U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 16ME7DCMCT **Max Marks: 100**
Course: Mechatronics **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.

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.

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

UNIT - I

1	a)	Identify the sensor, signal conditioner and display elements in the following measurement systems: i). Mercury in glass thermo meter ii). A Bourdon pressure gauge	**06**
	b)	Explain the factors considered in designing the mechatronic system.	**06**
	c)	Describe with the help of a block diagram microprocessor-based control system for automatic washing machine	**08**

UNIT - II

2		Discuss in brief i). Infrared sensors ii) Hall effect sensors iii). Piezo-electric sensor iv). Inductive proximity sensor	**20**

UNIT - III

3	a)	Explain S-R flip-flop as a contact bounce eliminator.	**06**
	b)	Explain the working principle of silicon-controlled rectifiers with V-I characteristics.	**07**
	c)	Explain the working principle of variable reluctance stepper motor.	**07**

OR

4	a)	Explain the role of Accumulator in hydraulic system.	**06**
	b)	Explain the working principle spool type direction control valve with a neat sketch.	**07**
	c)	Explain with a neat sketch the operating principle of single acting cylinder.	**07**

UNIT - IV

5	a)	Realize decimal to binary Encoder with logic diagram.	**07**
	b)	Realize the counter method of analog to digital conversion.	**07**
	c)	Realize full adder using two half adders.	**06**

OR

6	a)	Differentiate clearly between PAM & PWM.	**06**
	b)	Derive an expression for the voltage gain factor for non-inverting amplifier.	**06**
	c)	Explain Shannon's Sampling theorem.	**08**

UNIT - V

7	a)	Identify the size, addressing mode and category of the following instructions & also write full form of instructions i) ADI ii) SHLD iii) RLC iv) STAX	**12**
	b)	Write an assembly language program to divide D9 H from 2B H such that the 'Quotient & remainder' are stored in 'x and x+2 ' locations	**08**

****

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