

BITS PILANI, DUBAI CAMPUS

SECOND SEMESTER 2011- 2012

Comprehensive Examination (Closed Book)

Course Code: ES C263

II YEAR

Date: 10.06.2012 (AN)

Course Title: Microprocessors Programming & Interfacing

Max Marks: 120

Duration: 3 hours

Weightage: 40 %

- Note:**
1. Answer Part A, B and C in separate booklet.
 2. Answer sequentially and all parts of a question together.
 3. No Calculators are allowed.

PART-A

1. Convert from hexadecimal into binary.
BAD.DAD 2M
2. Convert the binary into octal number system
111101100.001101111 2M
3. Write the default 16 bit offset registers for all the segment registers. 4M
4. Write the advantages of segment and offset addressing scheme. 2M
5. Suppose a file is having 3 records namely RECA, RECB and RECC and each record contain 10 elements, write a program to add element 0 of RECA and element 1 of RECB and store the answer in element 2 of RECC using base relative plus index addressing method. 6M
6. MOV BYTEPTR [DI],22H
MOV DWORDPTR [DI],22H
Suppose DS:1100 H DI: 0250 H, Draw the contents of memory after executing these two instructions separately, and explain. 4M
7. Write the machine code appears in an 80386 or above processor, operated in the 16 bit instruction mode. Refer to the table attached.
MOV EAX, DS:[EDI+20] 5M
8. Write a program to write the string data FFFFH in the memory in 100 consecutive locations. 5M
9. Write a program to multiply the content of AX by 22 without using MUL instruction. 5M
10. Write a short sequence of instruction that sets 8th and 11th bit of register CX and inverts 12th and 15th bit of CX. 5M

Code	W = 0 (Byte)	W = 1 (Word)	W = 1 (Doubleword)	R/M Code	Function
000	AL	AX	EAX	000	DS:[EAX]
001	CL	CX	ECX	001	DS:[ECX]
010	DL	DX	EDX	010	DS:[EDX]
011	BL	BX	EBX	011	DS:[EBX]
100	AH	SP	ESP	100	Uses scaled-index byte
101	CH	BP	EBP	101	SS:[EBP]*
110	DH	SI	ESI	110	DS:[ESI]
111	BH	DI	EDI	111	DS:[EDI]

PART-B

1. Write a procedure named SQUARE that squares the contents of BL and places the result in BX.
(Complete program is not required.) 4M
2. Write a macro to check whether the string is palindrome or not. (Complete program is not required.) 8M
3. a. Write a program to read a character from keyboard, and echo it back to screen. If character = CONTROL_C, exit. (ASCII value of Control-C is '03', Use DOS and BIOS) 7M
b. Write a program to read a string from keyboard, and convert it to upper case and display it in the middle of the screen. 7M
4. Explain in brief the functions of clock generator chip 8284. What will be the PCLK output of the 8284, if the crystal oscillator is operating at 14MHz? 4+2M
5. Draw the timing diagram to represent the read from a memory, instruction. Show the state of the following signals during one bus cycle.
ALE, DT/ \overline{R} , Address, Address / Data, IO/ M, RD. 8M

PART-C

1. a. With a neat block diagram, explain a memory device, and explain all the signals clearly. 3M
b. How is memory decoding different in 8088 and 8086 microprocessors? 2M
c. With a truth table explain how memory selection is done using BHE and BI.E signals. 2M
d. Show how a 3-to-8 decoder is used to connect eight memory devices each of size 16K to a 8088 microprocessor. Clearly show the address range of each memory device. 8M
2. a. What is the significance of the IN and the OUT instructions? Give the different variations of the IN and OUT instructions. 3M
b. With a figure show how a 16 bit I/O port is decoded at I/O addresses 8AH and 8BH. Give the Programmable Array Logic Equations. 8M
3. a. Draw a neat block diagram of the 8255 Programmable Peripheral Interface . 4M
b. Show how the port address and control word register of the 8255 is selected as F0H, F1H, F2H and F3H. 3M
c. Where is the 8255 used? Name any two applications where the 8255 can be used. 2M
4. a. Name the flag bits used with interrupts. 2M
b. What is the purpose of the 8259 Programmable Interrupt Controller? Mention the blocks in the 8259. 3M

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Test – II (Open Book)

Course Code: ES C263

II YEAR

Date: 06.05.2012

Course Title: Microprocessors Programming & Interfacing

Max Marks: 60

Duration: 50 minutes

Weightage: 20 %

Note: Only prescribed text book and handwritten class notes are allowed.

1. Assume that CL contains 02_{hex} and AX contains $091A_{\text{hex}}$. Determine the new contents of AX and the carry flag after the following instruction is executed. 5M
 SAR AX, CL

2. The 2's complement signed data contents of AL are -1 and that of CL are -2. What result is produced in AX by executing the following instruction? 5M
 IMUL CL

3. Write a program to search a character in a given string using string operations and display the message "FOUND" or "NOT FOUND". 10M
(Example Input String: microprocessor, string to be searched: a)

4. Draw the timing diagram to represent the read from a memory, instruction. Show the state of the following signals during one bus cycle.
ALE, $\overline{\text{DT}}/\overline{\text{R}}$, Address, Address / Data, $\overline{\text{M}}/\overline{\text{IO}}$, $\overline{\text{RD}}$.

To the above timing diagram add two wait states and show the new timing diagram. What is the new signal required and explain why it is important to introduce wait states. Assume a negative edge triggered clock (activated on a high to low transition). 4 + 6 = 10M

5. Use Interrupts (DOS and BIOS) to clear the screen first, then position to the center of the screen and display the message "DO YOU LIKE CHOCOLATE ? Y/N " and to read the input y/n entered by the user and display the same on the screen. 10M

6. Write a ALP to find maximum number in the array of 10 numbers using procedure. 10M

7. Develop a macro to determine absolute value of an integer. And using this macro in the code find the absolute value of -5 and 8. 10M

*****ALL THE BEST*****

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SECOND SEMESTER 2011- 2012

Test – I (Closed Book)

Course Code: ES C263

II YEAR

Date: 18.03.2012

Course Title: Microprocessors Programming & Interfacing

Max Marks: 60

Duration: 50 minutes

Weightage: 20 %

Note: Calculators are not allowed. Answer all the questions.

- 1.a. Convert decimal number 1924 into packed BCD form. 2M
- b. Mention the memory size of Pentium microprocessor. 2M
- c. Convert binary-coded hexadecimal number 1111101011011110 into hexadecimal. 2M
- d. Represent the word CAB5H in little endian format at memory location 4543H. 4M

- 2.a. Determine the memory location addressed by the following real mode Pentium 4 register combinations. DS = 1239H, EDX = 0000A900H, BP = 3200H. 4M
- b. Find the starting and ending address of the memory segments, DS = 2135H, CS = 343AH and SS = 40BCH. Each segment occupy 64K bytes. Write the answers in tabular form. 6M

3. Convert the following from assembly language to machine language using 16 bit instruction mode format. Please refer to the table given below.
 - a. MOV BYTE PTR SS:[BP],DL 7M
 - b. MOV WORD PTR [BX+DI+20], F00FH 7M

4. Explain what happens when PUSHF instruction executes. 3M

5. Compare LEA instruction and MOV with OFFSET instruction. 3M

6. Write an assembly language **program** to copy a byte of data from the third location in an array to the seventh location of the array using the following three addressing modes.
 - a. Base plus Index addressing
 - b. Register relative addressing
 - c. Scaled index addressing 5X3 = 15M

7. Diagrammatically represent the address of the stack **before** and **after** executing the instruction PUSH DX. Given the following values SS = DB00H SP = FFA9H DX = C3B4H 5M

16-bit R/M
memory-addressing modes.

R/M Code	Addressing Mode	Code	W = 0 (Byte)	W = 1 (Word)
000	DS:[BX+SI]	000	AL	AX
001	DS:[BX+DI]	001	CL	CX
010	SS:[BP+SI]	010	DL	DX
011	SS:[BP+DI]	011	BL	BX
100	DS:[SI]	100	AH	SP
101	DS:[DI]	101	CH	BP
110	SS:[BP]*	110	DH	SI
111	DS:[BX]	111	BH	DI

BITS PILANI, DUBAI CAMPUS
SECOND SEMESTER 2011- 2012

Quiz – I (Closed Book)

Version - A

Course Code: ES C263

II YEAR

Date: 27.02.2012

Course Title: Microprocessors Programming & Interfacing

Max Marks: 15

Duration: 20 minutes

Weightage: 5 %

Note: Calculators are not allowed.

Name: _____

ID No. _____

Note: Answer all the questions.

1. _____ flag is a copy of the interrupt flag bit available to the Pentium – Pentium 4 microprocessors. 1M

2. In the real mode, show the starting and ending addresses of the segment located by the segment register value and occupying 64K bytes CAD1H. 2M

3. Determine the memory location addressed by the following real mode 80286 register combination
SS = 2800H, SP = 3A50H, DI = 2000H 2M

4. Convert the following Hexadecimal number to binary number BA.12F 1M

5. How many binary digits and hexa decimal digits are required to address a memory of size 16 MB
2M

6. Convert from decimal number given below to octal number 270.375

1M

7. Give appropriate instructions for the following commands (Program not required)

a. Add data stored in two variables Data1 and Data2 where Data1 and Data2 are words of data.

b. Move the byte contents of data at memory location 2000H to the Data Register and memory location 5050H to the base register .

c. Move binary data 83 to the 16 bit accumulator.

(2 + 2 + 2 M)

↓
(decimal)