

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI  
II SEMESTER 2013-2014  
EEE/CS/INSTR F241 MICROPROCESSOR PROGRAMMING AND INTERFACING  
Mid-Semester Exam (OPEN BOOK)  
07-03-2014

MARKS: 80

ID No:

Note: The paper contains 12 questions. Write your answer in the space provided.

Q1. State which of the following instructions are valid or invalid for 8086 microprocessor. (10)

DURATION: 90 MIN

Sec:

- a) MOV AH,CX
- b) MOV 1234H,AX
- c) MOV CS,[SI]
- d) MOV [1234H],[1234H]
- e) MOV [SI+DI],CX

Q2. What will be the contents of the CX register after execution of the following code snippets? Write 'X' if the contents cannot be determined. (6)

a) MOV CX, 54H  
MOV BX, 3300H  
MOV AX, 7666H  
MOV [BX], AX  
ADD CX, 777H  
MOV CX, [BX]

b) MOV AX, 3H  
MOV BX, 3H  
MOV CX, 00H  
ADD CX, 3H  
INC CX,5

CX=

Q3. After the x86 is reset, from which memory location does the x86 fetches the first instruction. (1)

Q4. Mention the two ways the Trap flag register can be set/reset. (2)

Q5. If the microprocessor is working at 2 MHz and memory access time is 500 ns, then how many wait states are required? Assume set-up time for address and data to be zero. Ignore buffer delays also. (2)

Q6. Find the status of the flag register (8086) after the execution of the following instruction. Provide the answer using 1 or 0. Assume all the flags mentioned below are zero initially. (6)

MOV AL, OFFH  
INC AL

a) carry flag

b) parity flag

c) zero flag

d) Auxiliary carry flag

e) sign flag

f) overflow flag

Q7. Mention true/False for the following statements applied to memory segments (4)

a) Two segments may overlap -

b) Four segments may partially overlap -

c) No segments may overlap -

d) Four segments may completely overlap -

Q8. For the following instructions, determine the addressing mode and the Machine code in hexadecimal. Assume instructions are in 16 bit mode of operation. (6)

a) MOV EBX, 12340000H

b) MOV AX, 4020[BX+DI]

Q9. If an 8086 processor is working at 10 MHz - how much time does two MEMR cycles take, (6)

a) If there are no wait states

p) If there are 3 wait states

- pl. Write the machine cycles executed for the following instructions (8)  
CPU operating in 16 bit mode). State them in the right order
- a) PUSH 3324H
  - b) MOV [DI], AX
  - c) ADD EAX, 09H
  - d) ADC EAX, [09H]

pl. With reference to the 8086 assembly program given below,

.MODEL TINY  
.DATA

```
PORT1 EQU 7
LOC1 DB 28H, OFFH, 76H, 05H, 0F1H
ARRAY DW 43ABH, 66H, 175, 00H
LOC2 DB 5 DUP(00H)
DAT1 DB 'VALID'
ALIGN 2
DAT2 DD 4B3H
DAT3 DQ 43ABH
DAT5 DW 08H
DAT6 DW ?
```

.CODE  
.STARTUP

```
MOV SI, OFFSET LOC1
ADD SI, PORT1
MOV AL, [SI+1]
MOV BX, DAT5
MOV CL, [SI+BX]
MOV DX, [SI+BX+5]
```

.EXIT  
END

(10)

pl. Fill the 40 locations in data segment starting from 0118H.

0118H

DS:0120H  
DS:0128H  
DS:0130H  
DS:0138H

b) Determine the final values of AL,BX,CL,DX registers.

(4)

register	AL	BX	CL	DX
value				

Q12. Write a program that computes the square of a 16-bit number stored in memory at offset dat1. The result has to be stored again in memory at an offset res1. Write a near procedure to compute the square of the number and call this procedure from the main program. Use AX register to pass the parameter to the procedure.

(15)