Question 1: Multiple Choice (6 marks)

1) Given that \(W = 75\) and \(R = 00\), then the instruction DECF R,1 results in
   a) \(W = FF, R = 00\)
   b) \(W = 74, R = 00\)
   c) \(W = 75, R = FF\)
   d) \(W = 75, R = 74\)

2) Given that \(W = C5\) and \(R = A8\), then the instruction SUBLW F2 results in
   a) \(W = 35\)
   b) \(W = 2D\)
   c) \(W = C3\)
   d) \(W = B3\)

3) A memory with 10 address lines and 16 bit word, has a size of
   a) 200 Byte
   b) 20 Byte
   c) 640 K Byte
   d) 2K Byte

4) The PIC16F84 has
   a) 8-bit RAM with 7-address lines, 14-bit ROM with 10-address lines
   b) 7-bit RAM with 10-address lines, 14-bit ROM with 8-address lines
   c) 8-bit RAM with 8-address lines, 14-bit ROM with 13-address lines
   d) 8-bit RAM with 14-address lines, 10-bit ROM with 10-address lines

5) The Working Register is part of
   a) Register Array
   b) Arithmetic Logic Unit
   c) RAM
   d) ROM

6) Given that the Mnemonic BTFSS f,b has 14-bit code: 01 11bb bfff ffff
   Then the hex code for BTFSS 9C, 2 is
   a) 1DFF
   b) 1EFF
   c) 2E8C
   d) 1D1C
**Question 2:** (4 marks)

Consider the 2-bit data system below.

Your goal is to subtract two 2-bit numbers, B-A, and store the result in register C.

a) Give the sequence of control signals needed to calculate B-A.

b) Add a Decoder (and show its connections) to the above circuit in order to store the result in the desired register.
Question 3: (10 marks)

Use a PIC16F84 with four LEDs and one switch to do the following:

1. At start, only one LED will be ON in the following order:
   - LED1 \(\rightarrow\) LED2 \(\rightarrow\) LED3 \(\rightarrow\) LED4
2. Continuously check the switch
3. If the switch is closed all LEDs should flash (On/Off)
   - Use a delay between the flashes
4. If the switch is open, go back to the sequence given in 1.

The following design requirements are given
- Use only Port A for all input and output signals
- The Switch and all LEDs should be active LOW

a) Design the hardware schematic (show all connections)
b) Draw the flow chart
   c) Write the assembly code (must include comments)