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

Total No. of Questions : 18

B.Tech.(EE/Electrical & Electronics Engg.) (2012 Onwards)
B.Tech. (Electronics & Electrical Engg.)/(Electrical Engineering & Industrial Control) (2012 to 2017) (Sem.–6)

NON-LINEAR AND DIGITAL CONTROL SYSTEMS

Subject Code : BTEE-603
M.Code : 71149

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.

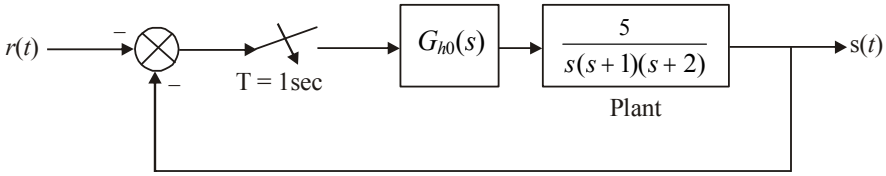
SECTION–A

Answer briefly :

1. Give significance of zero order hold device.
2. State disadvantages of digital control system.
3. What do you mean by singular points? State its importance.
4. Comment on controllability and observability of systems with pole zero cancellation.
5. Define describing function and give its value for an ideal relay.
6. Find the z-transform of e^{-at} sin ωt.
7. Explain the process of reconstruction of sampled signal.
8. What are the advantages of modern control theory over classical control theory?
9. State the limitations of Z-transform.
10. Define dead-zone and backlash.

SECTION-B

11. A sampler and ZOH are introduced in the forward loop. Study the stability of the sampled data system via bilinear transformation.



12. The output $y(t)$ of a non linear device is related to the input $x(t)$ through the following differential equation:

$$y(t) = 4x^2 + 6x + 3x^2\dot{x}$$

Determine the describing function of this device.

13. Write a short note on dead zone and saturation.

14. Explain the isoclines method for analyzing stability of non linear systems graphically.

15. For the system $x + x^2 - 1 = 0$. Draw the phase plane trajectory using delta method taking zero initial conditions.

SECTION-C

16. State and explain Lyapunov's stability theorem for linear digital systems.

17. Write short notes on the following :

    a. Model reference adaptive controller.

    b. Krasovskii's Theorem.

18. Write a short note on ideal relay and relay with dead zone and hysteresis and draw its characteristics.

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.