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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

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

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

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **10EI218** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **Modern Control Systems** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Marks** |
| **PART-A(10X1=10 MARKS)** | | |
| 1. | Write any two classification of Control System. | (1) |
| 2. | Define transfer function | (1) |
| 3. | Write the formula for calculating rise time. | (1) |
| 4. | Calculate natural frequency for the following transfer function. | (1) |
| 5. | Find the corner frequency for the following sinusoidal transfer function. | (1) |
| 6. | γ =180+, where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (1) |
| 7. | “The necessary and sufficient condition for stability is that all of the elements in the first column of the Routh array be \_\_\_\_\_\_\_\_\_\_\_\_\_\_”. | (1) |
| 8. | Write the equation for finding angle of asymptotes while constructing root locus. | (1) |
| 9. | Write state space representation of state and output equation . | (1) |
| 10. | Define state. | (1) |

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| **PART B(5 X 3= 15 MARKS)** | | |
| 11 | Compare Open loop and closed loop system. | (3) |
| 12 | What are the standard test signals employed for time domain studies? | (3) |
| 13 | Mention the any three basic factors that frequently occur in a typical transfer function G (jω) in bode plot construction. | (3) |
| 14 | For the following transfer function calculate centroid for root locus.. | (3) |
| 15 | Write state space representation for the following state equation. | (3) |

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| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. |  | Explain different types of system. | (15) |
| (OR) | | | |
| 17. | a. | Find transfer function for the following signal flow graph. | (15) |
| 18. | a. | A unity feedback system characterised by the open loop transfer function  Find Kp,KV,Ka | (9) |
|  | b. | Define steady state error. Write the formula for calculating steady state error | (6) |
| (OR) | | | |
| 19. | a. | Find Rise time, peak time, settling time and % overshoot for the following transfer function. | (15) |
| 20. | a. | For the following transfer function draw bod plot and obtain gain cross over frequency. | (15) |
| (OR) | | | |
| 21. | a. | Sketch polar plot for the following transfer function | (15) |
| 22. | a. | Sketch root locus for the following unity feed back control system given below | (15) |
| (OR) | | | |
| 23. | a. | Define Stable system, unstable system and Marginally stable system. | (6) |
| b. | Use Routh Hurwitz criterion and determine the stability of the following system whose characteristic equation is | (9) |
| 24. | a. | Obtain transfer function model for the following state space system. | (10) |
|  | b. | Write the advantages of state space representation. . | (5) |
| (OR) | | | |
| 25. | a. | Define controllability and observability. | (6) |
| b. | Find the Eigen value for the following matrix A. | (9) |

ALL THE BEST