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**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14EI3058** | **Duration :** | **3hrs** |
| **Sub. Name :** | **LINEAR 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. | Explain the concept of diagonalization. | CO1 | 5 |
| b. | Apply the concept of diagonalization to obtain the canonical form for the system  given below  = +u  Y= | CO1 | 15 |
| (OR) | | | | |
| 2. | a. | Determine the state model of field controlled dc motor. | CO1 | 20 |
| 3. | a. | Is it possible to determine the transfer function from state space? Justify your answer. | CO1 | 5 |
|  | b. | What is meant by eigen values and characteristic equation? | CO1 | 5 |
|  | c. | Find the eigen values and eigen vectors for the system matrix given. A= | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | A discrete-time system has the transfer function  Determine the state model of the system in Phase variable form | CO2 | 10 |
|  | b. | Determine the state model of the system in Jordan canonical form. | CO2 | 10 |
| 5. | a. | Design a full order state observer. | CO2 | 10 |
|  | b. | Check whether the given system is controllable or not.  = +u  Y= | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Explain the concept of Liapunov Stability Theorems. | CO3 | 10 |
|  | b. | Obtain the solution of non homogenous state equations. | CO2 | 10 |
| 7. | a. | Convert the following system matrix to canonical form and hence calculate the state transition matrix  A = | CO2 | 20 |
| (OR) | | | | |
| 8. | a. | Find f(A)=for | CO3 | 20 |
| 9. | a. | Consider the system described by the state model where ; . Design a full-order state observer. The desired eigen values for the observer matrix are µ1 = -5; µ2 = -5 | CO3 | 20 |

ALL THE BEST