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 :** | **14EI2009** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PROCESS DYNAMICS AND CONTROL** | **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. | Obtain the mathematical model for the following system figure (1):    Figure 1 | CO1 | 16 |
| b. | Outline the concepts of Self regulating process. | CO1 | 4 |
| (OR) | | | | |
| 2. | a. | Derive the Mathematical model of the two tank Non-interacting liquid level system. | CO1 | 16 |
| b. | State the importance of Piping and Instrumentation diagram. | CO1 | 4 |
|  |  |  |  |  |
| 3. |  | With the given values Kp=5, KI = 0.7 s-1, KD= 0.5 s and pI(0) = 20%, Design the PID Controller for the error as shown in figure(2) below.  Error  ep % 1  0  1 2 3 4 5  Time (Seconds)  -1  Figure 2 | CO2 | 20 |
| (OR) | | | | |
| 4. | a. | Illustrate the working of Sluggish Controller in detail with necessary graphs. | CO2 | 10 |
|  | b. | Outline the concept of Integral Windup and Suggest a remedy for the same. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Identify the need of Controller tuning. | CO2 | 5 |
|  | b. | Interpret the controller tuning procedure and rules of Process Reaction Curve method. | CO2 | 15 |
| (OR) | | | | |
| 6. | a. | Explain the Time-integral performance criteria with necessary formulae. | CO2 | 10 |
|  | b. | Discuss about the ¼ Decay Ratio method of controller tuning. | CO2 | 10 |
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|  |  |  |  |  |
| 7 | a. | Illustrate Characteristics of Control Valve. | CO3 | 10 |
|  | b. | Examine the function of control valve sizing. | CO3 | 10 |
| (OR) | | | | |
| 8. |  | Explain the working of different types of Pneumatic Actuators with necessary diagrams. | CO3 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Outline the control scheme which has two measurements and one manipulated variable. | CO3 | 10 |
|  | b. | With necessary diagrams, Explain the various control configurations of chemical reactor in detail. | CO3 | 10 |

ALL THE BEST