Name of the Student:_____
Max. Marks : 21 Marks **Time : 21 Minutes**

Q1.

An electric water pump is powered by the 230 V mains supply.
The 230 V mains supply transfers 9000 J of energy to the pump motor in 1 minute.
Calculate the current in the pump motor.
Use the equation

$$I = \frac{E}{V \times t}$$

(3)

current = ... A

(Total for question = 3 marks)

Q2.

(i) Figure 6 shows an electric kettle.

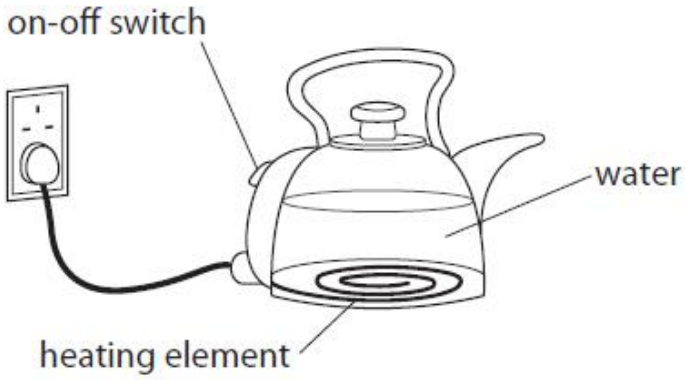

Figure 6

The kettle contains 1.5 kg of water.
The kettle is switched on.
Calculate the energy needed to raise the temperature of the water by 50 °C.
Specific heat capacity of water = 4200 J/kg °C
Use the equation

$$\Delta Q = m \times c \times \Delta\theta$$

(2)

energy needed = ... J

(ii) The amount of energy, E, needed to bring the water to boiling point is 670 000 J.

The kettle has a power of 3500 W.
Calculate the time, *t*, it takes to bring the water to boiling point.
Use the equation

$$P = \frac{E}{t}$$

(3)

time to bring the water to boiling point = ... s

(Total for question = 5 marks)

Q3.

The voltage (potential difference) across a length of wire is 1.5 V.

A charge of 0.042 C flows through the wire.

Calculate the energy transferred.

Use the equation

$$E = Q \times V$$

(2)

E = ... J

(Total for question = 2 marks)

Q4.

Figure 7 shows details of a transformer.

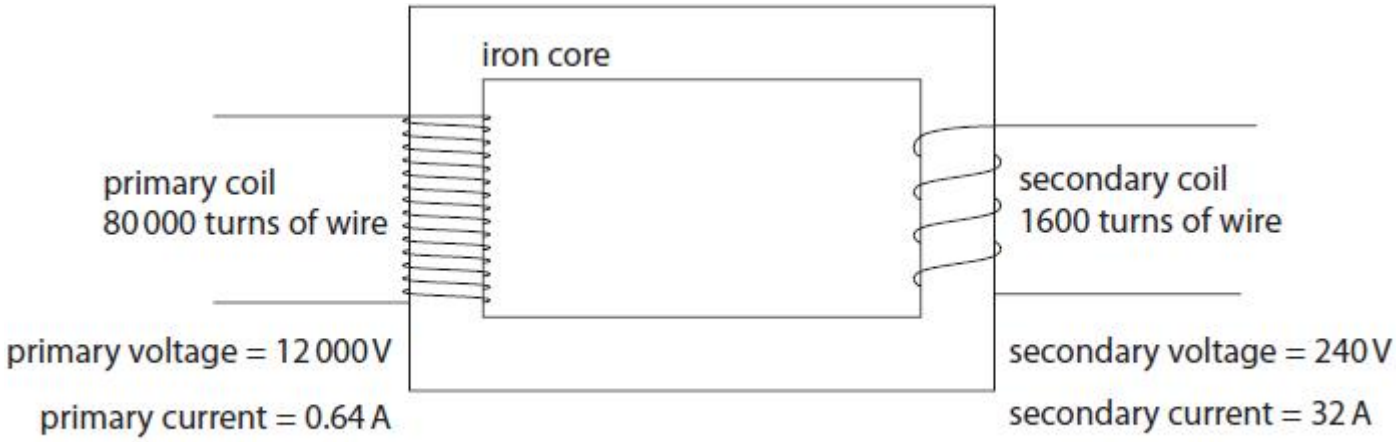

Figure 7

(i) Calculate the power in the primary coil.

Use the equation

$$P = V \times I$$

(2)

power in the primary coil = ... W

(ii) Calculate the following for the transformer in Figure 7.

$$\frac{\text{number of turns in secondary coil}}{\text{number of turns in primary coil}}$$

(2)

.....

(iii) For the transformer in Figure 7, evaluate, in its simplest form, the ratio

secondary voltage : primary voltage

(2)

..... : .....

(Total for question = 6 marks)

Q5.

Figure 8 shows a saucepan of milk being heated on an electric cooker.

Figure 8

The cooker supplies 130 000 J of energy in a time of 87 s.

(i) Calculate the power supplied by the cooker.

Use the equation

$$P = \frac{E}{t}$$

Give your answer to 2 significant figures.

(3)

power = ... W

(ii) The cooker supplies 130 000 J of energy but only 96 000 J of this energy is used to heat the milk.

Calculate the efficiency of heating the milk using this cooker.
Use the equation

$$\text{efficiency} = \frac{\text{useful energy transferred}}{\text{total energy supplied}}$$

(2)

efficiency = ...

(Total for question = 5 marks)