

6E 7013

Roll No. _____

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6E 7013**B.Tech. VI Semester (Main/ Back) Examination, May -June 2015****Mechanical Engineering****6ME3A Mechatronics****Time : 3 Hours****Maximum Marks : 80****Min. Passing Marks : 24****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 suitably be assumed and stated clearly.) Units of quantities used/ calculated must be stated clearly.

UNIT - I

1. a) Explain how mechatronics helps in automation of machines with the help of suitable example? (8)
- b) Write the application of Mechatronics in various disciplines. (8)

(OR)

1. a) Explain in detail the classification of Mechatronics system with some suitable example? (8)
- b) Describe in detail CNC machines. (8)

UNIT - II

2. a) What is the significance of sensor used in machines and equipments? Write and explain the classification of sensors. (8)
- b) Explain the working of temperature sensors with suitable diagrams. (8)

(OR)

2. a) What will be the change in resistance of an electrical resistance strain gauge with a gauge factor of 2.1 and resistance 50Ω if it is subject to a strain of 0.001? (8)
- b) Explain the principle and working of servomotors. Write its advantages and limitations. (8)

UNIT - III

3. a) Discuss in detail with suitable examples the role of modelling in Mechatronics design. (8)
- b) What is adaptive control Design? (8)
- (OR)
3. a) Describe the working and application of neural networks with suitable examples.
- b) Differentiate between continuous and Discrete - time state - space models. (8)

UNIT - IV

4. a) Why a data acquisition system is necessary? List the important features and applications of DAS. (8)
- b) What are the various processes used in signal conditioning? (8)
- (OR)
4. a) Describe operational Amplifier circuits for
- i) Inverting Amplifier
 - ii) Non-inverting Amplifier
 - iii) Summing Amplifier
 - iv) Comparator
- b) What is a data logger? List its applications. Compare it with DAS. (8)

UNIT - V

5. What is anti - lock braking system used in cars and describe the principles of its operation (16)
- (OR)
5. Compare hydraulic, electric and pneumatic robot drive systems. (16)