

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019**

**Course Code: MR482**

**Course Name: Mechatronics**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks.*

Marks

- |   |   |       |
|---|---|-------|
| 1 | Demystify Mechatronics?   | ( 5 ) |
| 2 | Differentiate between open loop and closed loop control system?                                       | ( 5 ) |
| 3 | Explain the advantages of hydrodynamic bearing over antifriction bearing                              | ( 5 ) |
| 4 | Write short note on adaptive machine Controllers  | ( 5 ) |
| 5 | Write short note on proximity sensing in robotic application and how it helpful for robotic movements | ( 5 ) |
| 6 | Mention the stages involved in the design process of a mechatronics system                            | ( 5 ) |
| 7 | Illustrate basic block diagram of engine management systems & list its major components               | ( 5 ) |
| 8 | With a neat sketch design a closed loop systems for heating a room                                    | ( 5 ) |

**PART B**

*Answer any three full questions, each carries 10 marks.*

- |    |   |       |
|----|---|-------|
| 9  | a) Explain the evolution of Mechatronics?   | ( 4 ) |
|    | b) With neat sketch explain any one mechatronics system used in our daily life?                 | ( 6 ) |
| 10 | a) With neat sketch explain the working of piezo electric crystal?                              | ( 7 ) |
|    | b) How a piezo electric crystal can be converted to a piezo electric sensor? Explain in detail? | ( 3 ) |
| 11 | a) Define Preloading? Explain any two methods of preloading                                     | (10)  |
| 12 | a) Explain PID controller.  | (5)   |
|    | b) Explain any one of the PID controller tuning technique                                       | (5)   |
| 13 | a) Explain the architecture of programmable logic controller                                    | (10)  |

**PART C**

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

- 14 a) With neat sketch explain the significance, characteristics of Modern CNC over conventional NC machines. (15)
- 15 a) With a suitable block diagram discuss the working of robot (6)  
b) Explain the working tactile sensing in robotics (6)  
c) Discuss about the limitations of robots (3)
- 16 a) Compare artificial neural networks with biological neural networks (10)  
b) List key features of processing elements of ANN are suggested by the properties of biological neurons (5)
- 17 a) Investigate the working of pick and place robot with a suitable block diagram (15)

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