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

Q1.

The transformer in another battery charger has a primary coil and a secondary coil.

The voltage across the primary coil = 230 V.

The voltage across the secondary coil = 15 V.

The current in the secondary coil is 3.1 A.

Calculate the current in the primary coil.

Use the equation

$$\text{primary current} = \frac{\text{secondary voltage} \times \text{secondary current}}{\text{primary voltage}}$$

(2)

current = ... A

(Total for question = 2 marks)

Q2.

A transformer is used to connect a laptop computer to the mains electricity supply.
The input voltage to the transformer is 230 V.
The output current from the transformer is 2.37 A.
The transformer has an output voltage of 19.0 V.
The transformer used is 100% efficient.

Calculate the input current to the transformer.

Use the equation

input current × input voltage = output current × output voltage

(3)

input current = ... A

(Total for question = 3 marks)

Q3.

Figure 7 shows details of a transformer.

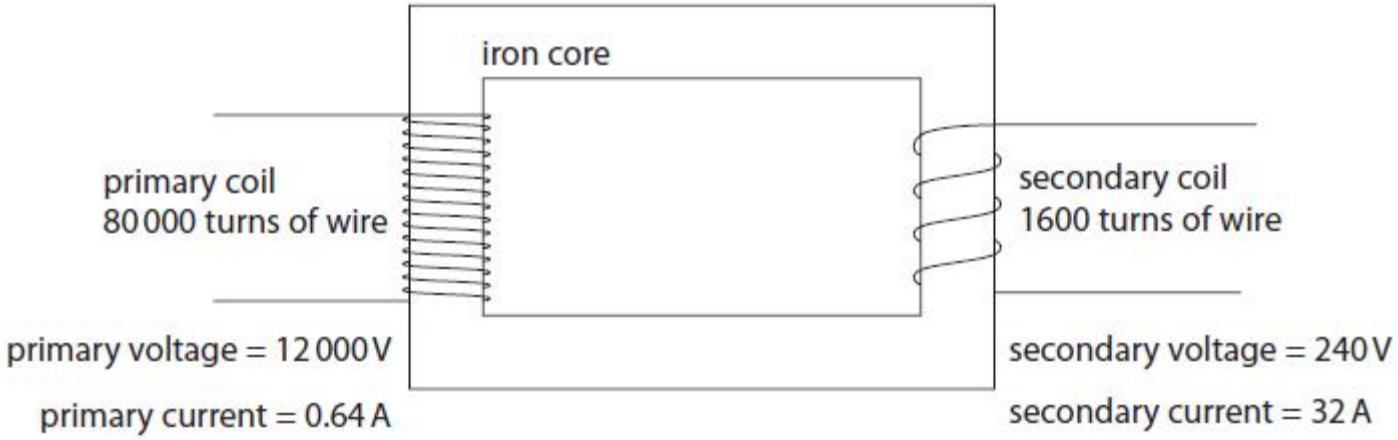

Figure 7

(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)

Q4.

Figure 6 shows part of the UK National Grid system for the supply of electricity to homes.

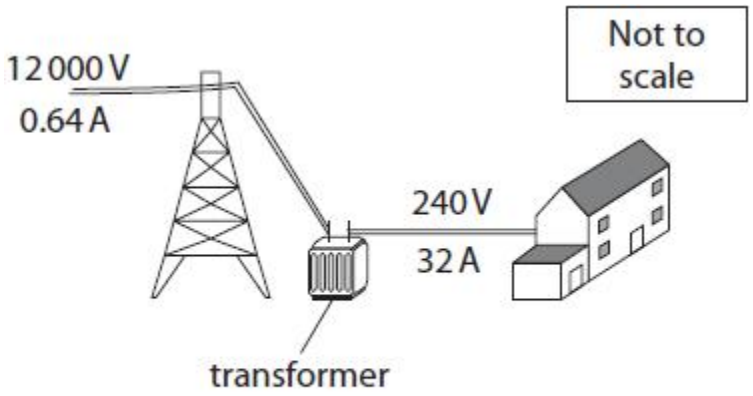

Figure 6

Explain why the National Grid uses high voltages with small currents to transfer electricity from power stations.

(2)

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.....

(Total for question = 2 marks)

Q5.

Complete the following sentences using one of the phrases from the box below.

efficiency is reduced the national grid a power station heat loss is reduced a transformer

(i) Electrical power is generated at

(1)

.....

(ii) Electricity is transmitted over long distances by transmission lines that are part of

(1)

.....

(iii) Electricity is transmitted at high voltages so that

(1)

.....

(Total for question = 3 marks)

Q6.

In a small transformer

- the primary voltage is 230 V
- the primary current is 0.020 A
- the secondary voltage is 5.0 V

Calculate the secondary current.

Use the equation

$$I_s = \frac{V_p \times I_p}{V_s}$$

(2)

secondary current = ... A

(Total for question = 2 marks)

Q7.

* The first public power station was built in the centre of New York.

It used generators to supply direct current at 110 V. The cables had to go underground and they could only supply
nearby shops and offices.

The electricity was mainly used for electric light.

The development of alternating current generators led to major changes in the way electricity is transmitted and used.

Compare the modern National Grid system with the early system in New York.

(6)

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Q8.

Which statement is true for transformers?

(1)

- ☒ **A** Transformers can only step-up voltages.
- ☒ **B** Transformers can only step-down voltages.

☒ **C** Transformers can work with direct current.
☒ **D** Transformers have primary and secondary coils.

(Total for question = 1 mark)