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



**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14EI2016** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DIGITAL 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. | Illustrate the basic elements of a digital control system and show the block diagram representation of such a system. Also discuss briefly about functioning these elements. | CO2 | 10 |
| b. | Discuss in detail about the successive approximation type analog to digital converters with neat schematic diagram. | CO2 | 10 |
| (OR) | | | | |
| 2. | a. | Find the Z-transform of   1. Unit Ramp 2. Cos ωt. | CO1 | 10 |
| b. | State and prove the following Z-Transform theorem.   1. Initial value theorem 2. final value theorem. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Differentiate between the continuous and discrete time signals. | CO1 | 10 |
|  | b. | Obtain the inverse z-transform of the following function.  F(z)= | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | For the sampled data control system shown in figure, find the response to unit step input, where | CO2 | 10 |
|  | b. | Discuss in detail about the hold operation and derive a model of Sample-and-Hold operation. | CO3 | 10 |
|  |  |  |  |  |
| 5. | a. | Describe the procedure for tuning a controller using Ziegler-Nichols tuning method based on Ultimate gain and Period. | CO3 | 10 |
|  | b. | Discuss the basic routes to the design of digital controller in detail. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Using Parallel realization, realize the given pulse transfer function | CO2 | 10 |
|  | b. | Explain the following   1. Positional error constant 2. Velocity error constant 3. Acceleration error constant. | CO2 | 10 |
|  |  |  |  |  |
| 7. | a. | Transform the given state model into a canonical state model and  also compute the state transition matrix,.  and | CO2 | 10 |
|  | b. | Check whether the given system is Controllable and Observable. | CO3 | 10 |
| (OR) | | | | |
| 8. | a. | Construct a state model for a system characterized by the differential equation, . Give the block diagram representation of the state model. | CO3 | 10 |
|  | b. | A discrete time system is described by the difference equation, ; ; T=1. Determine a state model in canonical form. | CO3 | 10 |
|  | |  |  |  |
|  | | **Compulsory:** |  |  |
| 9. |  | Consider the matrix A. Compute by using matrix exponential method. A= | CO3 | 20 |

ALL THE BEST