

3 (a) Convert the following hexadecimal number into 12-bit binary:

4 A F

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[3]

(b) The 2016 Olympic Games will be held in Rio de Janeiro. A timer that counts down to the opening of the Games is shown on a microprocessor-controlled display.

The number of hours, minutes and seconds until the Games open are held in three 8-bit registers.

The present register values are:

0	1	1	0	1	0	0	1
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105 hours

0	0	1	0	0	0	0	0
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32 minutes

0	0	0	1	0	1	0	0
---	---	---	---	---	---	---	---

20 seconds

The timer will count **down** in seconds.

(i) Show the values in each 8-bit register **30 seconds** after the time shown above:

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hours

--	--	--	--	--	--	--	--

minutes

--	--	--	--	--	--	--	--

seconds

[3]

(ii) Write the hexadecimal value of the **minutes** register from **part (b)(i)**.

.....[1]