1. The code below is supposed to set up the ARM M0 for a baud rate of 19,200. What is the actual baud rate created by this code?

```
IOCON_PIO1_7 |= 0x01; // TxD enable to output
SYSAHBCLKCTRL |= (1 << 12); // Clock to UART
UARTCLKDIV |= 4; // UARTPCLK
U0FCR |= 0x01; // Enable FIFO buffer
U0LCR |= 1 << 7; // DLAB must be 1 to write to U0DLL
U0DLL = 39;
U0LCR &= ~(1 << 7); // DLAB back to 0 to transmit
U0LCR |= 0x03; // 8-bit data width
U0TER |= 0x80; // Enable transmit
```

2. In the ARM Cortex M0 register set, registers 13, 14, and 15 are special. What is special about these three registers?

3. Write a program in C which will rotate a single one among the bits P0.0 to P0.4. The rotation should be from lowest to highest. You may assume that P0 has been set up as output.

4. The reference voltage on the A to D converter is set to 3.0 volts. If the user does a conversion and the binary number received is 0x20B = 523₁₀, what is the voltage on the analog input?

5. What does the following program segment do?

```
GPIO0DIR = 0x3;
while(1)
{
    GPIO0DATA = 0x00000000;
    GPIO0DATA = 0xFFFFFFFF;
}
```
6. The program below uses a 16-bit timer to trigger an interrupt which toggles P0.1. Calculate the frequency of the resulting square wave on P0.1.

```c
int main()
{
    SYSAHBCLKCTRL |= (1 << 8); //Enable clock for 16-bit timer 1
    GPIO0DIR |= 2;              //Port0.1 set to output
    count = 0;
    NVIC_ISER |= (1 << 17);    //Enable 16-bit timer 1 interrupt
    TMR16B1PR = 9;              //Prescale register.
    TMR16B1MR0 = 10000;         //Match count register
    TMR16B1MCR |= 1;            //Generate an interrupt if match on MR0
    TMR16B1MCR |= (1 << 1);     //Causes TimerCounter to be reset if match on MR0
    TMR16B1TCR |= 1;            //Enable TimerCounter to run
    while (1);
}
```

```c
//
void TIMER16_1_IRQHandler(void)
{
    GPIO0DATA ^= 0x2;
    TMR16B1IR = 1;           //clear interrupt
}
```

7. The program below does nothing useful. Answer the following questions.

A) Describe in words what the assembly language function does.

```c
#include "IOCON.H"
__asm int Mystery(int x, int y, int z);
int main()
{
    int x, y, z, result;
    x = 3; y = 9; z = 14;
    result = Mystery(x, y, z);
    result++;
}
```

B) What is the value in the variable `result` when the program ends at line 10?  \( \text{1CH} = 28_{10} \)

8. What is the purpose of the phase locked loop on the ARM M0 processor?
9. Eight LEDs have been connected to Port 0 as shown below. Suppose you have an 8-bit number in the lower byte of integer \( x \). Write a code segment to output this 8-bit number to the 8 LEDs with the least significant bit going to P0.0, etc.

```
```

10. The code below shows a main program segment and a function which it calls. What are the values of the variable shown after the main program runs?

```c
float x = 1.2;
int arr[] = {1, 2, 3};
int a = 7, b;
int *p;
*p = &a;
b = MyFunction(x, arr, *p);
```

```c
int MyFunction(float x, int [] arr, int *p)
{
    int z = 84;
    arr[2] = 4;
    arr[1] = 9;
    x = 2.1;
    *p = 65;
    return z;
}
```