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

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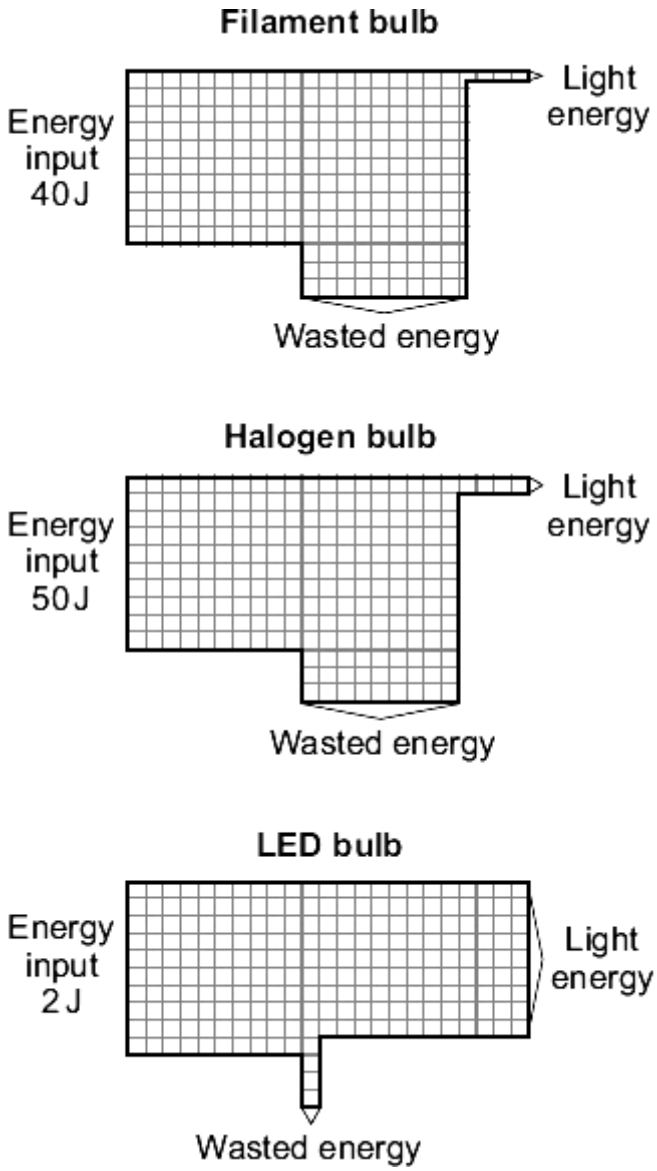
**Name of the Student**:_____
**Max. Marks : 21 Marks** **Time : 21 Minutes**

## Q1.

The Sankey diagrams show the energy transferred to the surroundings each second by three different bulbs.




(a) The filament bulb is the least efficient of the three bulbs.

Explain what *least efficient* means.

_____

_____

_____

_____

**(2)**

(b) Calculate the percentage efficiency of the halogen bulb.

Use the correct equation from the Physics Equations Sheet.

Show clearly how you work out your answer.

_____

_____

_____

_____

Efficiency = _____%

**(2)**

(c) What effect does the wasted energy from a bulb have on the surroundings?

_____

_____

**(1)**

(d) Use the Sankey diagrams to give a reason why the overall cost of using an LED bulb is the lowest of the three bulbs.

_____

_____

**(1)**

(e) The table gives further information about each type of bulb.

| Bulb | Cost to buy in £ | Average lifespan in hours |
|---|---|---|
| Filament | 0.50 | 1000 |
| Halogen | 2.00 | 2500 |
| LED | 15.00 | 25000 |

Use **only** the information in the table to answer the following questions.

(i) Which type of bulb is the most cost-effective?

Give a reason for your answer.

Bulb _____

Reason _____

_____

**(2)**

(ii) Sales of LED bulbs are increasing.

Suggest **one** reason why.

_____

_____

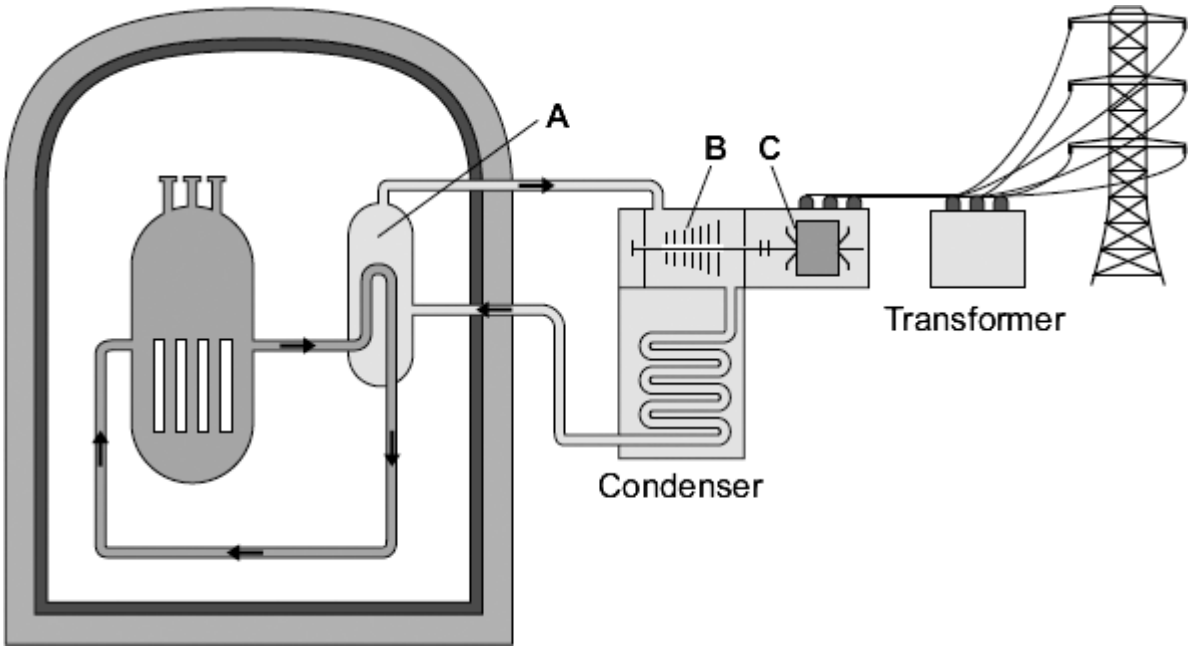
**(1)**

**(Total 9 marks)**

## Q2.

A nuclear power station generates electricity using nuclear fuel.

The diagram below shows a nuclear power station.




(a) The transformer changes the voltage of the electricity generated by the power station.

(i) What type of transformer is shown in the diagram?

_____

**(1)**

(ii) Changing the voltage increases the efficiency of the power transmission.

Explain how.

_____

_____

_____

_____

**(2)**

(b) A country generates 80% of its electricity using fossil fuel power stations.

The country's government is considering replacing all of its fossil fuel power stations with nuclear power stations.

Suggest **two** factors that the country's government will have to consider in making a decision.

_____

_____

_____

_____

**(2)**

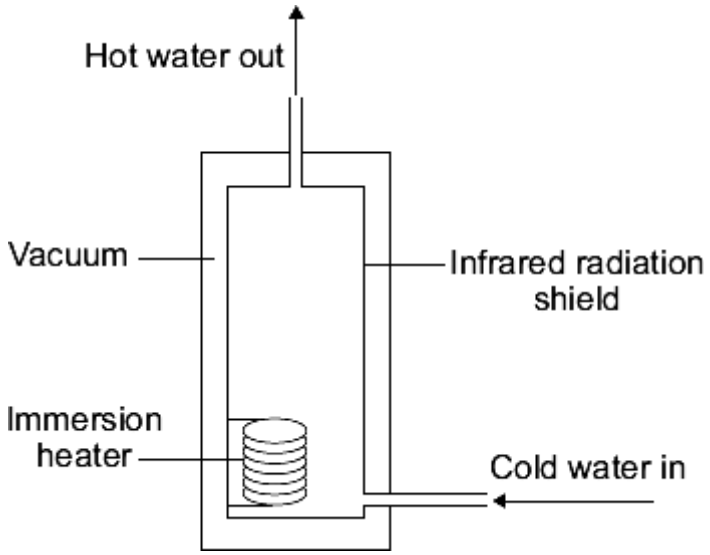
**(Total 5 marks)**

## Q3.

Modern kitchens can be fitted with a device that immediately supplies water at a temperature of 93 °C.

A tank that stores very hot water is fitted under the sink so that hot water is always available.

The infrared radiation shield and the vacuum reduce the energy transfer to the surroundings.




(a) The infrared radiation shield is made of shiny metal.

Why does the shiny metal reduce energy transfer?

_____

_____

**(1)**

(b) When the hot water tank is filled with water, the immersion heater can heat the water from a temperature of 15 °C to 93 °C in 10 minutes.
The energy transferred to the water is 982 800 joules.
The specific heat capacity of water is 4200 J/kg°C.

Calculate the mass of water needed to fill the hot water tank.

Use the correct equation from the Physics Equations Sheet.

Show clearly how you work out your answer.

_____

_____

_____

_____

Mass = _____ kg

**(3)**

(c) When hot water is **not** needed the immersion heater has a power input of 10 W.
The energy is used to maintain the 93 °C temperature in the hot water tank.

How much energy, in joules, does the immersion heater transfer in 30 minutes when the power input is 10 W?

Use the correct equation from the Physics Equations Sheet.

Show clearly how you work out your answer.

_____

_____

_____

Energy = _____ J

**(2)**

(d) The manufacturer of the device made the following claim:
'When people use conventional electric kettles, they always boil more water than they actually need. This system makes sure you only heat the water you need.'

Suggest **one** other advantage of using the device compared to using a conventional electric kettle.

_____

_____

**(1)**

**(Total 7 marks)**