Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) The energy transferred each second to the bulb.

1

(b) power = potential difference × current
or

P = VI

1

(c)

*an answer of 0.17 (A) scores **3** marks*

40 = I × 230

1

$$I = \frac{40}{230}$$

1

I = 0.17 (A)

*a correct answer that rounds to 0.17 (A) scores **3** marks*

1

(d)

$$\text{efficiency} = \frac{\text{useful power output}}{\text{total power input}}$$

1

(e)

*an answer of 2.7 (W) scores **3** marks*

$$0.30 = \frac{\text{useful power output}}{9.0}$$

1

useful power output = 0.30 × 9.0

1

useful power output = 2.7 (W)

1

(f) bulbs also transfer thermal energy

allow light bulbs emit infrared radiation as well as visible light
ignore so people know how bright the bulb is

1

the efficiency of the light bulb also needs to be considered

allow the cost to power the light bulb depends on the efficiency

allow to see how much energy is wasted

1

[11]

Q2.

(a) transfer of <u>electrons</u>

mention of positive charge moving negates both marks

1

from the carpet to the student

1

(b) three arrows perpendicular to sphere's surface with all arrows directed inwards and distributed evenly around sphere

1

(c) there is a potential difference between the student and the tap

*do **not** accept the tap / sink is charged*

1

which causes electrons / charges to transfer from the student
or
which causes electrons / charges to transfer to the tap

1

which earths the charge

allow the tap is earthed

1

(d) carpet / copper has a low resistance

allow carpet is a conductor
or
copper is a conductor

1

lower / no build-up of charge (on the student)
or
(so there is a) smaller / no potential difference between student and tap / earth

1

[8]