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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Fifth Semester, B.E. - Mechanical Engineering
Semester End Examination; Dec. - 2015
Mechatronics and Microprocessor

Time: 3 hrs   Max. Marks: 100

Note : *i) Answer **FIVE** full questions, selecting **ONE** full question from each **unit**.*
ii) Assume suitably missing data if required.

UNIT - I

1 a. Explain :

(i) Control element   (ii) Comparison element   (iii) Correction element   10

(iv) Process element   (v) Measurement elements of a closed loop system with examples.

b. With a suitable diagram explain the microprocessor based engine management system.   10

2 a. How sensors are classified? Explain with example.   7

b. State the principle of working and application of hall effect sensor.   8

c. Explain the method of debouncing using Schmitt trigger.   5

UNIT - II

3 a. Explain how Bipolar transistor can be used as switches.   8

b. With suitable circuit diagram, explain the phase control circuit.   8

c. What is the use if Snubber circuit? Explain it.   4

4 a. Explain the principle of brushless D.C. permanent magnet motor. Also explain the torque versus speed characteristic of it.   10

b. With a neat sketches, explain :

i) Variable reluactance stepper motor   10

ii) Permanent magnet stepper motor.

UNIT - III

5 a. With suitable examples, explain some of the process this can occur in conditioning a signal.   10

b. Explain the following :

(i) Inverting amplifier   10

(ii) Non inverting amplifier.

6 a. Explain how temperature compensation is achieved for :

(i) Platinum resistance temperature sensor   10

(ii) Electrical resistance strain gauge Using wheat stone bridge.

b. Explain with suitable sketches :

(i) Weighted resistor DAC   10

(ii) Successive approximation ADC.

UNIT - IV

7 a. In Intel 8085 microprocessor, How I/O devices are addressed. Explain. 10

  b. With a neat sketch Explain the functional organization of Intel 8085 μp. 10

8 a. What are the different addressing modes used in Intel 8085? Explain them giving one example for each. 10

  b. Draw the timing diagram for memory read cycle. 5

  c. Give the classification of Intel 8085 microprocessor Instruction set. 5

UNIT - V

9 a. Convert the following as specified :

  (i) $(7834.291)_{10}$ to Hexadecimal

  (ii) $(7B9C.BD)_{10}$ to Octal

  (iii) $(10110010.10101)_2$ to Decimal 6

  b. With truth table, explain OR, NAND, NOR an EXCLUSIVE –OR gates. 4

  c. Explain with example for each has - ve integers are represented in the memory. 10

10 a. It is desired to represent floating point number in an 8 bit per word memory with an accuracy of atleast five decimal digit and average of $10^{\pm38}$. Show by sketching the layout how the memory would be organized. 10

  b. Assuming 5 bit binary number with the left most bit being sign bit perform the following subtraction using both 1's-compliment method as 2's-Compliment method :

  (i) 00101-00100

  (ii) 01011-01101

  (iii) 00101-11010 10

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