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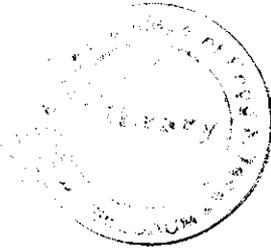
# Fourth Semester B.E. Degree Examination, June/July 2018
## Microprocessors and Microcontrollers

Time: 3 hrs.                                                                              Max. Marks: 80

*Note: Answer any FIVE full questions, choosing one full question from each module.*

### Module-1

1   a.   What is a microprocessor? With a neat diagram explain the internal block diagram of 8086 microprocessor along with functions of each block and registers. **(10 Marks)**

b.   What is an addressing mode? List the addressing modes of 8086 μp with one example each (any six modes). **(06 Marks)**

### OR

2   a.   What are the assembler directives? Explain the following assembler directives:
(i) DB     (ii) Assume     (iii) OFFSET     (iv) PTR **(04 Marks)**

b.   What is a flag and flag register? Explain the format of flag register with a suitable example. **(06 Marks)**

c.   Write an assembly level program (ALP) to sort a given set of 'n' 16-bit numbers in descending order. Using Bubble sort algorithm to sort given elements. **(06 Marks)**

### Module-2

3   a.   Explain the following instructions with a suitable example:
(i) MOV      (ii) PUSH     (iii) LEA     (iv) SHR
(v) ROL      (vi) CMP      (vii) DAA    (viii) TEST. **(08 Marks)**

b.   What is an interrupt? Explain various types with an interrupt vector table. **(08 Marks)**

### OR

4   a.   Explain the following instructions with a suitable example:
(i) XLAT     (ii) RCR      (iii) AAA     (iv) MUL
(v) DIV      (vi) LOOP     (vii) ROL     (viii) OR **(08 Marks)**

b.   Explain rotate instructions with an example. **(08 Marks)**

### Module-3

5   a.   With example, explain how to identify overflow and underflow using flags in a flag register for performing an arithmetic operation on 16-bit numbers. **(08 Marks)**

b.   Explain 74138 decoder configuration to enable the memory address 08000H to 0FFFFH to connect four 8K RAMS. **(08 Marks)**

### OR

6   a.   Briefly explain the control word format of 8255 IC in I/O mode and BSR mode. Find the control word if $P_A$ = out, $P_B$ = in , $P_{C0} - P_{C3}$ = in and $P_{C4} - P_{C7}$ = out. Use port address of 300H – 303H for the 8255 chip. Then get data from port A and send it to port B. **(08 Marks)**

b.   Write an assembly level program (ALP) to read $P_B$ and check number of one's in a 8-bit data as $P_A$ and display FFh on $P_A$ if it is even parity else 00h on Port A ($P_A$) if it is an odd parity. **(08 Marks)**

## Module-4

7  a. Compare CISC with RISC. (05 Marks)
   b. Explain registers used under various modes. (05 Marks)
   c. Explain ARM core data flow model with a neat diagram. (06 Marks)

**OR**

8  a. Explain the architecture of a typical embedded device based in ARM core with a neat diagram. (08 Marks)
   b. Explain the various fields in the current program status register. (08 Marks)

## Module-5

9  a. Explain the following instructions of ARM processor with suitable example:
   (i) MVN     (ii) RSB     (iii) ORR     (iv) MLA
   (v) SMULL   (vi) LDR     (vii) SWP     (viii) SWPB (08 Marks)
   b. Explain various formats of ADD instructions based on operands of ARM7 processor. (04 Marks)
   c. If $r_5 = 5$, $r_7 = 8$ and using the following instruction, write values of $r_5$, $r_7$ after execution
      MOV $r_7$, $r_5$, LSL $\neq 2$ (04 Marks)

**OR**

10 a. Explain software interrupt instruction of ARM processor. (06 Marks)
   b. Explain various types of SWAP instructions with syntax and example. (06 Marks)
   c. What are the silent features of ARM instruction set? (04 Marks)

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