

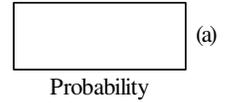
MARKS

7

(6, 1)

1. The design of an electronic circuit calls for a 100-ohm resistor and a 250-ohm resistor connected in series so that their resistances add. The components from which the circuit is manufactured do not exactly meet their nominal resistances – the *actual* resistances vary independently in a way that can be modelled by normal distributions. The resistance of the 100-ohm resistors has a mean of 100 ohms and a standard deviation of 2.4 ohms, and that of the 250-ohm resistors has a mean of 250 ohms and a standard deviation of 3.2 ohms.
 - (a) Find the probability the total resistance of a circuit containing one of each type of resistor selected equiprobably ('at random') and connected in series has a total resistance of between 345 and 355 ohms.
 - (b) Explain briefly why it is reasonable to assume that the distributions used to model the resistances of the two resistors in the circuit can be considered to be *probabilistically independent*.

(a)



(b)