Total number of questions: 08

May 18.
Reappear.

M.Tech. -EE/ 1ˢᵗ Sem
Digital Control System
Subject Code: MTEE-104
Paper ID:

Time allowed: 3 Hrs

Max Marks:100

Important Instructions:

- Attempt all questions and each question carry equal marks.

Q. 1.   a) What are the state space representation forms? and Explain them in detail.   CO1
   b) Discuss steps involved for obtaining solution of state equation.

OR

a) What is the state transition matrix and discuss its properties and prove them. ● CO1
b) What are the methods for computation of state transition matrix. Explain any one method?

Q. 2.   a) State and prove the sampling theorem.   CO1
   b) Explain the relation between the bilinear transformation and the w plane?

OR

List down the basic elements of a digital control system and show the block diagram   CO1
representation of such a system and discuss briefly about functioning these elements.

Q. 3.   a) Obtain state equations and state model for the given transfer function   CO2
$\frac{Y(s)}{U(s)} = \frac{K}{(s+1)(s+2)(s^2+1)}$

b) Write short notes on Multi-variable digital control systems.

OR

Define controllability and observability. And find controllability and observability   CO2
for

$$\frac{Y(s)}{U(s)} = \frac{2}{s^3 + 6s^2 + 11s + 6}$$

Q. 4. Define stability of a digital control system and discuss how is Jury stability criterion   CO3
applied for stability investigation for such systems. Find whether the given system
is stable or not. Use Jury's method.

$$z^3 + 3.3z^2 + 4z + 0.8 = 0$$

OR

Discuss the stability analysis of discrete control system using (i) Routh stability   CO3
criteria (ii) Bilinear transformation

Q. 5. a) Discuss working of a Digital position, control system with a simplified block   CO4
diagram.
b) Explain Design of state feedback controller.
OR

a) Discuss the stepping motor-operation with control action included and disk   CO4
drive system incorporated.
b) Short note on Digital Compensator design using root locus plots.