Roll No

MMIP-104

M.E./M.Tech., I Semester

Examination, December 2017

Mechatronics

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt all questions.

ii) Attempt any two parts from each question.

iii) All questions carry equal marks.

1. a) What are the basic processes of MEMS? Discuss them in detail.

   b) Explain the construction and working of LVDT with help of neat sketch.

   c) Explain static performance characteristics of a sensors.

2. a) A unity feedback control system has its open loop transfer function given by $G(s) = \frac{4s+1}{s^2}$

   Determine an expression for the time response when the system is subjected to

   i) Unit impulse input function

   ii) Unit step input function.

   b) The characteristics equation of feedback control system

   $s^4 + 20s^3 + 15s^2 + 2s + k = 0$

   i) Determine the range of K for the system to be stable.

   ii) Can the system be marginally stable? If so find the required value of K and the frequency of sustained oscillation.

   c) Explain steps to sketch Bode Plot.

3. a) Discuss the principle and operation of PID controller.

   b) What is filtering? Mention the four different types of filters.

   c) Explain the Data Acquisition System.

4. a) Explain the applications of pneumatic and hydraulic controllers.

   b) Explain Stepper Motor.

   c) Compare the performance of various types of actuators.

5. a) i) Realize EX-OR gate with NAND logic.

   ii) Implement the expression with logic gates,

   AB + BCD + EFGH

   b) Explain the architecture of 8085 microprocessor.

   c) Explain programmable logic controller with neat diagram.

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