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B.Tech.(EE/Electrical & Electronics Engg.) (2012 Onwards)**B.Tech. (Electronics & Electrical Engg.)
(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**1. Answer briefly :**

- a) What is the significance of singular points?
- b) Why is transfer function of any system important?
- c) What is the significance of dead zone?
- d) What do you understand from stability of the system?
- e) What is the difference between laplace transform and Z transform?
- f) Is there any loss in observability due to sampling?
- g) What is state variable model?
- h) What is the use of variable gradient method?
- i) Differentiate coulomb friction and backlash.
- j) Where can be the jury test of stability applied?

SECTION-B

2. Produce a state model for following differential equation :

$$\ddot{y} + 6\dot{y} + 10y = \dot{u} + 5u$$

3. What is the structure of state feedback control system? What is the effect of state feedback on controllability and observability? What system is neither observable nor controllable?
4. Explain the Jury test of stability. How it helps to find stability of given system? Explain with suitable example.
5. How the reconstruction of sampled signal is done? Differentiate zero order and first order hold.
6. What is the use of lyapunov functions to estimate transients? Comment upon the stability of linear and non linear systems.

SECTION-C

7. What is the role of laplace transform and Z transform in sampling process? How the state variable formulation of discrete time system is carried out explain with suitable example.
8. What do you understand from describing functions? What analysis does they provide about the system stability? What is the significance of saturation and dead zone?
9. Explain in detail the phase portrait of second order non linear system? What is the need of phase plane analysis?

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.