Exam.Code:1018
Sub. Code: 35258

2055

M.E. Electrical Engineering (Power Systems)

Second Semester

EE-8203: Digital Control System

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt any five questions.

x-x-x

I. a) List the fundamental elements of a digital control system and illustrate its block diagram representation.

b) Define digital control systems and differentiate them from analog control systems. (2x5)

II. a) Explain the principle of discretization. How does an ideal sampler differ from an actual sampler?

b) Compare different hold circuits based on their impulse and frequency response characteristics. (2x5)

III. a) Why is the z-transform important in digital control system analysis? Define the pulse transfer function and state the limitations of the z-transform.

b) Discuss the practical considerations in selecting an appropriate sampling rate. (8,2)

IV. a) Define the z-transform and explain its relationship with the Laplace transform.

b) What is system stability in digital control systems? List various methods used to analyze system stability. (2x5)

V. Illustrate the block diagram of a digital position control system and explain its working. (10)

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VI. a) What are digital compensators? Describe the methods used for their implementation.

b) Explain the working of a stepping motor, including control actions and its application in a disk drive system. (2x5)

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

$$x(k+1) = \varphi(1)\, x(k) + \Theta(1)\, x(k)$$

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

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

VIII. Write short notes on:-

a) Multivariable digital control systems

b) Solution of state equations (10)

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