Prob.1	Prob.2	Prob.3	**Total**

Name :   Section :   *I.D.*

Answer all three questions, which carries equal marks.   *Exam TIME: 6:30 to 8:00 PM*

1(a). Find the address of Port A and Port C of 0th PPI. Show how you obtain your answers and write them in the specified box below. *Assume don't care address pins are at 'logic 0' state.*
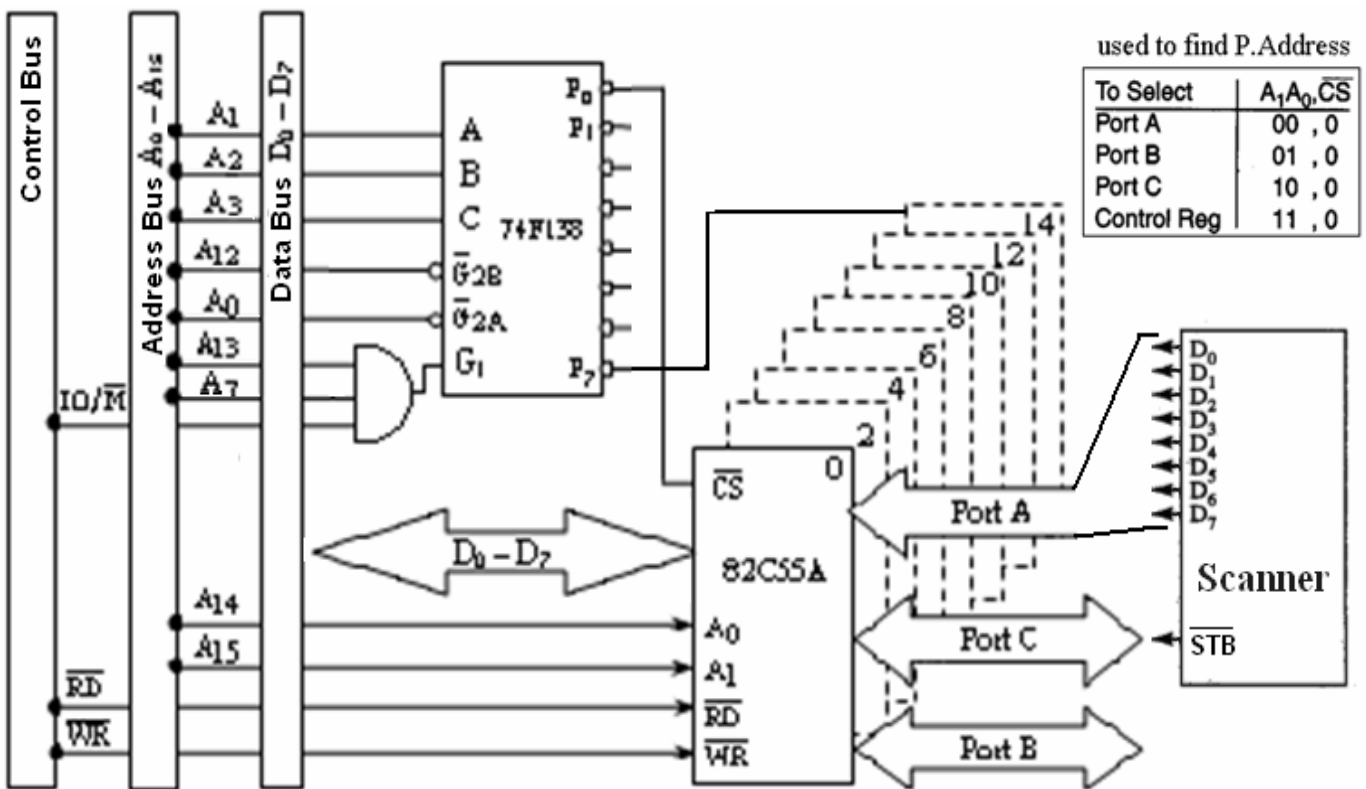
Port A (Physical address)	(in Hex)
Port C (Physical address)	(in Hex)

Remember to use 0's for don't cares address pins.

1(b). As shown in the previous figure, the data pins (D_0-D_7) of the scanner are connected with the PA_0-PA_7 (port A) of the 0th PPI and the strobe signal ($\overline{STB}$) of the scanner is connected with the LSB of Port C, of the 0th PPI.

Assume that once a byte-data is scanned, the scanner generates a short strobe-pulse ('1' ➔ '0' ➔ '1'), during which the computer receives the scanned data-byte. (*Thus, during 'logic 0' state of $\overline{STB}$ signal, PA_0-PA_7 of the 0th PPI receives the scanned data-byte but during 'logic 1' state, PA_0-PA_7 of the 0th PPI do not receive any data from the scanner*)

Write an efficient assembly language program, which will use Isolate I/O interface to operate the PPI in MODE 0 and store eleven scanned data bytes in memory location starting from physical address DS:000A$_H$. The unused ports of the PPI should behave like output ports.

```
TITLE  "Question 1(b)"
.MODEL  SMALL
.STACK  032H
.DATA
.CODE
      MOV  AX, @DATA
      MOV  DS, AX
```

Use as many lines as needed (to write an efficient program).

Line 1:_____   Line 15: _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

Line 14: _____   _____

```
                          MOV AX,4C00H
                          INT 21h
                       END
```

2(a). Execute the program up to INT 21H instruction and find the required <u>memory</u> and <u>register</u> contents. For 'SAHF' instruction, AH is give by =
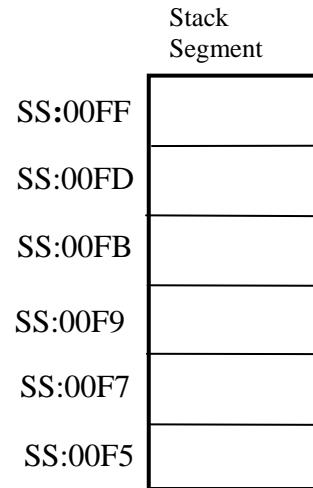
SF	ZF	0	AF	0	PF	1	CF

```
 Title "Question 2a "
.MODEL small
.STACK 32
.DATA
        VAR1  DW  0403H, 0518H, 0B2AH
        VAR2  DB   16H, A2H, B3H, 40H, 15H
        VAR3  DB   11H, 22H, 33H, 44H, 55H
.CODE
        MOV    AX,@DATA
        MOV    DS, AX
        MOV    SP, 00FDH
        LES    AX, [VAR1]
        PUSH   AX
        LEA    BX, [VAR3]
        XLAT
        PUSH   AX
        CALL   SUB1
CS:1234 : POP   BX
        MOV    AX, 4C00H
        INT    21H
           SUB1  PROC NEAR
               MOV   AX, SP
               SAHF
               RET
           ENDP
   END
```

Write the appropriate values:

Stack
Segment

SS:00FF

SS:00FD

SS:00FB

SS:00F9

SS:00F7

SS:00F5

After the program execution, find:

BX = _____ ;

SP = _____ ;

Carry Flag = _____ ;

2(b). **Answer the following questions in the given space below:**

(i) Write a program (sequence of instructions) that will load the offset address of '4321_H' into Instruction Pointer (IP).

(ii) When the 8086's A_0 and $\overline{BHE}$ pins are both at 'logic high' state, CPU access;

   (a) Even addressed Word

   (b) Odd addressed Word;   (**Encircle** the correct answer/answers)

   (c) None of the above ;

3(a). Write the approximate steps needed to complete an Input/output Read Bus-cycle for a 8088 CPU, operating in Minimum-Mode.

_____

_____

_____

_____

_____

_____

_____

_____

3(b). For a minimum mode Write Bus-cycle, pin 28 of the CPU is sending a signal of

'M/$\overline{\text{IO}}$' = 'logic 1'. What type of CPU is used here (8088/8086): _____.

3(c). If SI=1234$_H$ and DI=9876$_H$, Write a program using 'REP' prefix' and 'String Handling Instruction', which will move 3 data-bytes starting from a physical address DS:SI to ES:DI. (*Use the given lines for the program.*)

Line 1: _____

_____

_____