Solutions 3:

Question 1:

```
loop: LDR R0, foo       @ 144
      LDRB R1, bar      @ 146
      LDRB R2, qux      @ 148
      LDRB R3, [R0, R1] @ 14A
      B _start          @ 14C
      .align
foo:  .word 0x080000FE  @ 150
bar:  .word 0x6655      @ 154
qux:  .word foo         @ 158
norf:                   @ 15C
```

a) 0x0800 0150 2 marks
b) 0x0800 015C 1 mark
c)
R0: 0x0800 00FE 1 mark
R1: 0x55 1 mark
R2: 0x50 1 mark
R3: 0x08 1 mark

Question 2:

a) 8 KiB / 4 = 8*1024 / 4 = 2048 1 mark
b) 0x200000FC, 0x200000FD, 0x200000FE, 0x200000FF 2 marks
c) 3 marks
R1: 0x2000 00F0
R3: 0x2000 00F4
R4: 0x2000 00F8
R5: 0x2000 00FC

Question 3:

I’m not too fussy on out-by-one calculations here. The exact formula for ADC values isn’t that well defined anyway.
a) 3.1 V / 1024 = 3.027344 mV 1 mark
b) 0.5 / 0.003027344 = 165 = 0xA5 1 mark
c) As per a), each quantisation interval is 3.027344 mV.
Midpoint of interval number 0x1EE = 0x1EE * 3.027344 mV = 1.495507812 V
Range = midpoint plus/minus half an interval. = 1.495507812 V plus/minus 1.513672 mV = 1.49399414 V to 1.497021484 V
d) ADC_CFGR1 1 mark
e) (next page)

```
      LDR R0, ADC_BASE
      LDR R1, [R0, #0x0C]
      LDR R2, MASK_OUT
      ANDS R1, R1, R2
      MOVS R2, #0b00101000
      ORRS R1, R1, R2
      STR R1, [R0, #0x0C] 2 mark

      .align
ADC_BASE: .word 0x40012400
MASK_OUT: .word 0xFFFFFFC7
```

Bonus:
As per figure 9 of the programming manual, 8 registers are pushed. Hence the SP is decremented by 32. 1 mark