Process Dynamics and Control

ME-Chemical 2nd semester, Max Marks: 30; Time: 60mins

Note: i. Attempt all questions.

ii. Submit your answer sheets as a single pdf against the assignment created on GCR by due date and time.

iii. Write your name, roll number and class on each page of answer sheets.

I   Draw the neat root locus diagram for the control system shown in figure below. For drawing root locus, assume τ_i such that the performance of the control system   (15) is good in some sense, which must be justified by you. Derivative time constant may be assumed as 0.05s. Determine the controller gain using ¼ decay ratio criteria.
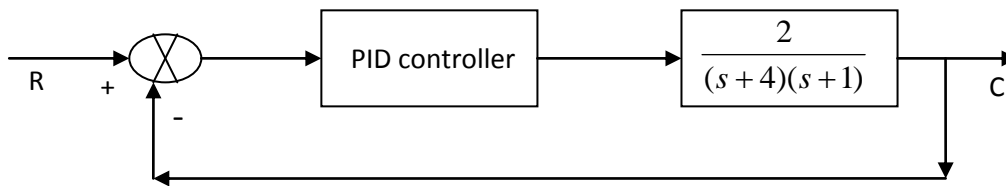
II   Design cascade controller using frequency response technique for the system   (15) given below:

$$G_{CS} = K_{CS}, \quad G_{PS} = \frac{2e^{-1.5s}}{4.5s+1}, \quad G_{CP} = K_{CP}\left(1+\frac{1}{\tau_I s}\right), \quad G_{PP} = \frac{2.5e^{-1.2s}}{4s+1}$$

Neglect the dynamics of all other elements. The terms are having their usual meaning