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This is a closed book exam. You must put your answers on this piece of paper only. You have 50 minutes, so allocate your time accordingly. Please read the entire quiz before starting.

(5) Question 1. Give the decimal value……

$C_3 = -128+64+2+1 = \text{-61}$

(5) Part 2a. Specify 0 or 1 ……………

100 - 210 = -110 (doesn’t fit)

C = 1

(5) Part 2b. Specify 0 or 1 ……………

100 - -46 = +146 (doesn’t fit)

V = 1

(5) Question 3. Specify A-H ………………

C) 16-bit signed fixed-point number with resolution of 0.01

Precision is 4000 alternatives (0 to 3999)
R_{\text{max}} is 399.9Ω

(5) Question 4. Give the range……

Precision is 4000 alternatives (0 to 3999)
R_{\text{max}} is 399.9Ω

(5) Question 5. Show the machine code…. 

$\text{6E5B}$

(5) Question 6. Give example inputs, specify “none” if none exist.

None, 255*255<65535

(5) Question 7. Give example inputs, specify “none” if none exist.

Divide by 0 causes overflow

(5) Part 8a. What value is pushed?…………

Return address is pushed
16-bit $\text{5005}$

(10) Part 8b. Simplified memory cycles (you may or may not need all 5 entries)

<table>
<thead>
<tr>
<th>R/W</th>
<th>Addr</th>
<th>Data</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>$\text{5008}$</td>
<td>$\text{5E}$</td>
<td>IR=$\text{5E}$, PC=$\text{5009}$</td>
</tr>
<tr>
<td>R</td>
<td>$\text{5009}$</td>
<td>$\text{02}$</td>
<td>EAR=$\text{0002}$, PC=$\text{500A}$</td>
</tr>
<tr>
<td>W</td>
<td>$\text{0002}$</td>
<td>$\text{12}$</td>
<td></td>
</tr>
</tbody>
</table>
(15) Question 9. Write the assembly language. (not a subroutine or a main program, just instructions)

; Solution 1
bclr DDRT,#$08
bset DDRT,#$04

; Solution 2
ldaa DDRT
anda #$F7 ; clear bit 3
oraa #$04 ; set bit 2
staa DDRT

(30) Question 10. Write the assembly language subroutine. (Do not include the main program)

; Solution 1
;*******Set5**********
; Initializes memory $3900 to 397F to value 5
; inputs: none
; outputs: none
; errors: none
Set5 ldx #$3900
loop movb #5,1,x+ ; copy value to memory
  cpx #$397F
  bls loop
  rts

; Solution 2
;*******Set5**********
; Initializes memory $3900 to 397F to value 5
; inputs: none
; outputs: none
; errors: none
Set5 ldx #$3900
   ldab #5
   loop stab 1,x+ ; copy value to memory
     dbne A,loop
   rts

; Solution 3
;*******Set5**********
; Initializes memory $3900 to 397F to value 5
; inputs: none
; outputs: none
; errors: none
Set5 ldx #$3900
   ldab #5
   loop stab 1,x+ ; copy value to memory
     deca
bne loop
rts