switched off at midnight.

The graph shows how the temperature inside the house changes after the heating system has been switched off.

Draw a ring around the correct answer in the box to complete the sentence.

Between midnight and 6 am the rate of energy transfer from

the house

| decreases. |
| decreases then stays constant. |
| increases. |

Give the reason for your answer.

....

....

(2 marks)