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**University Examinations 2016/2017**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF TECHNOLOGY IN MECHANICAL ENGINEERING.

**EMT 3300: INTRODUCTION TO MICROPROCESSOR**

**DATE: DECEMBER, 2016 TIME: 2 HOURS**

**INSTRUCTIONS: -** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. With the aid of a block diagram, explain the functions of the following microcomputer sections
2. Microprocessor
3. ROM
4. Bus system
5. I/O ports (10 marks)
6. Explain the functions of the following microprocessor registers
7. Program counter
8. Instruction register
9. Stackpointer (6 marks)
10. State any two equipment used in microprocessors fault diagnosis (2 marks)
11. An 8-bit microcomputer has 32 address lines. Determine:
12. The number of addressable memory locations
13. The word size
14. The memory capacity (6 marks)
15. Write an assembly language program to add the contents of two memory locations FAOOH and FA01H and store the result in a third memory location FA02H. (6 marks)

**QUESTION TWO (20 MARKS)**

1. Define the following terms as used in memories
2. Volatile
3. Access time (4 marks)
4. A particular 8 bit microprocessor based system requires 4K bytes of RAM. Available RAM chips are 1K x4 bits
5. Determine the number of 1K x 4 bits chips required
6. Show how the 1K x 4 bits chips should be connected to achieve the 4K bytes of RAM required for the system. (13 marks)
7. State any three advantages of semiconductor memories over magnetic memories (3 marks)

**QUESTION THREE (20 MARKS)**

1. State two advantages and two disadvantages of the following I/O techniques
2. Isolated
3. Memory-mapped (8 marks)
4. Explain any three function of interfaces (6 marks)
5. State the three methods of parameter passing used in subroutines (3 marks)
6. State the three modes of DMA data transfer (3 marks)

**QUESTION FOUR (20 MARKS)**

1. Study the program below and determine; (12 marks)
2. The number of bytes being added
3. The address of the memory location where the final results is stored
4. The length of the program in bytes

STA 0091H ORG 1800H

LXI 1800H

MOV A,M

MVI C,0AH

AGAIN INX H

ADD M

DRC C

JNZ AGAIN

HLT

1. Describe the following microprocessor addressing modes (8 marks)
2. Immediate
3. Register indirect
4. Direct
5. Register