

Veermata Jijabai Technological Institute

ESE B. Tech Third Year (Semester V)

181090071

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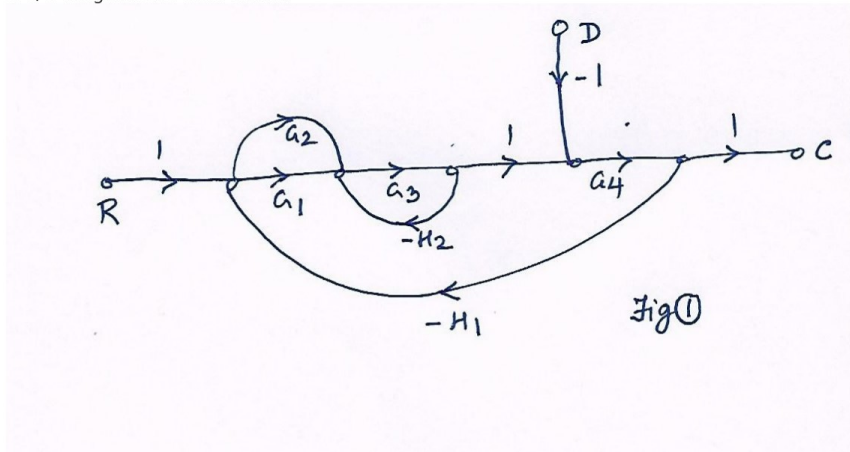
This is the subjective part of your examination. Write the answers on a paper, then scan and upload it in the appropriate classroom.
All questions are compulsory.

R4ET3002S - Control Systems

Section 1: 8 marks per question

8

1. For the Signal Flow Graph shown in Fig 1, find C/R & C/D using Mason's Gain Formula & C/D using Mason's Gain Formula.



Section 2: 4 marks per question

8

1. The forward path transfer function of a unity feedback system is given by $G(s) = 2 / (s+3)$. Obtain the expression for unit step response of the system.
2. For a system with open loop transfer function $G(s)H(s) = [k(s+13)] / [s(s+3)(s+7)]$. Using Routh's Stability Criterion, find the range of K for the system to be stable.

Section 3: 8 marks per question

8

1. Sketch the Root Locus for the system whose open loop transfer function is $[20k] / [s(s+1)]$

Section 4: 8 marks per question

8

1. Sketch the Nyquist plot for the transfer function $G(s)H(s) = [180] / [(s+1)(s+2)(s+5)]$ & comment on closed loop stability.

Section 5: 8 marks per question

8

1. Given the system represented in state-space as in Fig 5, find the transfer function $T(s) = Y(s) / U(s)$, where $U(s)$ is the input & $Y(s)$ is the output.

$$\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 10 \\ 0 \\ 0 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} X$$

Fig 5