Question Paper

Exam Date & Time: 24-Apr-2019 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.Sc (Applied Sciences) IN ENGINEERING
END SEMESTER THEORY EXAMINATION APRIL / MAY 2019
MICROPROCESSORS [ICS 241 - S2]

Marks: 100 **Duration: 180 mins.**

Answer 5 out of 8 questions.

1) A) Discuss the internal architecture of 8086 with a neat diagram. (10)

B) Describe the following 8086 assembler directives with an example for each. (5)
(i) EQU (ii) ASSUME (iii) DD

C) Compute the effective and physical addresses in each of the following cases. DS is used as the segment register and BX=0158, DI=10A5, Displacement=1B57, DS=2100. (5)
(i) Direct.
(ii) Register direct.
(iii) Register indirect assuming register BX.
(iv) Base index assuming registers BX and DI.
(v) Relative base index assuming registers BX and DI.

2) A) Consider the following 8086 code fragment. (6)

```
    MOV CX,N
    NOP
L1:NOP
    NOP
    NOP
    LOOP L1
```

What should be the value of N to generate a delay of 1000μs, assuming that the clock frequency of 8086 is 5MHZ.

B) Explain all the 8086 conditional flags with an example for each. (6)

C) Write an 8086 ALP that sorts an array of words in ascending order using selection sort technique. (8)

3) A) Consider a string of lowercase characters declared in the data segment. Write a complete 8086 ALP that will replace each character in the input string based on the following conditions. Toggle the character if the character in the input string is a vowel. Otherwise, replace the character with its previous character in the alphabetical order. (8)

	B)	Describe the following 8086 string instructions with an example for each. (i) MOVSW ii) CMPSB iii) SCASW (iv) LODSB (v) STOSB.	(5)
	C)	How can the parameters be passed to and from the procedures using pointers in 8086? Explain with an example program.	(7)
4)		Write short notes on the following 8086 interrupt types. (i) Type 0 (ii) Type 2 (iii) Type 4.	(6)
	A)		
	B)	List the series of actions that 8086 steps through while responding to an interrupt request. Also, explain the importance of interrupt vector table in 8086 interrupt response.	(6)
	C)	Discuss all the operational modes of 8255A.	(8)
5)		Explain the 8086 minimum mode system with a neat sketch.	(10)
	A)		
	B)	Draw the output timing diagram for 8086 minimum mode system.	(5)
	C)	Assume that 8259A operates in fixed-priority mode. The interrupt that is currently served is IR4. At this point, let us say an interrupt comes to IR2 pin. How do 8259A respond? Explain with a neat diagram.	(5)
6)		With a neat diagram, explain how 80286 computes physical address in segmentation mode.	(6)
	A)		
	B)	Answer the following: (i) Describe the bus unit of 80286. (ii) Define faults and traps with an example for each.	(6)
	C)	Write an 8086 ALP for the following. Define a recursive procedure called FACT which computes the factorial of a given number including '0' and '1'. The parameters are passed to and from FACT using memory.	(8)
7)		Write short notes on 80386 virtual 8086 mode.	(5)
	A)		
	B)	Describe the following pins of 80386. (i) BE0# to BE3# (ii) ADS# (iii) NA# (iv) BS16# (v) D/C#.	(5)
	c)	Answer the following: (i) Discuss how 80386 computes physical address in paging mode with a neat sketch. (ii) Write short notes on APIC feature of Pentium. (7+3)	(10)
8)		Write down the expects and returns for each of the following 8086 DOS interrupts.	(8)
	A)		

(i) INT 21H, function code 3CH.
(ii) INT 21H, function code 40H.
(iii) INT 21H, function code 42H.
(iv) INT 21H, function code 3DH.

B) Answer the following: (8)
(i) With a neat diagram, discuss the two integer pipelines of Pentium.
(ii) Write short notes on system management mode of Pentium. (6+2)

C) Explain the concept of passing parameters to a macro with an example program. (4)

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