

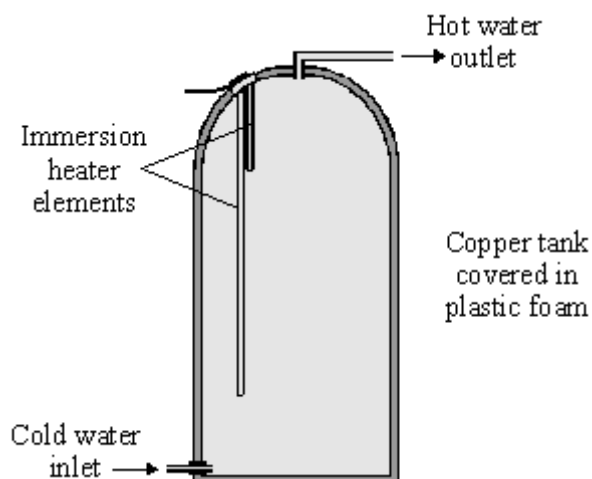
Name of the Student: _____

Max. Marks : 18 Marks

Time : 18 Minutes

Q1.

The diagram shows a type of electric immersion heater in a hot water tank. These hot water tanks are normally found in airing cupboards.



Information on the immersion heater states:

230 V
10 A

- (a) (i) What is the equation which shows the relationship between power, current and voltage?

(1)

- (ii) Calculate the power of the heater. Show clearly how you get to your answer and give the units.

Power = _____

(2)

- (b) (i) What rating of fuse should be in the immersion heater circuit?

(1)

- (ii) There are three wires in the cable to the immersion heater. Two of the wires are connected to the immersion heater. The third wire is connected to the copper tank.

Explain the function of this third wire and the fuse in the circuit.

(3)

- (c) (i) What is the equation which shows the relationship between resistance, current and voltage?

(1)

- (ii) Calculate the resistance of the heater. Show clearly how you get to your answer and give the units.

Resistance = _____

(2)

(Total 10 marks)

Q2.

A combination oven can cook food by using three methods; a microwave generator, a grill and a heating element.

voltage	230 V
microwave power (max)	900 W
grill power	1300 W
convection heater power	1200 W

- (a) What is the current when the oven is operating using full microwave power? Give the equation and show your working.

Current = _____ A

(3)

- (b) It is possible to cook using infrared radiation, from the grill, and microwaves. What is the maximum current in the oven when using both together?

Current = _____ A

(2)

- (c) For baking and roasting, the microwave is used at 450 W and the convection heating element is on fully at 1200 W. A thawed or fresh medium-sized chicken takes 30 minutes to cook.

Calculate the energy transferred in kilowatt-hours.

Use:

$$\text{units (kWh)} = \text{power (kW)} \times \text{time (h)}$$

$$\text{Energy} = \text{_____ kWh}$$

(2)

- (d) Why is a combination oven of this sort more economical than a convection-only oven?

(1)

(Total 8 marks)