

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

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019**

**Course Code: AE302**  
**Course Name: PROCESS CONTROL**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- |   |    |  |      |
|---|----|--|------|
| 1 | a) | With suitable example explain degrees of freedom                                       | (10) |
|   | b) | Enumerate the various incentives for process control.                                  | (5)  |
| 2 | a) | Explain the following terms  | (5)  |
|   |    | i)Steady state gain  |      |
|   |    | ii)Process time constant   |      |
|   | b) | Analyse the following control loops  | (10) |
|   |    | i)Liquid level control   |      |
|   |    | ii)Temperature control   |      |
| 3 | a) | What do you mean by self-regulating system and non-self-regulating system?<br>Explain. | (8)  |
|   | b) | Explain how an equal percentage valve compensates for non-linearity in the loop        | (7)  |

**PART B**

*Answer any two full questions, each carries 15 marks.*

- |   |    |   |      |
|---|----|---|------|
| 4 | a) | What are the various elements of a feedback control loop? | (10) |
|   | b) | Distinguish servo control from regulator control.         | (5)  |
| 5 | a) | Explain Cascade control with example                      | (10) |
|   | b) | Describe Ziegler Nichols method for controller tuning?    | (5)  |
| 6 | a) | What is feed forward control? Explain                     | (9)  |
|   | b) | Explain the various time integral performance criteria    | (6)  |

**PART C**

*Answer any two full questions, each carries 20 marks.*

- |   |    |  |      |
|---|----|--|------|
| 7 | a) | What is the principle of model predictive control? Explain | (10) |
|   | b) | Explain the classification of artificial neural network?   | (5)  |
|   | c) | Distinguish a crisp set from fuzzy set                     | (5)  |

- 8 a) Illustrate process interaction in a multivariable system (12)
- b) Explain the following with reference to a multivariable system (8)
- i) Operating window
  - ii) Controllability
- 9 a) Explain step analysis method to find time constants and dead time for a second order model (10)
- b) How relative gain array can be used for loop pairing in a multivariable system (10)

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