

Name of the Student: _____

Max. Marks : 16 Marks

Time : 16 Minutes

Q1.

A transformer is used to reduce the 230 V a.c. mains to the 12 V supply required for the lighting system. The transformer has 1150 turns on its primary coil.

Calculate the number of turns on the secondary coil of the transformer. Show clearly how you work out your answer.

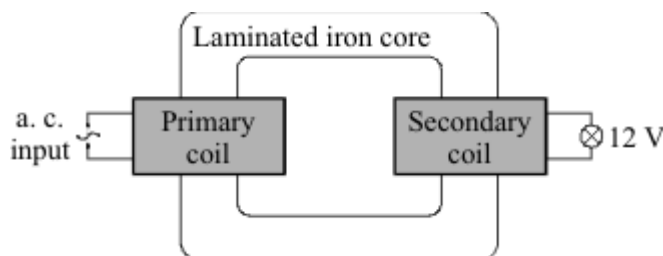
number of turns on the secondary coil = _____

(2)

(Total 2 marks)

Q2.

- (a) The diagram represents a simple transformer used to light a 12 V lamp. When the power supply is switched on the lamp is very dim.



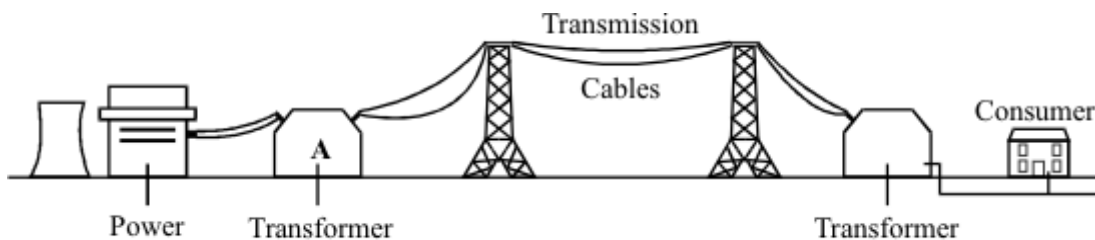
- (i) Give **one** way to increase the voltage at the lamp without changing the power supply.

(1)

- (ii) What is meant by the iron core being *laminated*?

(1)

- (b) Electrical energy is distributed around the country by a network of high voltage cables.



- (i) For the system to work the power is generated and distributed using alternating current rather than direct current. Why?

(1)

- (ii) Transformers are an essential part of the distribution system. Explain why.

(2)

- (iii) The transmission cables are suspended high above the ground. Why?

(1)

- (c) The power station generates 100 MW of power at a voltage of 25 kV. Transformer **A**, which links the power station to the transmission cables, has 44 000 turns in its 275 kV secondary coil.

- (i) Write down the equation which links the number of turns in each transformer coil to the voltage across each transformer coil.

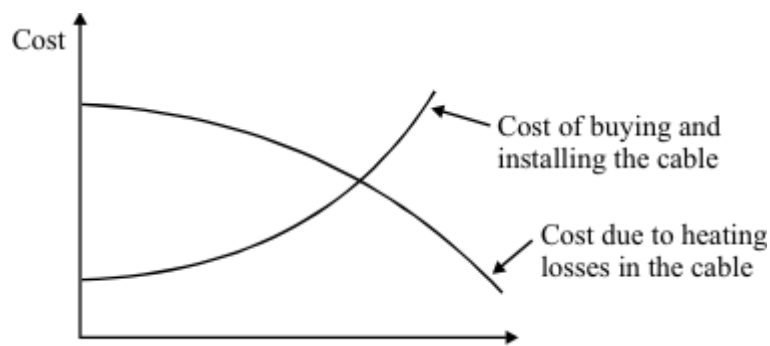
(1)

- (ii) Calculate the number of turns in the primary coil of transformer **A**. Show clearly how you work out your answer.

Number of turns = _____

(2)

- (d) The diagram shows how the cost of transmitting the electricity along the cables depends upon the thickness of the cable.



- (i) Why does the cost due to the heating losses go down as the cable is made thicker?

(1)

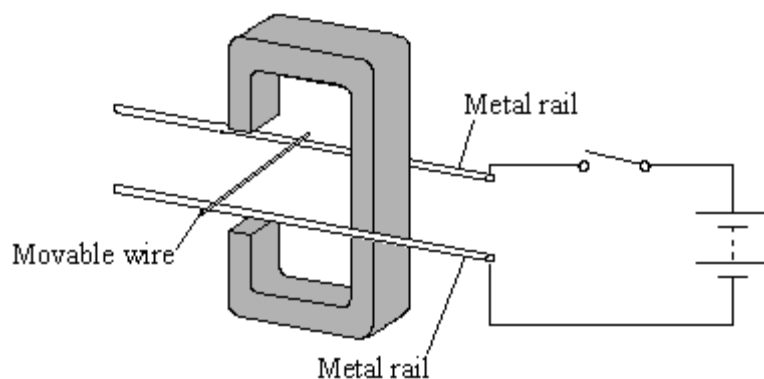
- (ii) By what process is most heat energy lost from the cables?

(1)

(Total 11 marks)

Q3.

The diagram shows apparatus used to demonstrate the electric motor effect. When the switch is closed the wire moves.



- (i) Draw an arrow on the diagram to show the direction the wire moves.

(1)

- (ii) Explain why the wire moves.

(2)

(Total 3 marks)