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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **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. | Write the differential equations governing the mechanical system shown below and determine the transfer function. | CO1 | (15) |
| b. | What is control system? Explain open loop and closed loop control system with an example. | CO1 | (5) |
| (OR) | | | | |
| 2. | a. | Write the differential equation governing the electrical system and derive its transfer function. | CO1 | (15) |
| b. | Explain the working of the basic mechatronic system. | CO1 | (5) |
| 3. | a. | Write the differential equations governing the mechanical rotational system shown below. | CO1 | (15) |
|  | b. | Explain current-voltage relation of R,L andC. | CO1 | (5) |
| (OR) | | | | |
| 4. | a. | Find the overall gain C(s)/R(s) for the signal flow graph shown below. | CO1 | (15) |
|  | b. | What are the basic properties of signal flow graph? | CO1 | (5) |
| 5. | a. | Find the transfer function of the block diagram using block diagram reduction techniques. | CO1 | (15) |
|  | b. | Write any five rules for reducing block diagrams. | CO1 | (5) |
| (OR) | | | | |
| 6. | a. | Construct Routh array and determine the stability of the system represented by the characteristic equation. Comment on the location of the roots of characteristic equation. | CO1 | (15) |
|  | b. | What is the necessary condition for stability? Explain the relation between stability and coefficient of characteristic Polynomial. | CO1 | (5) |
| 7. | a. | With a neat sketch, Explain the working of Hydraulic Actuating system. | CO2 | (15) |
|  | b. | Explain the working of permanent magnet stepper motor. | CO3 | (5) |
| (OR) | | | | |
| 8. | a. | Describe the working of Data Loggers with necessary block diagram. | CO4 | (15) |
|  | b. | What are the requirement of selecting the DAQ . | CO4 | (5) |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the architecture of 8051 Microcontroller with neat diagram. | CO5 | (15) |
|  | b. | Describe the imporatnce of Programmable logic Controller | CO5 | (5) |

ALL THE BEST