6 The National Grid is used in the United Kingdom for the large-scale transmission of electricity. The photograph shows solar panels connected to the National Grid.

(Source: © Jenson/Shutterstock)

(a) Solar panels provide direct current to a device that outputs an alternating current so that the energy from the solar panels can be supplied to the National Grid.

(i) Explain why a step-up transformer is used to supply the National Grid.

(2)

(ii) This is the label on the step-up transformer.

input voltage = 15 kV
output voltage = 340 kV
number of turns on primary coil = 1400

State the formula linking input voltage, output voltage and turns ratio for a transformer.

(1)

(iii) Calculate the number of turns on the secondary coil of the step-up transformer.

(3)

number of turns = ...

(b) Solar panels produce constant direct current (d.c.).

Explain why a transformer will not work when connected to constant direct current.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question 6 = 9 marks)

BLANK PAGE