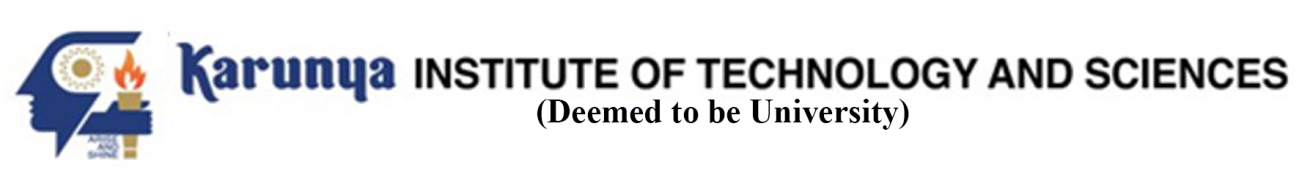
Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2018**

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|  |  |  |  |
| **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. | List out various reasons for automation. | CO1 | 5 |
| b. | Discuss the historical development in mechatronics. | CO1 | 5 |
| c. | Draw the block diagram for a measurement system of thermal filled station. | CO1 | 5 |
| d. | Name various elements in a mechatronic systems and draw the block diagram for a general measurement system. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Explain the basic elements of a closed loop control system with an example of heating a room. | CO1 | 12 |
| b. | Discuss on Closed loop verses open loop control systems | CO1 | 8 |
|  |  |  |  |
| 3. | a. | Discuss Routh-Hurwitz stability criteria. | CO2 | 10 |
| b. | Determine the stability of the system whose characteristic equation is given by s6 +s5 + 3s4 + 3s3 +3s2 +2s +1 = 0. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | Discuss the reduction rules of block diagram. | CO2 | 8 |
| b. | Find the canonical form of the following closed loop system the shown in below and determine the transfer function where R(s) and Y(s) are input and out signals.  https://www.kullabs.com/uploads/Picture7.png | CO2 | 12 |
|  |  |  |  |  |
| 5. | a. | Classify the data presentation systems. | CO3 | 4 |
| b. | Discuss briefly about A/D and D/A converters. | CO3 | 6 |
| c. | Discuss the working principle data presentation systems like Laser Printer and Inkjet Printers, with a neat diagram | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Sketch and explain the specifications of stepper motor with characteristic curves. | CO4 | 14 |
|  | b. | Classify and distinguish various types stepper motors. | CO4 | 6 |
| (OR) | | | | |
| 7. | a. | State the characteristics, merits and demerits of a D C motor. | CO4 | 8 |
|  | b. | Sketch the physical and block diagram of automatic control system for the speed of rotation of a shaft and find out various essential elements of control system. | CO4 | 12 |

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| (OR) | | | | |
| 8. | a. | Distinguish between sensor and transducer. | CO4 | 4 |
| b. | Classify sensors in detail. | CO4 | 4 |
| c. | Discuss in detail about various proximity sensors with neat sketches (minimum three). | CO4 | 12 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Draw the PLC controlled pneumatic circuit for AND logic with latching condition. | CO5 | 10 |
| b. | List out the advantages, disadvantages and applications of PLC. | CO5 | 6 |
| c. | How will you select a PLC for a particular applications, discuss. | CO5 | 4 |