6th Semester (Control System Engineering(EET 604) (Elective –C))

1. (a) State the value of damping ratio when the system is under damped,

Over damped, critical damped and undamped. (2)

(b) Explain the correlation between time and frequency response for a 1st order

system. (5)

2. (a) Define relative stability and absolute stability. (2)

(b) Sketch the polar plot for G(s) = . (5)

(c) What do you mean by PID controller and explain the time response with PID

controller. (7)

3. (a) What is static velocity error coefficient & static acceleration coefficient. (2)

(b) Explain the effect of adding poles and zeroes to transfer function. (5)

(c) Sketch the root locus plot of a unity feedback system with

G(s) =  (7)

4. (a) State Mason’s gain formula. (2)

(b) The open loop transfer function of system with unity feedback is given by

G(s) = . Determine damping ratio, undamped natural frequency of

oscillation and maximum overshoot in its step response. (5)

(c) Explain constant M& N circle. (7)

5. (a) What is Nichol’s chart? (2)

(b) Explain all pass & minimum phase system in frequency response analysis? (5)

(c) Apply Nyquist stability criterion to the system with open loop transfer function

is given by G(s) H(s) =  (7)

6. (a) Define delay time & peak time in transient response of 2nd order system. (2)

(b) Define gain margin, phase margin, gain cross over frequency & phase cross

over frequency in a polar plot . (5)

(c) Obtain bode plot for the following function.

G(s) = 

Determine the gain margin & phase margin of the system and also comment on

the stability. (7)

7. (a) What is resonant frequency? State the relation between resonant frequency &

damped frequency. (2)

(b) The open loop transfer function of a unity feedback system is given by

G(s) = 

Find static error coefficient and steady state error of the system when

subjected to an I/P is given by r(t)= 2+5t+2t2. (5)