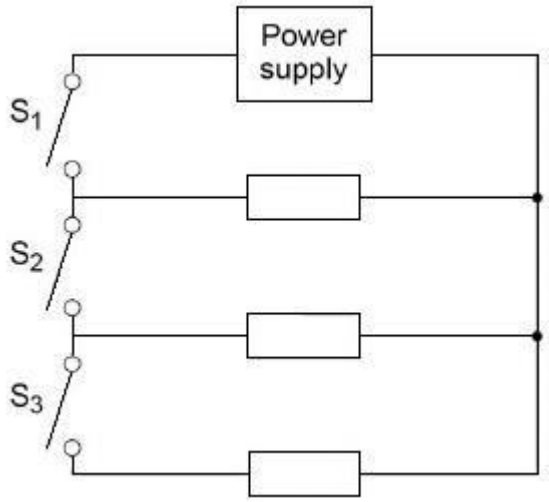
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

A hair dryer contains three heating elements.

The figure below shows the circuit diagram for the heating elements in the hair dryer.

In the figure the heating elements are represented by resistor symbols.



(a) Complete the sentence.

The three resistors in above diagram are connected in _____ with the power supply.

(1)

(b) Which switch must always be closed for the hair dryer to work?

Tick (✓) **one** box.

S_1 ☐

S_2 ☐

S_3 ☐

(1)

(c) Which switches must be closed for the hair dryer to work at maximum power output?

Tick (✓) **one** box.

S_1 and S_2 ☐

S_1 and S_3 ☐

S_1, S_2 and S_3 ☐

(1)

Use the Physics Equations Sheet to answer parts (d) and (e).

(d) Write down the equation which links energy transferred (*E*), power (*P*) and time (*t*).

_____

(1)

(e) The heating elements have a maximum power output of 1200 W.

The energy transferred to the heating elements to reach normal operating temperature is 3600 J.

Calculate the time taken for the heating elements to reach normal operating temperature at maximum power output.

_____

_____

_____

_____

_____

_____

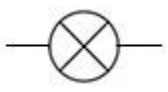
Time = _____s

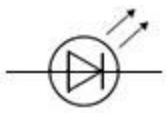
(3)

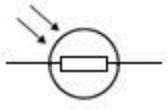
(f) The hair dryer has LEDs to indicate the power setting.

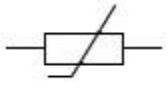
What is the circuit symbol for an LED?

Tick (✓) **one** box.

 ☐

 ☐



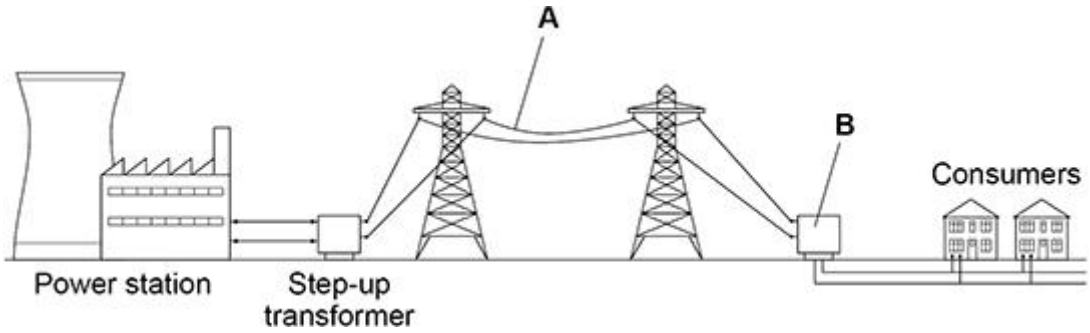


(1)

(Total 8 marks)

Q2.

The figure below shows part of the National Grid linking a power station to consumers.



(a) Name the parts of the figure above labelled **A** and **B**.

A _____

B _____

(2)

(b) Electricity is transmitted through **A** at a very high potential difference.

What is the advantage of transmitting electricity at a very high potential difference?

Tick (✓) **one** box.

A high potential difference is safer for consumers.	☐
Less thermal energy is transferred to the surroundings.	☐
Power transmission is faster.	☐

(1)

(c) The power station generates electricity at a potential difference of 25 000 V.

The energy transferred by the power station in one second is 500 000 000 J.

Calculate the charge flow from the power station in one second.

Use the equation:

charge flow = $\frac{\text{energy}}{\text{potential difference}}$

Charge flow in one second = _____ C

(2)

The electricity supply to a house has a potential difference of 230 V.

The table below shows the current in some appliances in the house.

Appliance	**Current in amps**
Dishwasher	6.50
DVD player	0.10
Lamp	0.40
TV	0.20

(d) Calculate the total power of all the appliances in the table above.

Use the equation:

power = potential difference × current

Total power = _____ W

(3)

(e) Each appliance in the table above is switched on for 2 hours.

Which appliance will transfer the most energy?

Give a reason for your answer.

Appliance _____

Reason _____

(2)

(f) The average energy transferred from the National Grid every second for each person in the UK is 600 J.

There are 32 000 000 seconds in one year.

Calculate the average energy transferred each year from the National Grid for each person in the UK.

_____

_____

_____

Average energy transferred = _____ J

(2)

(Total 12 marks)