Homework2

Question 1. How many bits wide is Port B? How many bits wideis Port F?

- Port B is 8 bits wide.
- Port F is 5 bits wide.

Question 2. Why are there two shift right instructions (LSR and ASR)

- **LSR** Use the LSR instruction when shifting unsigned numbers
- **ASR** Use the ASR instruction when manipulating signed numbers

## Question 3. Why are there five versions of the LDR instruction?

- **LDR** Load 32-bit word
- **LDRH** Load 16-bit unsigned halfword
- **LDRSH** Load 16-bit signed halfword (sign extend bit 15 to bits 31-16)
- **LDRB** Load 8-bit unsigned byte
- **LDRSB** Load 8-bit signed byte (sign extend bit 7 to bits 31-8)

Question 4. What address allows us to access just pin PA7?

- 0x40004200
-

```
#define PA7  (*((volatile unsigned long *)0x40004200));
```

Question 5. Interface a switch to Port A bit 5 using positive logic.
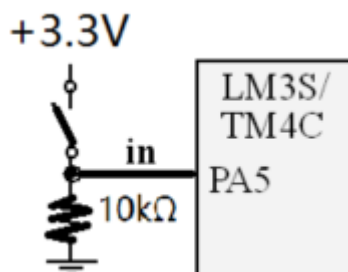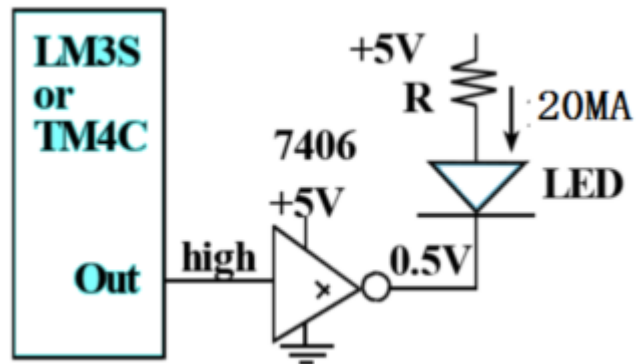

Question 6. Interface an LED to Port A bit 7 using positive logic. The LED parameters are 1.5V 20mA. Assume the output low voltage of a 7406 VOL is 0.5V. Calculate the limiting resistor and give the connection Diagram.

$V_d = 1.5V$

$I_d = 20mA$

$$R = \frac{5V - V_d - V_{OL}}{I_d} = \frac{5V - 1.5V - 0.5V}{0.02A} = 150\Omega \qquad (1)$$

Question 7. Interface an LED to Port A bit 4 using positive logic. The LED parameters are 1.4V 2mA. Assume the microcontroller output voltage VOH is 3.2V. Calculate the limiting resistor and give the connection Diagram.

$V_d = 1.4V$

$I_d = 2mA$

$$R = \frac{V_{OH} - V_d}{I_d} = \frac{3.2V - 1.4V}{0.002A} = 900\Omega \qquad (1)$$