

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E.

Branch: Mechanical Engineering

Course Code: 20ME7DCMCT

Course: Mechatronics

Semester: VII

Duration: 3 hrs.

Max Marks: 100

Date: 20.02.2023

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably be assumed.

UNIT - I

- 1 a) Define Mechatronics; Discuss the evolution of Mechatronics. **06**
- b) Realize full subtractor using two half subtractors. **06**
- c) Discuss the application of mechatronics for Flexible Manufacturing systems. **08**

UNIT - II

- 2 a) Explain the detailed classification of transducers. **06**
- b) Explain the working principle of a sensor used for the measurement of proximity & displacement for non - conducting objects. **06**
- c) Discuss the processes / need for signal conditioning with appropriate examples. **08**

OR

- 3 a) Discuss the different types of filters used in signal conditioning process; Also differentiate between active & Passive filters. **08**
- b) Explain the binary weighted resistor type digital to analog converter for the conversion of $1101_{(2)}$ into analog form. **06**
- c) Write a note on Micro - sensors highlighting their applications. **06**

UNIT - III

- 4 a) Explain the working principle of hybrid stepper motor; Discuss its merits & demerits. **08**
- b) Explain the working principle of ball screw based linear drives along with thread forms and preloading aspects. **08**
- c) Highlight the various classifications of Cams & Followers. **04**

UNIT - IV

- 5 a) Differentiate between positive & non-positive displacement pumps. **06**
- b) Explain with neat sketch the working principle of the following pumps along with their applications: **14**
 - (i) Centrifugal pump
 - (ii) External gear pump

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

OR

- 6 a) Discuss with neat sketch **12**
(i) Butterfly valve
(ii) Counterbalance valve
- b) Write the graphic symbols for the following hydraulic elements **08**
i) 4/3 way valve ii) Spring loaded check valve iii) Accumulator
iv) Unloading valve v) Flow control valve vi) Direction control valve with push button actuation vii) Direction control valve with solenoid actuation viii) 2/2 way valve

UNIT - V

- 7 a) Make use of block diagram to explain the stages in air treatment. **10**
b) What are actuators? Give the classification of Actuators; Explain with neat sketch the working principle of double acting cylinder. **10**

B.M.S.C.E. - ODD SEM 2022-23