

1129
M.E. Electrical Engineering (Power System)
First Semester
EE-8104: Digital Control Systems

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt any five questions.

x-x-x

- I. a) Enumerate basic elements of a digital control system and show the block diagram representation of such a system.
b) What are digital control systems and how are these different from analog control systems? (2x5)
- II. a) Discuss principle of discretization. How is ideal sampler different from its actual sampler counterpart.
b) Give a comparison of various hold circuits based on impulse and frequency response. (2x5)
- III. a) Why is z-transform useful in analysis of digital control systems? Define Pulse transfer function. Also mention limitations of z-transform.
b) What are practical aspects of choice of sampling rate. (8,2)
- IV. a) Define z-transform and discuss relationship between the Laplace transform and z-transform.
b) Define stability of digital control systems. Enumerate various methods used for stability investigation of such systems. (2x5)
- V. Give block diagram representation of a digital position control system and discuss its functioning. (10)
- VI. a) What are digital compensators and what are the methods for their realisation.
b) Discuss stepping motor operation with control action included and disk drive system incorporated. (2x5)

P.T.O.

(2)

- VII. a) What are the advantages of state variable method for analysis of digital control system? Show that the state variable model of a digital control system is given by

$$x(k+1) = \varphi(l)x(k) + \theta(l)u(k)$$

$$c(k) = D x(k) + E u(k)$$

- b) Define controllability and observability. (7,3)

- VIII. Write short notes on:-

a) Multivariable digital control system

b) On solution of state equation (2x5)

x-x-x