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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) $(4DFA)_{16} = (\dots)_{10}$
 - ii) $(0.862)_{10} = (\dots)_2$
 - iii) $(2747)_8 = (\dots)_{10}$
 - iv) $(1100100101)_2 = (\dots)_{16}$
 (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)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written e.g. 42.8 = 50, will be treated as malpractice.