**18MED22**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **June, 2022** | **Mechanical Engineering** | | |
| **Sixth Semester** | **Mechatronics** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. | a) | Define Mechatronics | CO1 | |  |
|  | b) | Applications of LVDT | CO1 | |  |
|  | c) | What is the function of a multiplex in DAQ? | CO2 | |  |
|  | d) | What is the purpose of Direction control valve? | CO2 | |  |
|  | e) | Define Transfer function | CO2 | |  |
|  | f) | Differentiate open loop and closed loop system | CO1 | |  |
|  | g) | Dynamic characteristics of sensor | CO3 | |  |
|  | h) | List applications of PLC | CO3 | |  |
|  | i) | Purpose of Relays in PLC | CO4 | |  |
|  | j) | Stages in mechatronics system | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | Explain in detail about Mechatronics measuring system | CO1 | **5M** | |
|  | b) | With the help of block diagram explain data acquisition system in detail | CO1 | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Classify sensors in detail. Explain selection of sensors. | CO1 | **5M** | |
|  | b) | What is basic structure of signal processing? Explain | CO1 | **5M** | |
| **Unit - II** | | | | | |
| 4. | a) | Differentiate among Hydraulic, Pneumatic and Electrical actuation system | CO2 | **5M** | |
|  | b) | Write the differential equation for the system shown in fig. | CO2 | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Explain the significance of Testing and calibration in mechatronics systems | CO2 | **5M** | |
|  | b) | Define node analysis and mesh analysis in an electrical system. | CO2 | **5M** | |
| **Unit - III** | | | | | |
| 6. |  | Explain dynamic response of Second-order system with suitable examples. | CO3 | **10M** | |
|  |  | **(OR)** |  |  | |
| 7. | a) | How the block diagrams are represented? Give the block diagram if the system is in series. | CO3 | **5M** | |
|  | b) | Discuss the working of PID controller. | CO3 | **5M** | |
| **Unit - IV** | | | | | |
| 8. |  | Draw and explain in detail about the architecture of PLC. Also explain about input /output channels present in PLC. | CO4 | **10M** | |
|  |  | **(OR)** |  |  | |
| 9. | a) | What is the need of a counter? Show the basic counting program using a ladder diagram. | CO4 | **5M** | |
|  | b) | List the seven modules of mechatronics design approach. | CO4 | **5M** | |

****