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

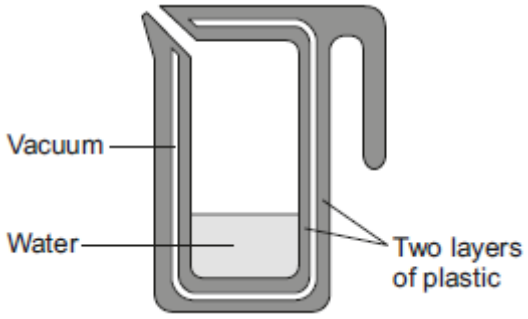
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Name of the Student:_____
Max. Marks : 24 Marks **Time : 24 Minutes**

Q1.

A new design for a kettle is made from two layers of plastic separated by a vacuum.
After the water in the kettle has boiled, the water stays hot for at least 2 hours.

The new kettle is shown below.



(a) The energy transferred from the water in the kettle to the surroundings in 2 hours is 46 200 J.

The mass of water in the kettle is 0.50 kg.

The specific heat capacity of water is 4200 J/kg °C.

The initial temperature of the water is 100 °C.

Calculate the temperature of the water in the kettle after 2 hours.

_____

_____

_____

_____

Temperature after 2 hours = _____ °C

(3)

(b) Calculate the average power output from the water in the kettle to the surroundings in 2 hours.

_____

_____

_____

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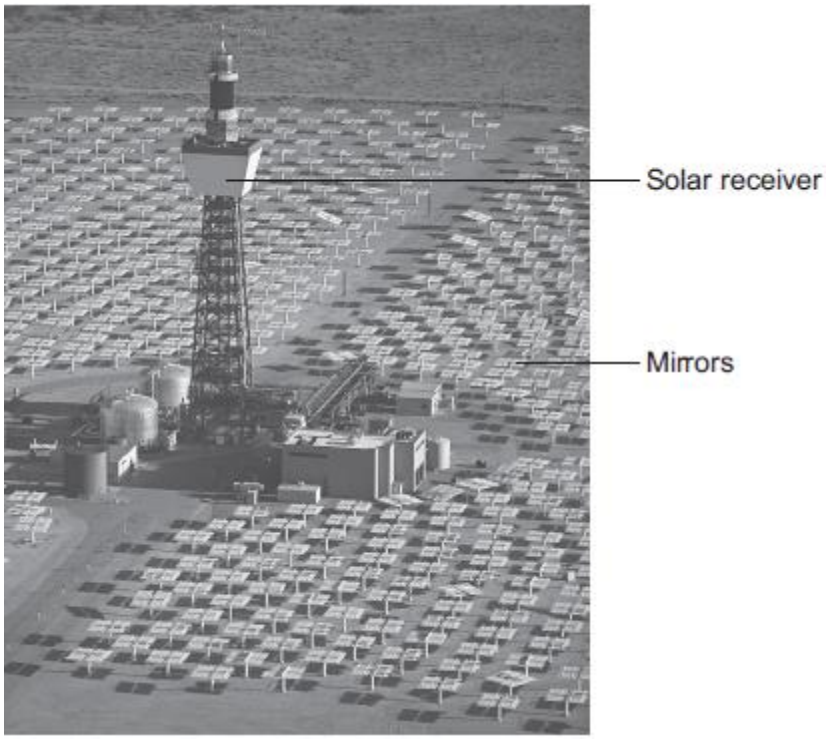
Average power output = _____ W

(2)

(Total 5 marks)

Q2.

The image shows a solar thermal power station.



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Energy from the Sun is directed at the solar receiver by many mirrors.

@

(a) (i) Suggest **one** reason why a solar thermal power station is built in a hot desert.

_____

_____

(1)

(ii) Complete the following sentence to describe how the mirrors direct energy from the Sun towards the solar receiver.

Energy from the Sun is _____ by the mirrors

towards the solar receiver.

(1)

(iii) Heated water is used to generate electricity in the solar thermal power station. Choose the correct answer from the box to complete each sentence.

boiler	**motor**	**transformer**	**turbine**

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At the solar receiver, water is heated in a _____

which turns the water into steam. The steam turns a

_____which is connected to a water into steam. The

steam turns a _____ which is connected to a generator.

The generator produces electricity. A _____ is used

to change the voltage for transmission along power lines.

(3)

(b) A solar storage power station is a new type of solar power station.
It is able to store energy from the Sun to generate electricity at night.

The solar storage power station can supply a town with a maximum electrical power of 140 000 kW for 15 hours.

Calculate the maximum energy, in kWh, stored by the solar storage power station.

_____

_____

_____

Energy = _____ kWh

(2)

(c) A different method of generating electricity uses wind turbines.
A student researching a wind farm wrote the following.

> Top Hill Wind Farm has 25 wind turbines.
> Last week, one of the wind turbines generated electricity for only 42 hours out of a possible 168 hours.
> My conclusion is that all wind turbines operate for only 25% of the time.

(i) Give **two** reasons why the student is **not** correct in reaching his conclusion.

1. _____

_____

2. _____

_____

(2)

(ii) Give **one** reason why wind turbines do not generate electricity all the time.

_____

_____

(1)

(iii) Give **one** advantage of using wind turbines to generate electricity compared with using

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fossil fuel power stations.

_____

_____

(1)

(Total 11 marks)

Q3.

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

A householder wants to reduce her energy bills. She collected information about a number of ways of reducing energy used. The information is shown in the table.

Ways of reducing energy used	Cost to buy and install in £	Money saved per year in £
Install an energy-efficient boiler	2 000	320
Insulate the loft	400	200
Install double-glazed windows	12 000	120
Install cavity wall insulation	415	145

Use the information in the table to compare the different ways of reducing the energy used. Your answer should include some calculations.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(6)

(b) Increasing the amount of insulation in a house affects the total U-value of the house.

(i) What is meant by the term ‘U-value’?

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_____

_____

_____

(1)

(ii) How is the U-value affected by increasing the amount of insulation?

_____

(1)

(Total 8 marks)

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