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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

**Fourth Semester, B.E. - Information Science and Engineering**

**Semester End Examination; June/July - 2015**

**Microprocessor**

Time: 3 hrs

Max. Marks: 100

*Note: Answer FIVE full questions, selecting ONE full question from each Unit.*

### UNIT - I

- |                     |  |                     |                        |                 |               |                           |                   |   |
|---------------------|--|---------------------|------------------------|-----------------|---------------|---------------------------|-------------------|---|
| 1. a.               | Explain the various register functionality of 8086 processor.  | 10                  |                        |                 |               |                           |                   |   |
|                     | b. Identity the addressing mode of the following instructions:   |                     |                        |                 |               |                           |                   |   |
|                     | <table style="width: 100%; border: none;"> <tr> <td style="width: 33%;">i) MOV AX, [SI]</td> <td style="width: 33%;">ii) MOV CX, AX</td> <td style="width: 33%;">iii) ADD N1, DX</td> </tr> <tr> <td>iv) IN AL, DX</td> <td>v) ADD 123H [BX] [SI], CL</td> <td>vi) MOV AL, 123H.</td> </tr> </table> | i) MOV AX, [SI]     | ii) MOV CX, AX         | iii) ADD N1, DX | iv) IN AL, DX | v) ADD 123H [BX] [SI], CL | vi) MOV AL, 123H. | 6 |
| i) MOV AX, [SI]     | ii) MOV CX, AX   | iii) ADD N1, DX     |                        |                 |               |                           |                   |   |
| iv) IN AL, DX       | v) ADD 123H [BX] [SI], CL  | vi) MOV AL, 123H.   |                        |                 |               |                           |                   |   |
|                     | c. Produce the machine code for the following instructions:  |                     |                        |                 |               |                           |                   |   |
|                     | <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">i) MOV 23H [SI], AX</td> <td style="width: 50%;">ii) MOV AX, 1234H [BX]</td> </tr> </table>  | i) MOV 23H [SI], AX | ii) MOV AX, 1234H [BX] | 4               |               |                           |                   |   |
| i) MOV 23H [SI], AX | ii) MOV AX, 1234H [BX]   |                     |                        |                 |               |                           |                   |   |
|                     | 2. a. Explain the bus interface unit components in brief.  | 6                   |                        |                 |               |                           |                   |   |
|                     | b. Explain the usage of flag register and pointer registers of 8086 processor.   | 6                   |                        |                 |               |                           |                   |   |
|                     | c. Explain the MOV instruction template fields along with the code tables.   | 8                   |                        |                 |               |                           |                   |   |

### UNIT - II

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|-------|---|----|
| 3. a. | Describe stack related instructions of 8086 processor.  | 8  |
|       | b. Write the significance of NOP and HLT instructions.  | 4  |
|       | c. Develop an assembly language program to find largest of four integers (No array to be used). | 8  |
|       | 4. a. Explain the working of rotate instructions of 8086 processor. With example.               | 10 |
|       | b. What is pseudo instruction? Describe any four pseudo instruction of 8086 processor.          | 10 |

### UNIT - III

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|-------|---|----|
| 5. a. | Differentiate between procedure and macros.   | 6  |
|       | b. Write an assembly language program to find $nC_r$ of two integers $n$ and $r$ using recursive function.    | 10 |
|       | c. Explain EXTRN and PUBLIC.  | 4  |
|       | 6. a. What is the difference between calling a far procedure and a near procedure? Explain with example code. | 10 |
|       | b. Write an assembly language program to read $n$ integers and sort them in ascending order.                  | 10 |

### UNIT - IV

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|-------|--|----|
| 7. a. | Write an assembly language program to read two strings, check if the strings are equal or not. Use macros to input and display wherever necessary. | 10 |
|       | b. What is an interrupt? What are the different types of inbuilt interrupt service routines of 8086 processor? Reproduce interrupt vector table.   | 10 |

- 8.a. Example different types of REP instructions of 8086 processor. 6
- b. Explain the working of CMPSB instruction with an example. 6
- c. Discuss the steps involved in handling interrupts. How is the INTR interrupt address obtained by 8086 processor? 8

**UNIT - V**

- 9 a. With a neat diagram explain the minimum mode configuration of 8086 processor. 10
- b. Explain the following pins of 8086 processor : 6
- i)  $\overline{MN} / \overline{MX}$                       ii) CLK                      iii)  $\overline{BHE}$
- c. Draw the timing diagram for 8086 to perform read operation in minimum mode. 4
- 10.a. Explain the function of  $\overline{S_0}$ ,  $\overline{S_1}$ ,  $\overline{S_2}$ ,  $Q_{s_0}$ ,  $Q_{s_1}$ , signals of 8086 processor. 6
- b. Explain with a neat block diagram the working of 8259 interrupt controller. 8
- c. Draw and explain the timing diagram of write operation of 8086 processor. 6

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