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10ME65

Sixth Semester B.E. Degree Examination, June/July 2016
Mechatronics and Microprocessor

Time: 3 hrs. Max. Marks:100

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

C.M.R. INSTITUTE OF TECHNOLOGY
Class

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 eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. What are the basic functions of control system? Mention the requirement of it in detail. **(06 Marks)**

b. What are the benefits of mechatronics in industries? **(06 Marks)**

c. Draw the structure of a programmable logic controller and mention the functions of each block. **(08 Marks)**

2 a. A potentiometer resistance transducer has a total winding resistance of 8KΩ and a maximum displacement range of 5cm. The power dissipation at maximum displacement is not to exceed 50 mW. Determine the output voltage of the transducer when the input displacement is 2cm. **(06 Marks)**

b. What are position sensors? Explain the working of Hall effect sensors and mention the advantages of it. **(08 Marks)**

c. Explain the operation of a linear variable differential transducer. **(06 Marks)**

3 a. Draw the switching arrangement of break before make and make before break. Mention disadvantages of mechanical switches. **(06 Marks)**

b. What are solenoids? What are the parameters to be consider for selecting a solenoids for an application. **(06 Marks)**

c. What is stepper motor and explain the working of a two stack stepper motor. **(08 Marks)**

4 a. Explain the operation of a optical isolator. **(06 Marks)**

b. For the op-amp circuit shown in Fig.Q.4(b), find the output voltage. **(04 Marks)**

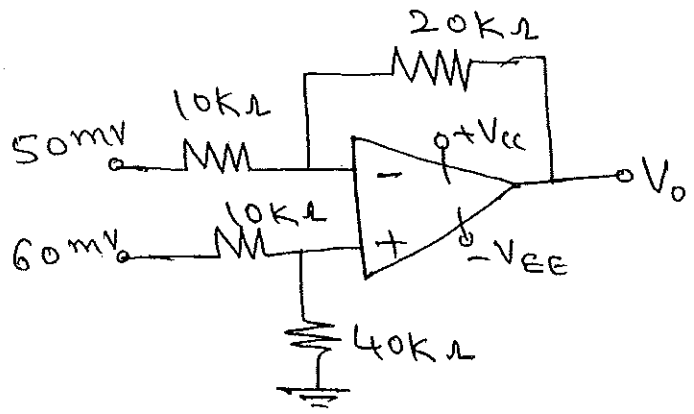

Fig.Q.4(b)

c. Illustrate a data acquisition system. **(07 Marks)**

d. What are the advantages of digital signal processing over analog signal processing? **(03 Marks)**

PART – B

5 a. Convert the following:
   i) $(ABC)_{16} = (_____)_{10}$
   ii) $(204.2)_8 = (_____)_{10}$
   iii) $(0.60)_{10} = (_____)_2$
   iv) $(101010.101)_2 = (_____)_{10}$. **(08 Marks)**

   b. Write a note on overflow and underflow. **(06 Marks)**

   c. Simplify the Boolean expression and realize using basic gates $Y = A\left(\overline{ABC} + A\overline{BC}\right)$. **(06 Marks)**

6 a. Define the following terms with respect to microprocessor:
   i) Fetch cycle
   ii) Accumulator
   iii) Interrupts
   iv) Stack pointer
   v) Write cycle. **(10 Marks)**

   b. Draw the block diagram of a micro controller and mention the functions of each block. **(10 Marks)**

7 a. Explain the different types of addressing modes of INTEL 8085 microprocessor with example. **(10 Marks)**

   b. Write a program to find the largest of N binary numbers that are stored at consecutive data memory locations starting at X. **(07 Marks)**

   c. What is the function of logical group of instructions and mention few of it. **(03 Marks)**

8 a. Draw the block diagram of a control unit and explain it. **(10 Marks)**

   b. Draw and explain the timing diagram of read operation. **(10 Marks)**

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