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Question Paper Code	12438
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2023

Fifth Semester

Instrumentation and Control Engineering

(Common to Electronics and Instrumentation Engineering)

20ICPC501 - PROCESS CONTROL

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

- | | <i>Marks,
K-Level, CO</i> |
|---|-------------------------------|
| 1. Recall the term degrees of freedom. | 2,K1,CO1 |
| 2. Relate servo and regulatory operations with example. | 2,K1,CO1 |
| 3. What is ISAS75.01 standard? | 2,K1,CO2 |
| 4. Tell about range ability of a control valves? | 2,K1,CO2 |
| 5. What is meant by Neutral Zone in ON-OFF controller? | 2,K1,CO3 |
| 6. Define reset time. | 2,K1,CO3 |
| 7. Write the tuning criteria for Damped Oscillation method. | 2,K1,CO4 |
| 8. Give the advantages and disadvantages of cascade controller. | 2,K1,CO4 |
| 9. Write the need for the multi loop control. | 2,K1,CO5 |
| 10. Sketch any four P and ID symbols of valves. | 2,K2,CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

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| 11. a) (i) Summarize the difference between continuous and batch process. | 7,K2,CO1 |
| (ii) Estimate the transfer function of first order level process. | 6,K2,CO1 |
| OR | |
| b) Demonstrate the laws, languages, and levels of process control and Obtain the mathematical model of a Flow process. | 13,K2,CO2 |
| 12. a) Illustrate how installed characteristics of a control valve are different from inherent characteristics. | 13,K2,CO2 |
| OR | |
| b) (i) Rephrase the steps to be followed for control valve sizing. | 6,K2,CO2 |
| (ii) Classify and Explain the different types of process parameters to be considered in selection of control Valves. | 7,K2,CO2 |

13. a) Compare the features of ON & OFF, P, I, D control modes and draw their characteristics. *13,K2,CO3*

OR

- b) (i). Summarize how to avoid reset windup. *7,K2,CO3*
(ii). Explain why derivative and integral control is not separately recommended for any application. *6,K2,CO3*

14. a) (i) Depict $\frac{1}{4}$ decay ratio criteria with example. *7,K2,CO4*
(ii) Explain the controller tuning concept using continuous oscillation Technique. *6,K2,CO4*

OR

- b) Demonstrate cascade control with neat diagram and explain it. *13,K2,CO4*

15. a) Outline three element boiler drum level control with suitable diagrams. *13,K2,CO5*

OR

- b) Explain the functions of IMC with block diagram and explain in detail. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Interpret the mathematical model of CSTR. Explain the CSTR control scheme with cooling socket. *15,K2,CO1*

OR

- b) Build a cascade control system for a Heat exchanger and process furnace. *15, K2,CO5*