ELEC211 - Microprocessor Systems part

Open-book exam 2019-20

TIME ALLOWED: 50 minutes

ADDITIONAL INFORMATION: The marking scheme is for reference only.

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1) Assume that the following registers initially hold the values given: **8**

   r3: 0x0310F027

   r4: 0xE3D62F27

   r5 : 0x3B51048D

   r6: 0xA0913C29

   r7: 0x9A404A07

   Find the values held in registers r1, r2, r3 and r4 after the following ARM Cortex M0 instructions are executed?

   i) ADDS r1, r5, r6

   ii) SUBS r2, r6, r7

   iii) RORS r3, r3, r7 ; rotate r3 by value of l.s.byte in r7

   iv) ORRS r4, r6

2) Find the 32 bit two's complement format for the decimal numbers -125_{10} and $-1{,}251{,}251{,}251_{10}$. (Note that 0x4A949433 is the hexadecimal equivalent of $+1{,}251{,}251{,}251_{10}$.) **4**

3) Find the IEEE 754 floating point format (single precision) for the decimal numbers, -102.5_{10} and $+13.4_{10}$. **4**

4) Find the decimal number that is equivalent to 0xC1A00000 in the IEEE754 floating point format. **4**

5) What is the state of the flags after the execution of the following ARM instruction: **10**

   ADDS r2, r5, #0x000000D8 ; add 216 to r5, put sum in r2

   i) When the value held by r5 is 0xFFFFFF28.

   ii) When the value held by r5 is 0x7FFFFF30.

Total 30