Code No:**R1641031** **R16** **Set No. 1**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**MECHATRONICS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any FOUR questions from Part-B***
*********

## PART–A *(14 Marks)*

| | | | |
|---|---|---|---|
| 1. | a) | State the significance of light sensors. | [2] |
| | b) | List the applications of solid state electronic devices. | [3] |
| | c) | State the advantages of electrical actuation systems. | [2] |
| | d) | Write the limitations of process controllers. | [3] |
| | e) | List the applications of Digital Signal Processing. | [2] |
| | f) | Write about principle of controller. | [2] |

## PART–B *(4x14 = 56 Marks)*

| | | | |
|---|---|---|---|
| 2. | a) | Discuss about measurement system and control systems. | [7] |
| | b) | Explain acceleration sensors with neat diagram. | [7] |
| 3. | a) | Illustrate the working of operational amplifiers with neat circuit diagrams. | [6] |
| | b) | Discuss about the following<br>i) PN Junction diode ii) Noise reduction | [8] |
| 4. | | Discuss the working principle of hydro-pneumatic servo system in detail. | [14] |
| 5. | a) | Explain Programmable Logic Controllers (PLCs) versus computers. | [7] |
| | b) | Discuss the block diagram of micro controller. | [7] |
| 6. | | Analyze different types of Digital to Analog converters in detail. | [14] |
| 7. | | Explain dynamic models and analogies with an example in detail. | [14] |

Code No:**R1641031** **R16** **Set No. 2**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**MECHATRONICS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any FOUR questions from Part-B***
*********

## PART–A *(14 Marks)*

| | | | |
|---|---|---|---|
| 1. | a) | State the significance of fluid pressure sensors. | [2] |
| | b) | Illustrate the types of filters. | [3] |
| | c) | Write the limitations of mechanical actuation systems. | [2] |
| | d) | List the applications of microprocessor. | [3] |
| | e) | Outline the advantages of Digital Signal Processing. | [2] |
| | f) | Define digital controllers. | [2] |

## PART–B *(4x14 = 56 Marks)*

| | | | |
|---|---|---|---|
| 2. | a) | Illustrate mechatronics design process with neat diagram. | [7] |
| | b) | State and explain advantages and disadvantages of mechatronics systems. | [7] |
| 3. | | Discuss analog signal conditioning in detail. | [14] |
| 4. | a) | Differentiate between hydraulic and pneumatic actuating systems. | [7] |
| | b) | Discuss the working principle of electro-pneumatic servo system. | [7] |
| 5. | | Analyze the working of programmable logic controllers in detail. | [14] |
| 6. | | Discuss the different types of Analog to Digital converters in detail | [14] |
| 7. | | Explain the design of mechatronics systems and future trends. | [14] |

Code No:**R1641031** **R16** **Set No. 3**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**MECHATRONICS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any FOUR questions from Part-B***
*****

## PART–A *(14 Marks)*

| | | | |
|---|---|---|---|
| 1. | a) | State the significance of liquid flow sensors. | [2] |
| | b) | Write the applications of FET. | [3] |
| | c) | Outline the advantages of fluid systems. | [2] |
| | d) | List the applications of digital electronics and systems. | [3] |
| | e) | Write the importance of system interfacing. | [2] |
| | f) | Define static response of system. | [2] |

## PART–B *(4x14 = 56 Marks)*

| | | | |
|---|---|---|---|
| 2. | a) | Discuss the levels of mechatronics system. | [7] |
| | b) | Explain proximity sensors with neat sketch. | [7] |
| 3. | a) | Illustrate about PN junction diode in detail? | [10] |
| | b) | What are the advantages of DIAC? | [4] |
| 4. | | Explain the components and working of hydraulic system with applications. | [14] |
| 5. | | Discuss the block diagram of microprocessors with neat diagram. | [14] |
| 6. | a) | Write about interfacing motor drives. | [6] |
| | b) | Explain block diagram of data acquisition system. | [8] |
| 7. | | Interpret various types of process controllers in detail. | [14] |

Code No:**R1641031** **R16** **Set No. 4**

**IV B.Tech I Semester Regular/Supplementary Examinations, March - 2021**

**MECHATRONICS**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any FOUR questions from Part-B***
*****

## PART–A *(14 Marks)*

| | | | |
|---|---|---|---|
| 1. | a) | State the significance of liquid level sensors. | [2] |
| | b) | Outline the applications of LEDs. | [3] |
| | c) | Write the advantages of electro-hydraulic servo system. | [3] |
| | d) | List the applications of PLCs for control. | [2] |
| | e) | Write the importance of data acquisition. | [2] |
| | f) | What is the significance of dynamic models and analogies. | [2] |

## PART–B *(4x14 = 56 Marks)*

| | | | |
|---|---|---|---|
| 2. | a) | Discuss elements of mechatronics system. | [7] |
| | b) | Explain temperature sensors with neat sketch. | [7] |
| 3. | a) | Write the significance, working and applications of BJT in detail. | [10] |
| | b) | What are the advantages of TRIAC. | [4] |
| 4. | a) | Discuss the components and working of pneumatic system. | [7] |
| | b) | Analyze different types of control valves. | [7] |
| 5. | | Illustrate about digital logic control and process controllers in detail. | [14] |
| 6. | | Explain Digital Signal Processing and data flow in DSPs in detail. | [14] |
| 7. | | Discuss functions and working of programmable logic controllers? | [14] |