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Question Paper Code	11822

B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023

Sixth Semester

Electronics and Instrumentation Engineering

EI8691 - COMPUTER CONTROL OF PROCESSES

(Regulations 2017)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level, CO
1.	Define the term state transition matrix of a discrete system.	*2,K1,CO1*
2.	Differentiate controllability and observability.	*2,K2,CO1*
3.	List out the various steps involved in system identification.	*2,K1,CO2*
4.	Distinguish between parametric and non-parametric method.	*2,K2,CO2*
5.	Mention the properties of ROC.	*2,K1,CO3*
6.	Obtain modified Z-Transform of 1/s.	*2,K2,CO3*
7.	State Multi-loop Control.	*2,K1,CO4*
8.	Mention the advantages of decoupler.	*2,K1,CO4*
9.	Identity any two challenges in the control of MIMO process.	*2,K2,CO5*
10.	Compare multivariable and multi loop control.	*2,K2,CO5*

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) (i) Check the stability of sampled data control system represented by $\Delta(z) = z^3 - 1.3z^2 - 0.08z + 0.24 = 0$.Use Jury's stability test. *7,K3,CO1*

(ii) Given the state equation X (k+1) =A X (K). Find the state transition matrix Φ (k) for the following. *6,K3,CO1*

$$A = \begin{bmatrix} 0 & 2 \\ 0 & -0.1 \end{bmatrix}$$

OR

b) A feedback system has the closed loop transfer function *13,K3,CO1*

$$\frac{Y(Z)}{U(Z)} = \frac{(6Z^3 - 15Z^2 + 7Z + 5)}{(Z-2)^2 (Z+1)}$$

Construct the state model for the system using

(i) phase variable form, (ii) Jordan canonical form.

12. a) Explain about transient and frequency response analysis of system identification. *13,K2,CO2*

OR

b) Discuss in detail about Parametric method. *13,K2,CO2*

13. a) Design a Dahlin's controller algorithm for $G_p(s) = \frac{e^{-1.4s}}{3.34s + 1}$ with T=1 sec. *13,K3,CO3*

OR

b) Find the state equation for the discrete time system described by y(n+3)+5y(n+2)+7y(n+1)+3y(n)=u(n). *13,K3,CO3*

14. a) Explain the properties and applications of RGA. *13,K2,CO4*

OR

b) Illustrate the methods in Tuning of Multi-loop PID Controllers with examples. *13,K3,CO4*

15. a) Explain the multivariable control of MIMO process with an example as four tank system. *13,K2,CO5*

OR

b) Illustrate Fuzzy logic controller using any one multivariable process. *13,K2,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Describe the multivariable dynamic matrix control scheme with detailed algorithmic steps. *15,K2,CO5*

OR

b) Explain the multivariable control of CSTR with neat description of the process. *15,K2,CO5*