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 :** | **14EI3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED PROCESS 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 two non interacting tanks shown below.  Fig | CO1 | 10 |
| b. | List the P & ID symbols shown in figure and explain the process. | CO1 | 10 |
| (OR) | | | | |
| 2. | a. | Reason out why derivative mode of control cannot be used alone. | CO1 | 2 |
| b. | A proportional controller has a gain of Kp = 2.0 and Po = 50%. Plot the controller output for the error given by Fig.1. | CO1 | 10 |
|  | c. | Mention the characteristics of the controller employed in Iron Box. | CO1 | 4 |
|  | d. | List the characteristics of floating mode of control. | CO1 | 4 |
| 3. | a. | Design a controller which utilizes more than one measurement and one manipulation for CSTR. | CO2 | 10 |
|  | b. | Compare and contrast the features of feedback and feedforward controller. | CO2 | 10 |
| (OR) | | | | |
| 4. | a. | What are the factors to be considered for the selection of control valves? | CO2 | 5 |
|  | b. | Draw the inherent characteristics of control valves and explain. | CO2 | 5 |
|  | c. | What is meant by One quarter decay ratio? | CO2 | 3 |
|  | d. | Explain the concept of Ziegler Nichol’s tuning method. | CO2 | 7 |
| 5. | a. | Explain the characteristics of PI controller. | CO2 | 10 |
|  | b. | What is the main problem caused by PI controller? How to overcome this? | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Explain the concept of Relative gain Array and the selection of loops. | CO3 | 10 |
|  | b. | Consider a process with the following input-output relationships:      Compute the relative gains. | CO3 | 10 |
| 7. | a. | Narrate how the type of controllers are selected for various processes. | CO3 | 6 |
|  | b. | Which is the controller which employs one measuremen and more than one manipulated variable?. Elaborate the concept for the control of Pressure in a Steam Header. | CO2 | 7 |
|  | c. | With the block diagram, explain the two configurations of ratio control for flow control applications. | CO2 | 7 |
| (OR) | | | | |
| 8. | a. | Draw the general block diagram of an adaptive control. | CO3 | 2 |
|  | b. | Design a Model reference Adaptive Controller using MIT rule. | CO3 | 18 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the concept of interaction in a Stirred Tank Reactor. | CO3 | 5 |
|  | b. | Design an Internal Model Controller. | CO2 | 15 |

ALL THE BEST