Reg No.:_____ Name:_____





**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

Sixth Semester B.Tech Degree (Hons.) Examination June 2020

**Course Code: BM362**

**Course Name: MECHATRONICS**

Max. Marks: 100 Duration: 3 Hours

**PART A**

***Answer any two full questions, each carries 15 marks.*** Marks

1 a) Describe the role of mechatronics in daily life with examples? (5)

b) A fluid storage tank set pressure is 5KPa. With neat sketch propose a method to maintain the set pressure? (10)

2 a) Describe the below actuators in detail with neat sketches (15)

a)Cams

b)Stepper motor

c)Linear hydraulic actuator

3 a) Discuss about the basic building blocks of a rotational mechanical system (7)

b) Explain the role of a kinematic chain in a single cylinder crank arrangement with neat sketch (8)

**PART B**

***Answer any two full questions, each carries 15 marks.***

4 a) Develop the mathematical model for any electro mechanical system? (10)

b) Describe the role of PLC in automation with its internal block diagram? (5)

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| 5 | a) | State the definition of a system transfer function with its properties | (5) |
| | b) | Describe the different manufacturing processes involved in MEMS manufacturing | (10) |
| 6 | a) | Compare the dynamic system response of a first order system for the below inputs<br>a) unit step signal<br>b) unit ramp signal | (10) |
| | b) | How is an adaptive controller different form a PID controller? | (5) |

## PART C

***Answer any two full questions, each carries 20 marks.***

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| 7 | a) | How point to point NC machines are different from contouring systems? | (10) |
| | b) | Describe the internal architecture of any robotic system. | (10) |
| 8 | a) | Comment on NC, CNC and DNC machine tools and also list down the advantages and limitations of NC, CNC and DNC machine tools. | (10) |
| | b) | How important is resolution, repeatability and accuracy in the design of a robotic manipulator? | (10) |
| 9 | a) | What are the key parameters to be considered in designing an NC machine tool and why? | (10) |
| | b) | Explain the role of robotics in biomedical engineering with existing robotic systems as examples. | (10) |

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