ARYA COLLEGE OF ENGINEERING AND I.T.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

SUBJECT: - CONTROL SYSTEM, SEMESTER:- V

ASSIGNMENT NO. 2

SUBMISSION DATE:-31/12/2021

QO1:- Define the term

(a) Stability (b) State (c) State Variable (d) gain margin

(e) Phase margin (f) gain cross over frequency (h) phase crossover frequency

QO2:- Describe the Lag, Lead and Lag & Lead compensation.

QO3:- Examine for controllability and observability of a system having following coefficient matrices.

$$\dot{x_1} = -2x_1 + x_2 + u$$
$$\dot{x_2} = -2x_2 + u \quad and \quad y = x_1 + x_2$$

QO4: - Determine the transfer matrix from the data given below:

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix},\ B = \begin{bmatrix} 1 \\ 1 \end{bmatrix},\ C = [1 \quad 1],\ D=0$$

QO5:- The open loop transfer function of a unity feedback system is given below:

$$G(S) = \frac{(S + 0.25)}{S^2(S + 1)(S + 0.5)}$$

Determine the close loop stability by applying nyquist criterion.

QO6:- Write down the salient features of root locus plot.

QO7:- Sketch the root locus plot for the open loop transfer function of a unity feedback control system given below and determine

(i) The value of K for ς =0.5. (ii) The value of K for marginal stability

(iii) The value of K at s=-4 (iv) Obtain the close loop transfer function for K=1.66

$$G(S) = \frac{K}{S(S + 1)(S + 3)}$$

QO8:- Sketch the bode plot for the open loop transfer function for the unity feedback system below and assess stability

$$G(S) = \frac{1000}{(1 + 0.2S)(1 + 0.002S)}$$

QO9:- Differentiate between P, PI, PD & PID control action.

QO10:- Explain the regulatory problem in optimal control system.

Q011:- Illustrate an expression for the M and N circles.