

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

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

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018**

**Course Code: AE302**

**Course Name: PROCESS CONTROL (AE)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

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

Marks

- |   |    |                                                                                              |      |
|---|----|----------------------------------------------------------------------------------------------|------|
| 1 | a) | What is degrees of freedom? Explain the relevance in designing a controller with an example? | (10) |
|   | b) | Explain with example about a process with dead time.                                         | (5)  |
| 2 | a) | Explain Linearization of an equal percentage valve into linear valve.                        | (5)  |
|   | b) | With the help of a neat sketch illustrate a pressure control loop diagram.                   | (5)  |
|   | c) | Explain the different types of scaling.                                                      | (5)  |
| 3 | a) | With a neat diagram explain the elements of process dynamics.                                | (10) |
|   | b) | Compare SLPC and MLPC.                                                                       | (5)  |

**PART B**

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

- |   |    |                                                                                        |      |
|---|----|----------------------------------------------------------------------------------------|------|
| 4 | a) | What are the goals that determine the best tuning constants?                           | (10) |
|   | b) | Describe the method for fine tuning of controller with example.                        | (5)  |
| 5 | a) | Explain feedback-feed forward control with suitable example.                           | (8)  |
|   | b) | Draw the block diagram and examine the importance of cascade control using an example. | (7)  |
| 6 | a) | Explain how correlation could be used for tuning controller with an example.           | (10) |
|   | b) | What do you mean by the term Backlash? How can it be removed?                          | (5)  |

**PART C**

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

- |   |    |                                                                                                        |      |
|---|----|--------------------------------------------------------------------------------------------------------|------|
| 7 | a) | What are the different tuning methods for multi-loop control system?                                   | (5)  |
|   | b) | What is RGA? Mention the importance of RGA for predicting interaction in multivariable control system. | (5)  |
|   | c) | Explain the multi Loop control Performance through decoupling.                                         | (10) |
| 8 | a) | Explain in detail about internal model control.                                                        | (10) |

- b) Explain the features of model predictive controller. (5)
- c) Explain the classification of Artificial Neural Network. (5)
- 9 a) Explain Influence of Interaction on the possibility of feedback control with the help of a 2x2 system. (10)
- b) Write short notes on smith predictor controller. (5)
- c) Find solution for the following fuzzy relational operation (i)  $R \cup \bar{R}$  (ii)  $R \cap \bar{R}$  (5)

$R$  is given by 
$$\begin{bmatrix} 0.2 & 0.5 & 0.2 \\ 0.5 & 0.6 & 0.7 \\ 0.7 & 0.1 & 0.3 \end{bmatrix}$$

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