DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary Winter Examination – 2024

Course: B.Tech.   **Branch :** Mechanical Engineering/Mechanical Engineering(Sandwich)
Semester : VII
Subject Code & Name: BTMC701 Mechatronics

Max Marks: 60   Date:05/02/2025   **Duration: 3 Hr.**

Instructions to the Students:
1. Each question carries 12 marks.
2. Question No. 1 will be compulsory and include objective-type questions.
3. Candidates are required to attempt any four questions from Question No. 2 to Question No. 6.
4. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
5. Use of non-programmable scientific calculators is allowed.
6. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	**Objective type questions. (Compulsory Question)**		**12**
1	Question : The function of transducer is to convert	Level 1	1

a. one form of energy into another form of energy

b. mechanical energy into electrical energy

c. electrical energy into mechanical energy

d. mechanical displacement into electrical signal

2	Question : The transfer function of a system refers to the	Level 1	1

a. ratio of Laplace transform of output to Laplace transform of input

b. ratio of Laplace transform of input to Laplace transform of output

c. product of Laplace transform of output and Laplace transform of input

d. none of the above

3	Question : Non-contact sensors have	Level 1	1

a. physical contact between the measured object and sensor

b. no physical contact between the measured object and sensor

c. all of the above

d. none of the above

4	Question : A sensor that converts speed of rotation directly into an electrical signal is called	Level 1	1

a. tachogenerator   b. tachometer   c. orifice meter   d. venturimeter

5	Question : An ideal amplifier has-------------input impedance	Level 1	1

a. high   b. low   c. medium   d. none of the above

6	Question : A 4/2 Directional Control Valve(DCV) has	Level 1	1

a. 2 ports   b. 4 ports   c. 6 ports   d. none of the above

7	Question : An -------------acts as a storage device for high pressure fluid and can store and release the hydraulic oil at a required system pressure	Level 1	1

a. accumulator   b. receiver   c. tank   d. none of the above

8	Question : The function of a check valve is to allow flow in----------	Level 1	1

a. one direction   b. two directions   c. three directions   d. none of the above

9	Question : Speed of a DC motor changes with	Level 1	1

a. flux   b. resistance in the armature circuit   c. voltage   d. all of the above

10	Question : An I/O port have to be of	Level 1	1

a. 8 bit   b. 16 bit   c. 7 bit   d. any width

11	Question : The integral control mode is	Level 1	1

a. phase leading   b. phase lagging   c. inphase   d. phase reversing

12	Question : The term PLC stands for	Level 1	1

a. personal logic controller   b. programmable logic controller   c. programmable logic computer   d. personal logic computer

Q. 2   Solve the following.   **12**

A)	What are the important advantages of mechatronics systems?	CO1	6
B)	How a capacitive proximity sensor works? Explain any one proximity sensor with a neat sketch.	CO1	6

Q.3	Solve the following.		12
A)	What is the need for signal conditioning? What are the operations performed by the signal conditioner?	CO2	6
B)	How a seven segment display works? Explain it with an example.	CO2	6
Q. 4	Solve Any Two of the following.		12
A)	Compare physical components of hydraulic and pneumatic systems.	CO3	6
B)	Explain the controlling of a double-acting cylinder with a suitable pneumatic circuit.	CO3	6
C)	Why are cascaded system circuits preferred for multi-cylinder control problems? Explain it with a suitable example.	CO3	6
Q.5	Solve Any Two of the following.		12
A)	Explain the architecture of a 8085 microprocessor with a suitable sketch.	CO4	6
B)	What are the guidelines used for selection of Programmable Logic Controllers (PLCs)? Explain it with one practical example.	CO4	6
C)	How Ladder Logic programming technique is used for programming of PLCs? Explain it with a suitable example.	CO4	6
Q. 6	Solve Any Two of the following.		12
A)	What do you mean by transfer function? Explain it with an example.	CO5	6
B)	How an integral controller works? Explain it with an example.	CO5	6
C)	Explain the PID controller with an example.	CO6	6

*** End ***