### Problem 1
Give number

13 bytes

### Question 8a
Choose A,B,C

It is possible for either one to be first

### Question 8b
Choose A,B,C

CCR is first pushed

### Question 8c
Choose A,B,C

ISR first clears C7F

### Question 8d
Choose A,B,C

ISR first clears C7F

### Question 9
Choose A-F

Precision (units)

9 bits, 2¾ digits, or 512 alternatives

### Question 10
Choose A-F

It changes value by means other

ATDCTL3 value

S8C-S1C=0011

ATDCTL3=0x18;

DJM=1, MULT=1

ATDCTL5=0x92;

### Question 11a
Choose A-F

ATDCTL3 value

PNP, Ice>500mA

D) TIP125

### Question 11b
Choose A-F

ATDCTL5 value

1, 3, 7, or 9

### Question 11c
Choose A-F

Specify register

1, 3, 7, or 9

### Question 12
Choose A-F

Second sample

ATDDR1

### Question 13
Choose A-F

D) read SCISR1, read SCIDRL

### Question 14
Draw graph, delay time greater than 14, but less than 50ms

![Graph](image-url)

### Question 15
Decoder with A15-A0 inputs and YourDeviceSelect as output (give chip numbers)

<table>
<thead>
<tr>
<th>Port</th>
<th>Address Range</th>
<th>Description</th>
<th>Chip Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>$5800-$58FF</td>
<td>0101,1000,xxxx,xxxxx</td>
<td>74HC04</td>
</tr>
<tr>
<td>RAM</td>
<td>$D000-$D3FF</td>
<td>1101,00xx,xxxx,xxxxx</td>
<td>74HC11</td>
</tr>
<tr>
<td>YourDevice</td>
<td>$D800-$DFFF</td>
<td>1101,1xxxx,xxxx,xxxxx</td>
<td></td>
</tr>
<tr>
<td>ROM</td>
<td>$E000-$FFFF</td>
<td>111x,xxxx,xxxx,xxxxx</td>
<td></td>
</tr>
</tbody>
</table>

YourDeviceSelect = A15 • not(A13) • A11
(4) Question 16a. Largest $t_a$
The rise of E occurs at 250ns, the fall of OE occurs at $250+[10,20]$, RDA starts at $250+[10,20]+t_a$. The worst case is the later RDA = $270+t_a$. RDR starts at 450ns. RDA must overlap RDR, so $270+t_a \leq 450$ns, or $t_a \leq 180$ns.

(4) Question 16b. Largest $t_s$
The fall of E occurs at 500ns, the rise of WE occurs at $500+[10,20]$, WDR starts at $500+[10,20]-t_s$. The worst case is the earlier WDR = $510-t_s$. WDA starts at 378ns. WDA must overlap WDR, so $378 \leq 510-t_s$, or $t_s \leq 132$ns.

(6) Question 17. Write code, $0.6 = 3/5$ and $2.0$ equals $512/256$

// start with original equation $y = 0.6*x + 2.0$
// substitute definitions $I_y/256 = 3*I_x/256/5 + 2.0$, then solve
$I_y = (3*I_x)/5 + 512$;

(16) Question 18.

(6) Part a) SCI ritual
void FSM_Init(void){
Pt = SA;      // initial state
SCIBDH = 0;   // br=MCLK/(16*BaudRate)
SCIBDL = 26;  // 9600 bits/sec
SCIACR1 = 0;
SCIACR2 = 0x2C; // RIE
/* bit value meaning
  7  0 TIE, no interrupts on TDRE
  6  0 TCIE, no interrupts on TC
  5  1 RIE, receive interrupt on RDRF
  4  0 ILIE, no interrupts on idle
  3  1 TE, enable transmitter
  2  1 RE, enable receiver
  1  0 RWU, no receiver wakeup
  0  0 SBK, no send break */
asm cli   // enable interrupts
}

(10) Part b) SCI interrupt service routine
interrupt 20 void SciHandler(void){
char input;
if(SCISR1&0x20){   // check RDRF
   input = SCIDRL;  // clears RDRF
   if(input=='a'){
      SCIDRL = Pt->Out[0]; // out
      Pt = Pt->Next[0];    // next
   }
   if(input=='b'){
      SCIDRL = Pt->Out[1]; // out
      Pt = Pt->Next[1];    // next
   }
}