Roll No. | | | | | | | | | | | | |  Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Instrumentation & Control Engg.) (Sem.–5)

# NON LINEAR AND SAMPLED DATA CONTROL SYSTEMS

Subject Code : EI-303

M.Code : 58022

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

## SECTION-A

**1. Answer briefly :**

a. What is State and state variable?

b. What are the advantages of state space analysis?

c. Write any two properties of eigen values.

d. Define Z-transform.

e. Explain the linear property of z-transform.

f. State (Shanon's) sampling theorem.

g. How nonlinearities are introduced in the systems?

h. What is dead-zone?

i. Define liapunov method.

j. Find the z transform of x(n) = u(n)?

## SECTION-B

2. Define controllability and observability. Explain both with the help of Kalman's test.

3. What is sampled data control system? Also explain the terms sampling and sampler with the help of suitable example.

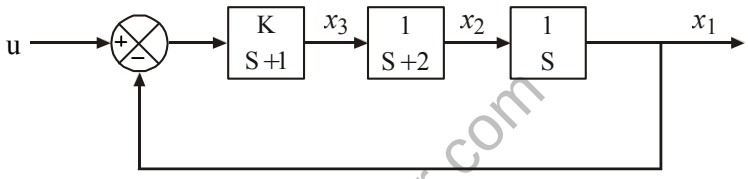
4. What are the fundamental elements used to construct the state diagram of discrete time system? Also explain complete state controllability.

5. Write any two properties of non-linear systems. Define singular point with its classifications.

6. List the properties of ROC.

## SECTION-C

7. Determine the stability range for the gain K of the system given below using liapunov method.




8. Explain in detail about the behaviour of nonlinear system and classifications of Non-linearities.

9. Write a short note on **any one** :

   a. Adaptative control

   b. Impulse modulation



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**