

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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E.

Branch: Mechanical Engineering

Course Code: 16ME7DCMCT

Course: Mechatronics

Semester: VII

Duration: 3 hrs.

Max Marks: 100

Date: 23.09.2023

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

UNIT - I

- 1 a) Define Mechatronics; Explain the life cycle factors & design environment factors of Mechatronic system. **06**
b) Explain the different levels of evolution of Mechatronics. **06**
c) Make use of block diagram to discuss the microprocessor based control system for Automatic Camera. **08**

UNIT - II

- 2 a) Discuss in brief: **10**
i) Hall effect sensors ii). Inductive proximity sensor
b) Explain the following terminologies with respect to transducers: **10**
i) Hysteresis
ii) Repeatability
iii) Dead band / Dead Time
iv) Range and Span

UNIT - III

- 3 a) Explain the working principle of silicon-controlled rectifiers with V-I characteristics. **08**
b) Differentiate between **12**
i) Thyristors & Triac
ii) Brushed D.C. Motor & Brushless D.C. Motor

OR

- 4 a) Explain the role of Accumulator in hydraulic system. **05**
b) Write any five valve actuation symbols used in Hydraulic circuits. **05**
c) Explain the working principle of solenoid activated double - acting cylinder with a neat sketch **10**

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.

UNIT - IV

- | | | | |
|---|----|---|-----------|
| 5 | a) | Realize full subtractor using two half subtractors. | 08 |
| | b) | Explain Edge triggered J-K Flip-Flop along with wave forms. | 12 |

OR

- | | | | |
|---|----|---|-----------|
| 6 | a) | Discuss the significance of signal conditioning. | 08 |
| | b) | Derive an expression for the voltage gain factor for summing amplifier. | 06 |
| | c) | Discuss in brief various filters used in signal conditioning | 06 |

UNIT - V

- | | | | |
|---|----|--|-----------|
| 7 | a) | Identify the size, addressing mode and category of the following instructions & also write full form of instructions:
i) SBI ii) STA iii) RAL iv) MOV M, C | 12 |
| | b) | Write an assembly language program to subtract 2A H from D8 H such that the 'Difference & Borrow' are stored in 'x and x+2 ' locations | 08 |
