Printed pages: 01 **Sub Code: NIC701/EIC701**

Paper Id: | 3 | 0 | 6 | 4 | **Roll No:** | | | | | | | | | | |

B TECH
(SEM VII) THEORY EXAMINATION 2017-18
CONTROL SYSTEM-II

Time: 3 Hours ***Total Marks: 100***

Notes: *Attempt all Sections. Assume any missing data.*

SECTION A

1. Attempt *all* questions in brief. 2 x10 = 20

a. What are the advantages and disadvantages of digital control systems?
b. What is sampling theorem?
c. What is the relationship between s-plane and Z-plane?
d. Explain four properties of ROC for Z-transformation.
e. What do you mean by digital control system? Explain with basic elements.
f. What is state and state variable?
g. What are phase variable?
h. What is controllability and observability?
i. What are the limitations of Z-transform?
j. What is the need of Digital control systems?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Discuss the necessary conditions for design of state feedback controller through pole placement?
b. Explain the design procedure in the w-plane?
c. Derive transfer functions for the following data hold circuits: (i) Zero order hold circuit (ii) First order hold circuit.
d. Explain the relation between the bilinear transformation and the w plane?
e. Explain the digital PID controller in detail.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain any two types of digital to analog converters with a neat circuit?
(b) Explain computation of discrete equivalents by numerical integration.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain microprocessor based position control system in detail.
(b) Explain the design procedure for digital control system by using state space analysis.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain Liapunov stability analysis system by Dead time.
(b) Describe Pulse transfer function for zero hold system in detail.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain reduced order observer with block diagram.
(b) What is convolution theorem and also prove it for Z-transform.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is optimal regulator and also explain the use of state regulator.
(b) Write the state equation and output equation of the following difference equation:
c(k+3)+5c(k+2)+3c(k+1)+2c(k)=u(k),Also find the state transition matrix.