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



**End Semester Examination – Nov/Dec – 2019**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **14ME2042** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MECHATRONICS AND CONTROL SYSTEMS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | With neat block diagram explain open loop and closed loop system. | CO1 | 10 |
| b. | Describe the elements of a control system employed to regulate the speed of a shaft with neat sketches. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Define sequential control system. Explain the steps involved in the working of washing machine with proper sketch. | CO1 | 15 |
| b. | Construct a block diagram and discuss the control system responsible for the autofocus in a digital camera. | CO1 | 5 |
|  |  |  |  |  |
| 3. | a. | Elaborate the construction and working of servo and proportional control valves with neat sketches. | CO2 | 15 |
| b. | Compare the features of hydraulic with pneumatic actuators. | CO2 | 5 |
| **(OR)** | | | | |
| 4. | a. | Design an optimal pneumatic circuit for a pick and place robot. | CO2 | 14 |
| b. | Explain the sequencing of two double acting pneumatic cylinder. | CO2 | 6 |
|  |  |  |  |  |
| 5. |  | Elaborate the role of sensors in a car engine management system with a neat block diagram. | CO3 | 20 |
| **(OR)** | | | | |
| 6. | a. | Classify the types of optical encoders. Discuss how angular displacement is sensed by an optical encoder with neat sketches. | CO3 | 14 |
| b. | List out the factors considered for the selection of a sensor. | CO3 | 6 |
|  |  |  |  |  |
| 7. | a. | With neat sketches explain various types of stepper motors. | CO4 | 10 |
| b. | Explain the construction and working of relays and solenoids. | CO4 | 10 |
| **(OR)** | | | | |
| 8. | a. | Explain about microcontrollers with block diagram. | CO4 | 10 |
| b. | Explain the common types of registers available in microprocessors. | CO4 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Discuss how AND, OR, NAND, NOR and XOR systems can be formed with a ladder diagram. | CO5 | 20 |