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

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17EI2009** | **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. | Describe a typical first order thermal process and obtain its mathematical model. | CO1 | 10 |
| b. | Bring out the differences between continuous and batch process with the help of neat diagrams. | CO1 | 10 |
| **(OR)** | | | | |
| 2. | a. | Analyse the need for developing the mathematical model of a process, in process control. | CO1 | 7 |
| b. | Develop the mathematical model of gas storage process. | CO1 | 7 |
| c. | Discuss the laws, languages and levels of process control. | CO1 | 6 |
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| 3. | a. | Explain with suitable examples, interacting and non interacting processes. | CO2 | 10 |
| b. | Discuss the characteristics of on-off control and the effect of differential gap of ON-OFF controller. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Explain the method for linearization of non-linear system with one variable. | CO2 | 10 |
| b. | What is the need for integral action in P.I controller? | CO2 | 3 |
| c. | What is the cycling process output and identify in which control mode it occurs? | CO2 | 7 |
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| 5. | a. | Elaborate on the design procedure of temperature control process. | CO3 | 13 |
| b. | How ITAE criterion is different from IAE? | CO3 | 7 |
| **(OR)** | | | | |
| 6. | a. | Briefly explain the Zeigler-Nicholas closed loop method of controller tuning. | CO3 | 10 |
| b. | Elaborate on the methods for prevention of integration windup. | CO3 | 10 |
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| 7. | a. | Explain the diaphragm actuator with neat diagram and also give its steady state force balance equation. | CO4 | 10 |
| b. | Give the essential modeling for pneumatically actuated control valve. | CO4 | 10 |
| **(OR)** | | | | |
| 8. | a. | Write a short note on inherent valve characteristics. | CO4 | 7 |
| b. | Compare pneumatic with electric actuators. | CO4 | 3 |
| c. | Suggest some suitable applications for Bernoulli’s equation and derive necessary equations. | CO4 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Explain the cascade control scheme with a typical example and also explain when to use cascade control. | CO5 | 10 |
| b. | Analyze the merits and demerits of various control methods involved in boiler drum level control. | CO5 | 10 |