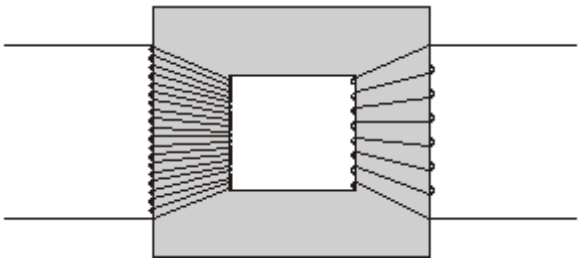
Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

(a) The basic structure of a transformer is a primary coil of insulated wire, an iron core and a secondary coil of insulated wire.



(i) Why is the core made of iron?

_____

_____

(1)

(ii) Explain how a transformer works.

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) A small step-down transformer is used in the charger for an electric screwdriver.

The input to the transformer is 230 V a.c. mains supply and the output is 5.75 V a.c. There are 3200 turns on the primary coil.

Use the equation in the box to calculate the number of turns on the transformer's secondary coil.

$$\frac{\text{p.d. across primary}}{\text{p.d. across secondary}} = \frac{\text{number of turns on primary}}{\text{number of turns on secondary}}$$

Show clearly how you work out your answer.

_____

_____

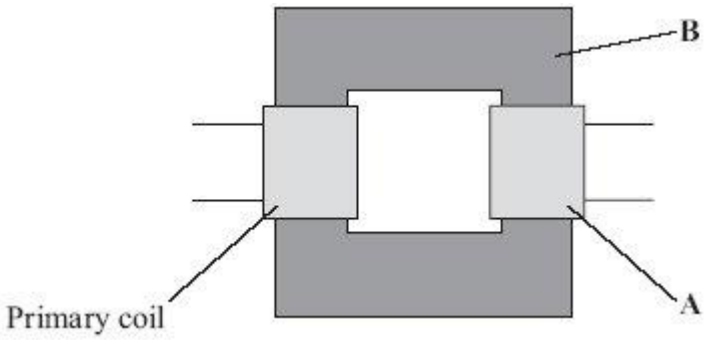
Number of turns = _____

(2)

(Total 7 marks)

Q2.

(a) The diagram shows a transformer.



(i) What is part **A**?

_____

(1)

(ii) What is part **B** and what is it made of?

_____

_____

(2)

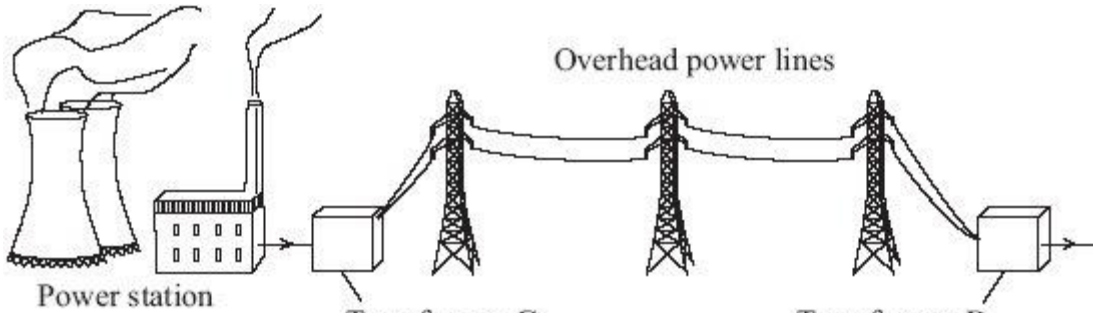
(iii) When there is an alternating current in the primary coil, what is produced in part **B**?

_____

_____

(2)

(b) Transformers are used in the National Grid. The diagram shows part of the National Grid.



Complete the **two** spaces in the sentence.

Transformer **C** is a _____ transformer and transformer **D** is a _____ transformer.

(1)

(c) This is an item from a newspaper.

Health at risk from power lines?

Are high voltage power lines a health risk to people who live near them?

Some scientists think that scientific evidence shows that they are.

Other scientists do not think that the scientific evidence supports this conclusion.

Which **two** suggestions would reduce the possible risk to people's health?
Put a tick (✓) in the box next to your answers.

Do not build new houses near to existing power lines.	☐
Move the power lines so that they take the shortest routes.	☐
Move each power station to the centre of the nearest city.	☐
Build new power lines away from where people live.	☐
Use more transformers in the National Grid.	☐

(2)
(Total 8 marks)

Q3.

(a) Name a material that could be used to make the outside case of the plug.

_____

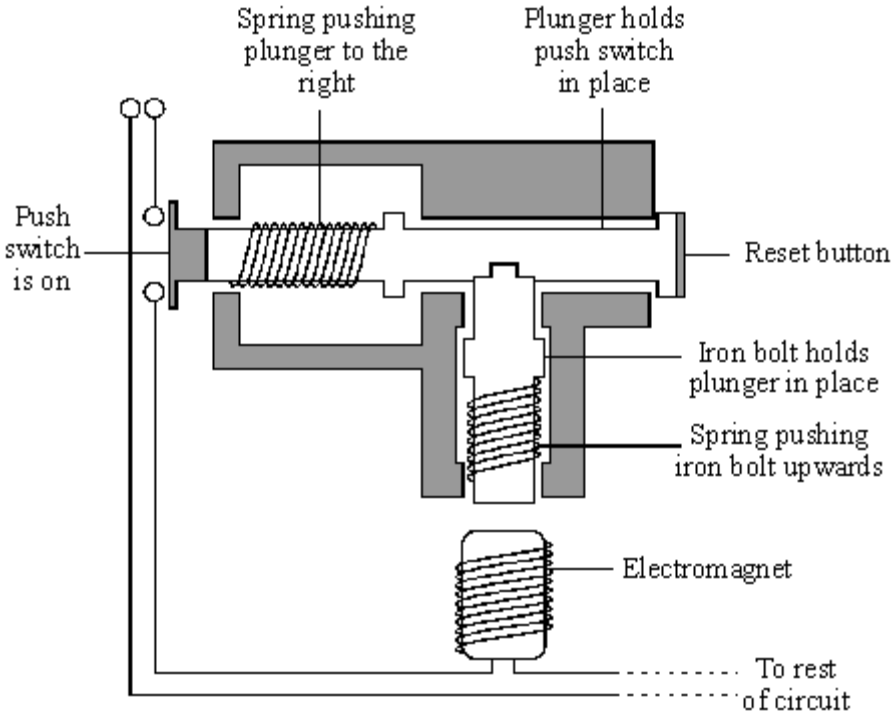
Give a reason for your choice.

_____

(2)

(b) *To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Some electrical circuits are protected by a circuit breaker. These switch the circuit off if a fault causes a larger than normal current to flow. The diagram shows one type of circuit breaker. A normal current (15 A) is flowing.



Source: adapted from V. PRUDEN and K. HIRST, AQA GCSE Sceince
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Explain what happens when a current larger than 15A flows. The answer has been started for you.

When the current goes above 15 A, the electromagnet becomes stronger and

(3)
(Total 5 marks)