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 – 2017**

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| **Code :** | **14EI2005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **CONTROL SYSTEMS** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Write differential equations governing the mechanical system shown in figure. Also draw the force current and force voltage analogous circuit. | CO1 | 20 |
| (OR) | | | | |
| 2. | a. | For the following block diagram, find the transfer function . | CO1 | 10 |
| b. | Find transfer function for the following signal flow graph. | CO1 | 10 |
| 3. |  | Closed loop transfer function of a system is given by    Obtain the rise time, peak time, maximum overshoot and the settling time when the system is subjected to unit-step input. | CO2 | 20 |
| (OR) | | | | |
| 4. | a. | Find ,,and steady state error for a systems with open loop transfer function as: where the input is unit ramp | CO2 | 14 |
|  | b. | A unity feedback system is characterized by open looptransfer function  .  Obtain the damping ratio, damped frequency and natural frequency. | CO2 | 6 |
| 5. |  | A unit-feedback system is characterized by the open-loop transfer function   1. b.   Using the Routh criterion,   1. calculate the range of values of K for the system to be stable. 2. Find out marginal value of K and frequency of oscillation | CO3 | 20 |
| (OR) | | | | |
| 6. |  | Obtain the root locus diagram for the following open-loop transfer function | CO3 | 20 |
| 7. |  | Sketch the Bode plots of the following transfer function.    Determine the gain cross over frequency, phase cross over frequency, Phase Margin and Gain margin. | CO3 | 20 |
| (OR) | | | | |
| 8. |  | Draw the polar plot for the following open loop transfer function and determine Gain Margin and phase margin. | CO3 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Evaluate the Observability and Controllability of the system with  = +U and Y=. | CO3 | 20 |

ALL THE BEST