2017/18 S2 MST (Soln)

MCQ.

A1 – d

A2 – b

A3 – c

A4 – b

A5 – d

A6 – c

A7 – a

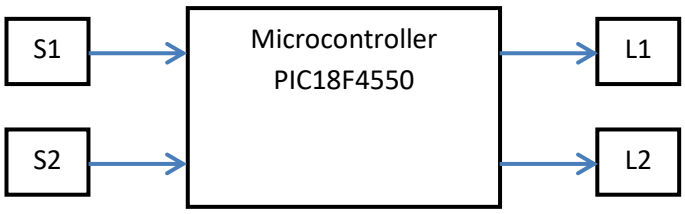
A8 – d

A9 – c

A10 – a

B1.

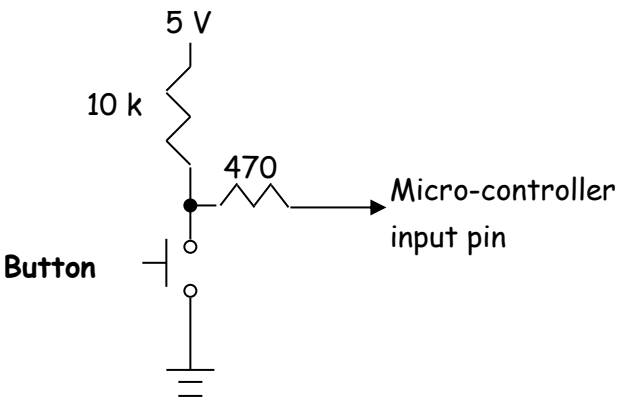
(a)



(b) (i) pedestrian detected?
(ii) no
(iii) yes
(iv) OFF lights L1 & L2
(v) Delay 0.5 second

B2.

(a)

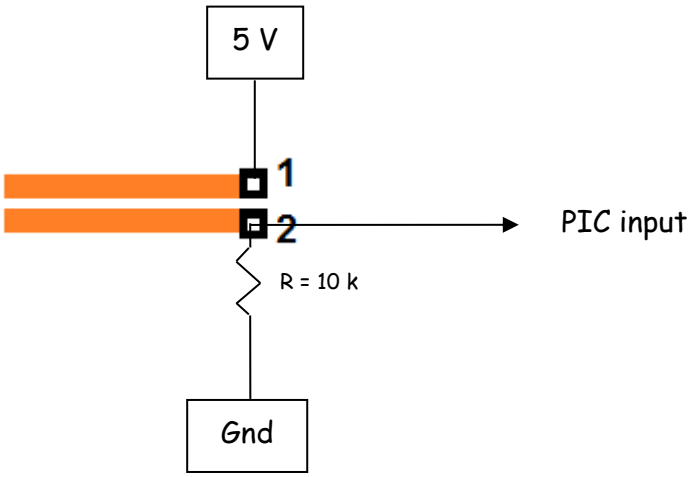


(b) (i) Count = 3;
(ii) if (PORTBbits.RB2 == 1)
(iii) count = count - 1;
(iv) PORTD = 0b00000010;

(c) A 7-segment display unit, or a few LED's, or an LCD display unit.

B3.

(a)



(b) TRISA = 0b00011000; // other bits: don't cares
TRISD = 0b00000000; // other bits: don't cares

(c) while (1) { // loop forever
if (PORTAbits.RA3 == 1) // if water level too high
PORTD = 0b00000101; // on Pump2, off Pump1, on Buzzer
else if (PORTAbits.RA4 == 0) // else if water level too low
PORTD = 0b00000011; // off Pump2, on Pump1, on Buzzer
else // else
PORTD = 0b00000000; // off all

B4.

(a) 0 0 0 0

(b) 0 0

(c) 1

(d) while (ADCONbits.GO == 1);

(e)

```
if (ADRESH == 0b00000011) PORTB = 0b00000000;

else if (ADRESH == 0b00000010) PORTB = 0b00000100;

else if (ADRESH == 0b00000001) PORTB = 0b00000110;

else PORTB = 0b00000111;
```

B5.

(a)
```
PORTBbits.RB0 = 1;
delay_us(10);

PORTBbits.RB0 = 0;
```

(b)

```
Count = 0; // initialise Count
while (PORTDbits.RD1 == 0); // wait for Echo pulse
while (PORTDbits.RD1 == 1) // while Echo is high
   {
    delay_us(58);  // delay 58us, as each Count = a pulse duration of 58 us
    Count = Count + 1; // increment Count
   }
```

(c) The buzzer can be made to beep if the obstacle distance is near e.g. < 50 cm i.e. if (Count < 50) // beep buzzer.