2 A car park has a payment machine that allows a customer to pay for their parking.

The cost of parking is displayed as a denary number on a screen on the payment machine.

The cost of parking is stored in two 8-bit binary registers.

For the parking cost of $10.50:
- register 1 stores the denary value 10 as binary
- register 2 stores the denary value 50 as binary.

(a) Give the parking cost that would be displayed on the payment machine when the registers store:
- register 1: 00010001
- register 2: 01000110

Parking cost displayed $ ..... [2]

Working space

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(b) The parking cost of $14.98 is displayed on the payment machine.

Give the 8-bit binary numbers that are stored in the registers to display the parking cost.

Register 1 .....

Register 2 .....
[2]

Working space

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(c) The payment machine gives the customer a ticket when they have paid their parking cost. Each ticket has a 4-digit hexadecimal ticket number that is stored as binary.

The binary number 1010000000111101 is stored for a customer's ticket number.

Give the hexadecimal ticket number that would be displayed on this customer's ticket.

Hexadecimal ticket number ..... [4]

Working space

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(d) Explain why data input into the payment machine needs to be converted to binary.

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(e) When a customer is leaving the car park they arrive at a barrier. The customer needs to insert their ticket into a system at the barrier. This system reads the ticket number then checks whether the parking cost has been paid for the car. The barrier is raised if it has been paid.

The system uses a microprocessor.

Describe the role of the microprocessor in the system and how it checks whether the parking cost has been paid.

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