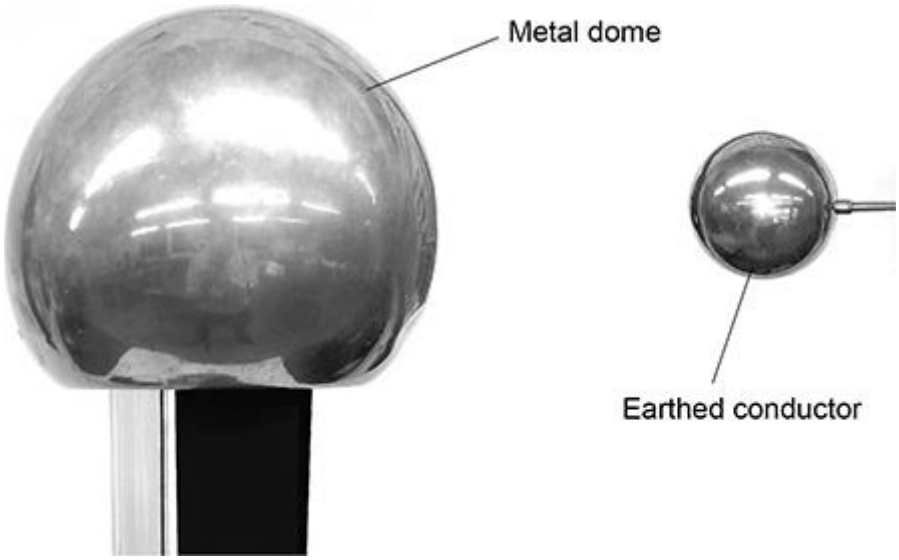
Questions are for both separate science and combined science students

Q1.

Figure 3 shows the negatively charged metal dome and an earthed conductor.

Figure 3



When the earthed conductor is moved towards the metal dome, there is a spark between the dome and the earthed conductor.

(a) The spark transfers 0.60 J of energy, and 2.0 μC of charge is transferred from the dome to the earthed conductor.

Calculate the potential difference between the metal dome and the earthed conductor.

Use the Physics Equations Sheet.

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Potential difference = _____ V

(4)

(Total 4 marks)

Q2.

Figure 1 shows a student putting a coin into a vending machine that sells food.

Figure 1

The vending machine identifies the value of the coin by measuring the resistance of the coin.

(a) The power dissipated by the coin is 340 mW when the current in the coin is 0.75 A.

Calculate the resistance of the coin.

Use the Physics Equations Sheet.

Resistance = _____ Ω

(4)

(Total 4 marks)

Q3.

(a) The current in the lamp is 0.21 A when the potential difference across the lamp is 6.0 V.

Calculate the energy transferred by the filament lamp in 30 minutes.

Use the Physics Equations Sheet.

Energy transferred = _____ J

(5)

(Total 5 marks)

Q4.

(a) The town of Hornsdale in Australia has electricity supplied by a huge battery.

On one day the battery transferred 3.24×10^{11} J of energy to the town.

The potential difference of the town s electricity supply is 230 V.

Calculate the charge flow to the town on this day.

Use the Physics Equations Sheet.

Give your answer to **3** significant figures.

_____

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_____

_____

_____

Charge flow (3 significant figures) = _____ C

(4)

(Total 4 marks)

Q5.

Figure 1 shows some hair straighteners.

Hair straighteners contain heating elements.

Figure 1

(a) The hair straighteners have a maximum power output of 120 W.

The energy transferred to the hair straighteners to reach normal operating temperature is 3.6 kJ.

Calculate the time taken for the hair straighteners to reach normal operating temperature when operating at maximum power.

Use the Physics Equations Sheet.

_____

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_____

_____

_____

Time = _____ seconds

(4)

(Total 4 marks)