Jonathan W. Valvano April 9, 2003, 1:00pm-1:50pm

(30) Question 1. Place one letter A-PP for each.

Arm key wakeup J bit 3.	T) `KWIEJ |= 0x08;`
Acknowledge key wakeup J bit 7.	BB) `KWIFJ = 0x80;`
Enable interrupts.	A) `asm(" cli");`
Disable interrupts.	C) `asm(" sei");`
Select falling edge of key wakeup PJ7.	M) `KPOLJ &= ~0x80;`
Select rising edge of key wakeup PJ3.	N) `KPOLJ |= 0x08;`
Select pullup resistor on PJ7.	MM) `PUPSJ |= 0x80;  PULEJ |= 0x80;`
Select pulldown resistor on PJ3.	JJ) `PUPSJ &= ~0x08;  PULEJ |= 0x08;`
Toggle PORTJ bit 0.	PP) **none of the above**
Disarm key wakeup J bit 7.	S) `KWIEJ &= ~0x80;`

(25) Question 2. Show the code that executes the FSM.

```
void main(void){
StatePtr Pt;            // Current State
int Input;
  Pt = S1;              // Initial State
  DDRA |= 0x0C;         // PA3,2 are outputs
  DDRA &= ~0x03;        // PA1,0 are inputs
  while(1){
    PORTA = (PORTA&0xF0)+(Pt->Out)<<2;  // Output depends on the current
state
    Input = PORTA&0x03;                 // Input=0,1,2,or 3
    Pt = Pt->Next[Input];               // Next state depends on the input
  }
}
```

(5) Question 3a.	Circuit B
(5) Question 3b.	Because of I_{OL}, A or B will work
(5) Question 3c.	(5-2-0.5)/0.01 = 250 Ω
(5) Question 4.	Circuit B

(25) Question 5. Design C code that spins two stepper motors at about 1 rotation per sec.

```
unsigned short volatile Ack;
#pragma interrupt_handler RTIHan()
void RTIHan(void){
  PORTT |= 0x01;
  RTIFLG = 0x80;
  if(Ack==1){   ^-----step();  // motor one step
    Ack = 0;
  }
  PORTT &= ~0x01;
}
#pragma abs_address:0xfff0
void (*RTI_vector[])() = { RTIHan };
#pragma end_abs_address
void RTIinit(void){
  asm(" sei");
  COPCTL = 0x00;
  DDRT |= 0x41;
  TSCR = 0x80;
  RTICTL = 0x81;      RTICTL = 0x86;   // 32.768ms
  Ack = 1;    ^-------DDRH=0xFF;       // PORTH outputs
  asm(" cli");
}
```