11 Scientific balloons are tested in a laboratory before they are used.

(a) In the first test the pressure of the air inside the balloon is 120 kPa.

The balloon is sealed and has a volume of 92 m^3.

(i) The pressure of the air inside the balloon is reduced to 64 kPa by reducing the external air pressure.

Calculate the new volume of the balloon.

(2)

volume = ... m^3

(ii) Give an assumption that is made in the calculation.

(1)

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(b) The pressure of the air in the balloon is returned to 120 kPa.

The temperature of the air inside the balloon is 290 K.

The balloon is tested again, changing the temperature of the air and keeping the volume of the balloon constant.

(i) Explain why the pressure of the air in the balloon decreases when the temperature of the air decreases.

(3)

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(ii) Calculate the temperature of the air when the pressure of the air in the balloon is 64 kPa.

Give your answer in kelvin.

(3)

temperature = ... K

(Total for Question 11 = 9 marks)