Practice Question Set For GCSE
Subject : Physics
Paper-1 Topic: Energy (Standard Demand)

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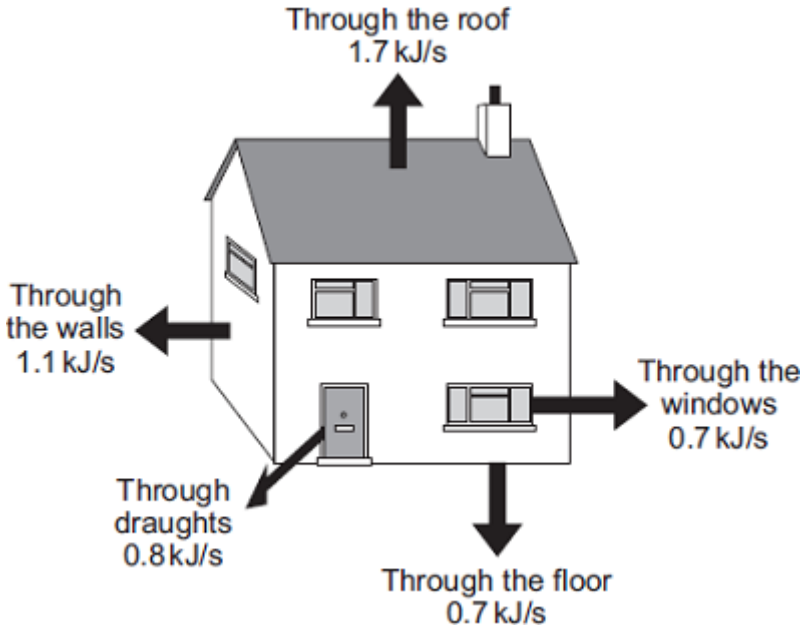
Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Q1.

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

Diagram 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)

(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.

_____

Energy transferred each day = _____ kWh

(2)

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

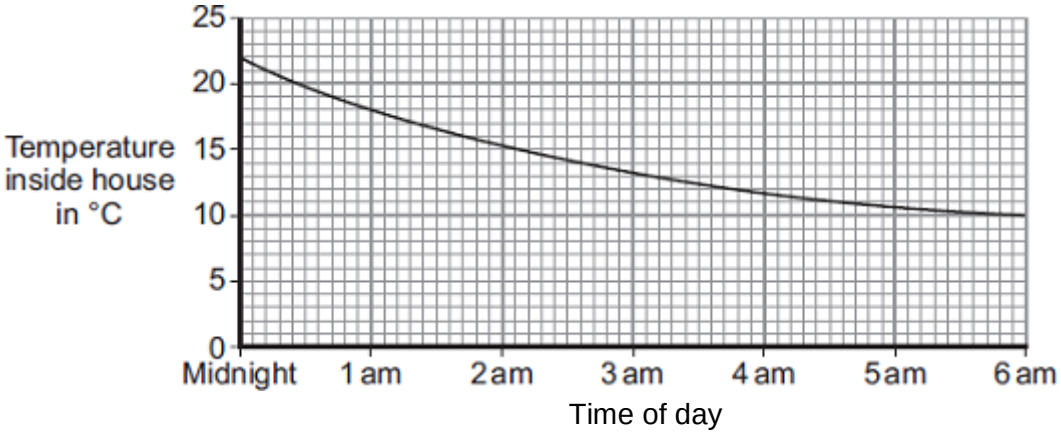
Calculate the cost of heating the house for one day.

Cost = _____

(1)

(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.

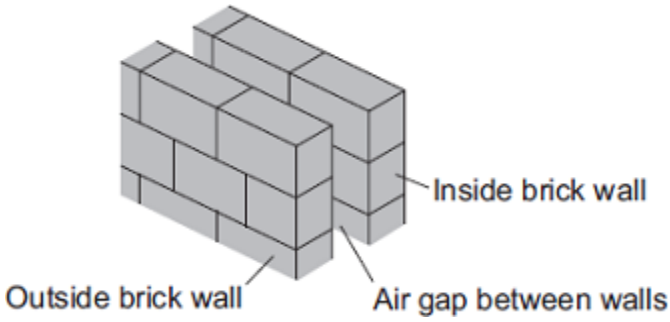
_____

_____

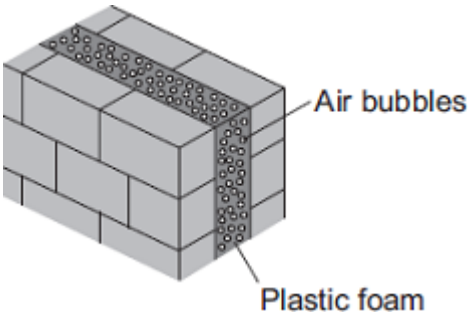
(2)

(b) **Diagram 2** shows how the walls of the house are constructed.
Diagram 3 shows how the insulation of the house could be improved by filling the air gap between the two brick walls with plastic foam.

Diagram 2 **Diagram 3**



U-value of the wall = 0.7



U-value of the wall = 0.3

The plastic foam reduces energy transfer by convection.

Explain why.

_____

_____

_____

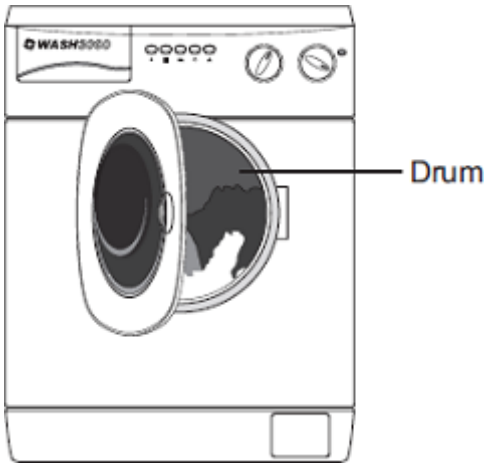
_____

(2)

(Total 8 marks)

Q2.

The picture shows a washing machine. When the door is closed and the machine switched on, an electric motor rotates the drum and washing.



(a) Complete the following sentences.

(i) An electric motor is designed to transform electrical energy into

_____ energy.

(1)

(ii) Some of the electrical energy supplied to the motor is wasted as

_____ energy and _____ energy.

(1)

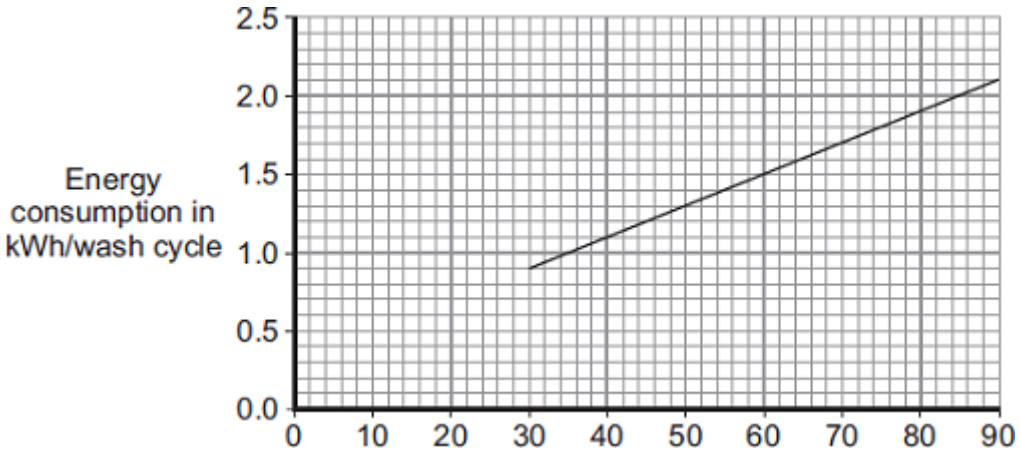
(b) What happens to the energy wasted by the electric motor?

_____

_____

(1)

(c) The graph shows that washing clothes at a lower temperature uses less energy than washing them at a higher temperature. Using less energy will save money.



(i) Electricity costs 15p per kilowatt-hour (kWh).

The temperature setting is turned down from 40 °C to 30 °C.

Use the graph and equation in the box to calculate the money saved each wash cycle.

total cost = number of kilowatt-hours x cost per kilowatt-hour

Show clearly how you work out your answer.

_____

_____

Money saved = _____

(2)

(ii) Reducing the amount of energy used by washing machines could reduce the amount of carbon dioxide emitted into the atmosphere.

Explain why.

_____

_____

_____

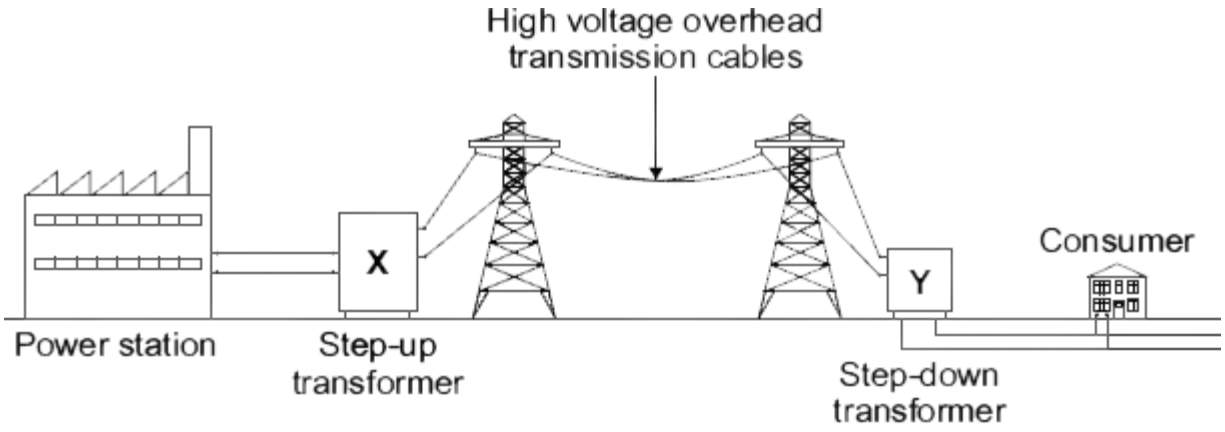
_____

(2)

(Total 7 marks)

Q3.

The diagram shows the National Grid system.



(a) The National Grid includes step-up transformers.

Explain why.

_____

_____

_____

_____

(2)

(b) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Over the next 10 years, more than 300 kilometres of new high voltage transmission cables are to be added to the National Grid. Most of the new cables will be suspended from pylons and run overhead while the rest will be buried underground.

Outline the advantages and disadvantages of both overhead transmission cables and underground transmission cables.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

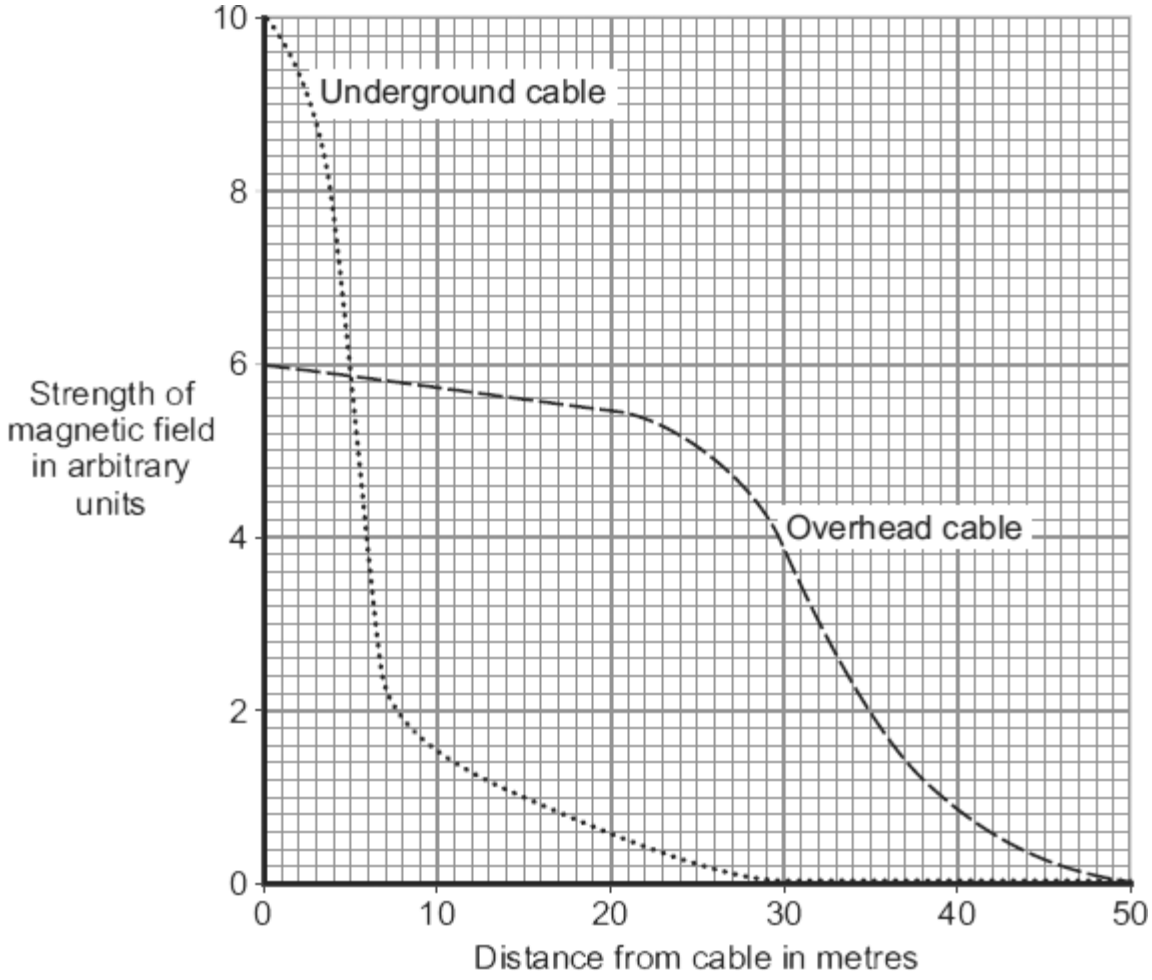
_____

_____

(6)

(c) When an electric current flows through a transmission cable, a magnetic field is produced.

The graph shows how the strength of the magnetic field varies with distance from both overhead and underground transmission cables that carry the same current.



What conclusions may be drawn from this graph?

_____

_____

_____

_____

(2)

(d) Some people think that, because of the magnetic fields, living close to transmission cables is dangerous to health. Laboratory studies on mice and rats exposed to magnetic fields for two or more years found that the magnetic fields had no effect on the animals' health.

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

economic

Using animals in scientific research raises | environmental / ethical | issues.

(1)

(Total 11 marks)