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 :** | **14EI3017** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DESIGN OF LINEAR MULTIVARIABLE 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. | a. | Discuss in detail about the system representations using detailed block diagram. | CO1 | 10 |
| b. | Derive the equation for converting state space to transfer function. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Illustrate the concept of polynomial Input/Output Representations with suitable examples. | CO3 | 10 |
| b. | For the given transfer function G(s) obtain the First companion and Jordon canonical realizations  G(s)= = . | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | The characteristic equation is  Check the stability of the system using Jury Conditions. | CO1 | 10 |
|  | b. | Discuss in detail about the Importance of Considering Modelling Errors. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Derive the Ricatti equation for linear quadratic regulator. | CO1 | 10 |
|  | b. | Illustrate the model and derive the equation for H-infinity control algorithm. | CO1 | 10 |
|  |  |  |  |  |
| 5. | a. | Design Kalman filter and enumerate the modelling details. | CO1 | 10 |
|  | b. | Explain the Selection of Design Parameters in Controller Synthesis. | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Outline the procedure for model reduction and discuss the need of Model reduction methods. | CO3 | 12 |
|  | b. | Identify the problems in robust control design. | CO3 | 8 |
|  |  |  |  |  |
| 7. | a. | Design a multi loop control system with two primary controllers and two cross controllers. | CO2 | 10 |
|  | b. | Explain any two control schemes used for the control for binary distillation column. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss the problems to be encountered while designing a controller for a multivariable control system. | CO2 | 10 |
|  | b. | Explain about the various control schemes used for CSTR. | CO2 | 10 |
|  | | **Compulsory**: |  |  |
| 9. |  | Derive the mathematical model of the paper machine head box and also validate the same with unknown inputs. | CO3 | 20 |

ALL THE BEST