

B. Sc. Semester V (Honours) Examination 2020

Subject- Electronic Science

Paper- DSE-II (Control System)

Full Marks- 40

Time- 2 hours

Questions are of equal value

Answer any eight questions of the following.

5×8=40

1. What is a control system? Distinguish between linear and nonlinear control system. Enlist and explain the special features of a good control system.
2. What are first order and second order control systems? What do you mean by transient and steady state time responses? How is time domain and frequency domain responses connected with each other?
3. Discuss on the stability of a control system. Mention and explain two techniques of finding stability of a control system.
4. A ramp type time signal is applied to a second order control system. Find the steady state error of the output.
5. What is PI controller? Discuss its merits and limitations.
6. A unity negative feedback control system is given with, $G(s) = \frac{5}{s^2 + 7s + 10}$. Calculate the steady state error for unit step input and a ramp input.
7. Discuss the role of compensators in control systems. Briefly explain the operation of lead compensator.
8. Frequency domain transfer function of a second order system is,

$$G(s) = \frac{4}{s^2 + 3s + 5}$$

Find its time domain impulse response.

9. A control system has open loop gain -3 and feedback factor 0.5. Find its closed loop gain.
10. Write note on any one of the following:
 - (a) Transition matrix
 - (b) Servomotor