

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

Light bulbs are labelled with a power input.

(a) What does power input mean?

Tick (✓) **one** box.

The charge transferred each second by the bulb.

☐

The current through the bulb.

☐

The energy transferred each second to the bulb.

☐

The potential difference across the bulb.

☐

(1)

(b) Write down the equation which links current, potential difference and power.

(1)

(c) A light bulb has a power input of 40 W

The mains potential difference is 230 V

Calculate the current in the light bulb.

Current = _____ A

(3)

The following table shows information about three different light bulbs.

Light bulb	Total power input in watts	Useful power output in	Efficiency
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		watts	
P	6.0	5.4	0.90
Q	40	2.0	0.05
R	9.0	X	0.30

- (d) Write down the equation which links efficiency, total power input and useful power output.

(1)

- (e) Calculate the value of **X** in the table above.

$$X = \text{_____} \text{ W}$$

(3)

- (f) In addition to power input, light bulbs should also be labelled with the rate at which they emit visible light.

Suggest why.

(2)

(Total 11 marks)

Q2.

Figure 1 shows a student walking on a carpet.

Figure 1



- (a) The student becomes negatively charged because of the friction between her socks and the carpet.

Explain why the friction causes the student to become charged.

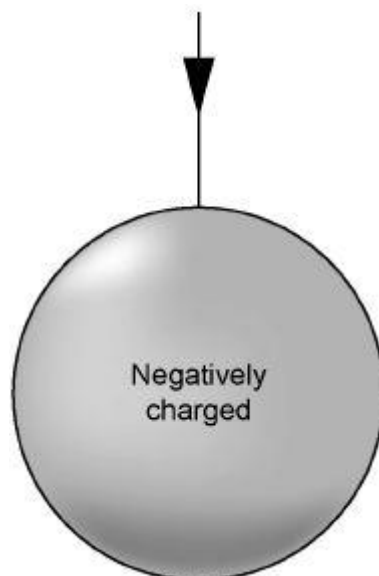
(2)

- (b) The student's head is represented by the sphere in **Figure 2**.

The student is negatively charged. The arrow shows part of the electric field around the student's head.

Draw **three** more arrows on **Figure 2** to complete the electric field pattern.

Figure 2



(1)

- (c) The negatively charged student touches a metal tap and receives an electric shock.

Explain why.

(3)

- (d) Some carpets have thin copper wires running through them. The student is less likely to receive an electric shock after walking on this type of carpet.

Suggest why.

(2)

(Total 8 marks)