USN |__|__|__|__|__|__|__|__|__|__| 10ME65

Sixth Semester B.E. Degree Examination, June/July 2013

Mechatronics and Microprocessor

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Define mechatronics. Explain the differences between conventional approach and mechatronic approach to product design.   **(08 Marks)**
    b. What is measurement and control systems? Explain with examples.   **(08 Marks)**
    c. Illustrate a closed loop system with an example.   **(04 Marks)**

2   a. Define the following terms:
       i) Accuracy   ii) Resolution   iii) Response time   iv) Settling time   **(06 Marks)**
    b. Explain with a neat sketch, an eddy current proximity sensor.   **(06 Marks)**
    c. Explain how sensing is achieved by an absolute optical encoder.   **(08 Marks)**

3   a. Show how bipolar transistor can be used as a switch.   **(10 Marks)**
    b. What are stepper motors? Explain with a neat sketch, the principle of working of a permanent magnet stepper motor.   **(10 Marks)**

4   a. Write the pin connections for a 741 operational amplifier.   **(04 Marks)**
    b. Explain the principle of ADC of signals.   **(08 Marks)**
    c. What is pulse modulation? Explain the two types of modulation.   **(08 Marks)**

PART – B

5   a. What are universal gates? With the help of symbols and truth table, explain NOR and NAND gates.   **(05 Marks)**
    b. Using 8 bits, show how a negative number $(-91)_{10}$ is stored in memory.   **(07 Marks)**
    c. Convert the following:
       i) $(4DFA)_{16} = (.........)_{10}$ ii) $(0.862)_{10} = (.........)_2$
       iii) $(2747)_8 = (.........)_{10}$ iv) $(1100100101)_2 = (.........)_{16}$ **(08 Marks)**

6   a. Explain with a neat sketch, the internal architecture of INTEL 8085 microprocessor.
                                                                                 (12 Marks)
    b. Explain the following terminology, related to microprocessor:
       i)   Program counter   ii) Flag register
       iii) Stack pointer   iv) Accumulator   **(08 Marks)**

7   a. Explain the different types of addressing modes of INTEL 8085 microprocessor, with examples.   **(10 Marks)**
    b. With a flow chart, write a program for multiplication of two 8-bit numbers located in different memory locations and store the result back into memory.   **(10 Marks)**

8   a. Explain the flow of instruction and data in the 8085 microprocessor.   **(10 Marks)**
    b. Draw and explain the timing diagram for memory write operation.   **(10 Marks)**

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