

04/05/2016

6E7013

Roll No. _____

Total No of Pages: **3**

6E7013

B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016

Mechanical Engineering

6ME3A Mechatronics

Common with ME, PI

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

*Attempt any **five** questions, selecting **one** question from each unit. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT-I

Q.1 (a) Explain merits and demerits of mechatronic system with suitable example. [8]

(b) Describe process control Automation in detail. [8]

OR

Q.1 (a) Explain flexible Manufacturing system in detail. [8]

(b) What are the key elements of any mechatronic system? Explain it's elements in brief. [8]

UNIT-II

- Q.2 (a) Describe the working of linear displacement transducers with suitable diagrams. [8]
- (b) What is the significance of actuators in equipments? Also define classification of actuators. [8]

OR

- Q.2 (a) An LVDT is used in an accelerometer to measure seismic mass displacement. The LVDT and signal conditioning output are 0.31mV/mm with a $\pm 20\text{ mm}$ core displacement. The spring constant is 240N/m and the core mass is 0.05 kg . Find
- (i) Relation between acceleration in m/s^2 and the output voltage
 - (ii) Natural frequency
 - (iii) Maximum acceleration measureable [5]
- (b) What are the selection criteria of any transducer? [6]
- (c) Write short note on flow sensor [5]

UNIT-III

- Q.3 (a) Differentiate between open loop and closed loop systems. [8]
- (b) Describe working and application of neural networks with suitable examples. [8]

OR

- Q.3 (a) Explain the role of control in mechatronics design. [8]
- (b) What are the operations used in digital signal processing? Also explain the digital signal processing for mechatronic application. [8]

UNIT-IV

- Q.4 (a) Describe analog to digital conversion with suitable diagrams. [8]
- (b) What do you mean by signal conditioning system? Explain the types of signal conditioning system. [8]

OR

- Q.4 (a) What is a data logger? Also define it's functional requirements. [8]
(b) Explain objectives of and applications of data Acquisition system. [8]

UNIT-V

- Q.5 (a) Define CNC machine in detail. [8]
(b) What are the technologies used in robot and manipulator arums? [8]

OR

- Q.5 (a) What do you mean by packaging system. Also define its objectives. [8]
(b) Explain Anti – lock braking system in brief. [8]
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