Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech 2nd year, March 2022

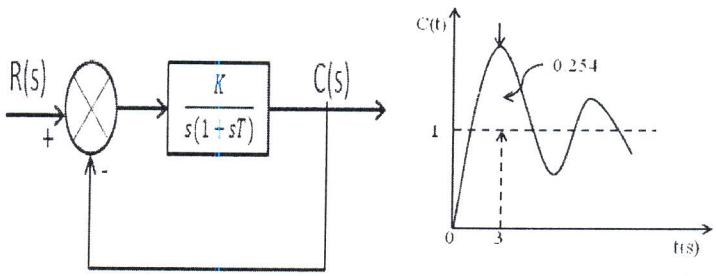
Branch : ECE | Semester: 4th

Title of the Course : Control Theory | Course Code: ECL-251

Time: 1 hour 30 minute | Maximum Marks: 25

Note: Attempt all questions

Q.1 The system shown in Fig. (a) when subjected to a unit step input gives the output response shown in Fig. (b). Determine the value of K and T from the response curve. [5]



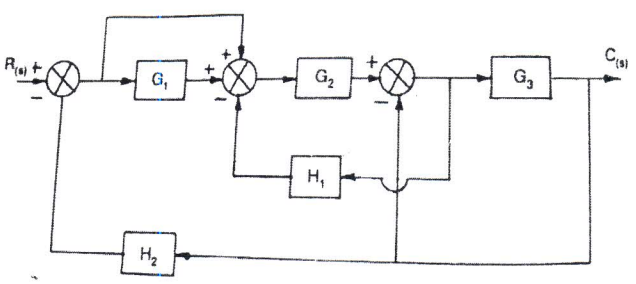
(a) (b)

Q.2 The characteristic equation of a system in differential equation form is

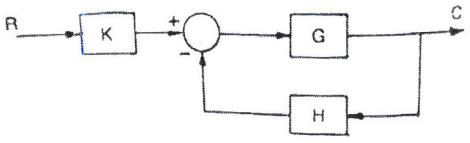
$$\ddot{x} - (K+2)\dot{x} + (2K+10)x = 0$$

Find the values of K for which the system is (i) stable, (ii) limitedly stable and (iii) unstable. [5]

Q.3 Using block diagram reduction method, reduce the block diagram and determine the C(s)/R(s). [5]



Q.4 Consider a system whose block diagram is shown in below. Find the sensitivity of overall transfer function with respect to G. [5]



Q.5 A unity feedback control system has forward transfer function given by $G(s) = \frac{8}{S(S+6)}$. Find the output C(t) when the system is subjected to a step of 2 units. [5]