Sanjay Ghodawat University, Kolhapur

2020-21

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

EXM/P/09/00

Year and Program: 2020-2021 TY BTECH	**School of Technology**	**Department: Electrical & Electronics Engineering**
Course Code: EET301	**Course Title: Control System**	**Semester : V**
Day : Monday Date: 14.12.2020	**End Semester Examination**	**Time:2 Hrs. Max Marks:50**

Instructions: 1) All Questions are compulsory.
2) Figures to right indicate full marks

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Explain Classification of Control System	8	L2	CO1
b)	Discuss the effects of PI controller on 2nd order system**.**	8	L2	CO2
c)	Criticizestability by R.H.Criterian $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$	8	L4	CO3
Q.2	**Answer the following (any two)** –			
a)	Sketch Root Locus of unity feedback control system with $G(S) = \frac{K}{S(S+1)(S+3)}$ Determine value of K for marginal stability.	8	L3	CO4
b)	$G(S) = \frac{1}{S(S+1)}$ Criticize stability using Nyquist Path.	8	L4	CO5
c)	The open loop transfer function of unity feedback control system is given by $G(S) = \frac{K}{S(S^2+S+1)(S+3)}$ Interpret stability using RH criteria. Find value of K which will cause sustained oscillations & also find corresponding oscillation	8	L3	CO3

frequency.

Q.3 **Answer the following (any two) –**

a) For unity feedback control system — 9 — L3 — CO5

$$G(S) = \frac{10}{S(S+1)(S+5)}$$

Sketch Bode Plot. Determine Gain & Phase margin

b) Evaluate state transition matrix for system — 9 — L5 — CO6

$$\begin{bmatrix} \dot{X}1 \\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -2 & 3 \\ 0 & -3 \end{bmatrix} \begin{bmatrix} X1 \\ X2 \end{bmatrix}$$

c) Interpret controllability of system — 9 — L2 — CO6

$$\begin{bmatrix} \dot{X}1 \\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -1 & -1 \\ 2 & -1 \end{bmatrix} \begin{bmatrix} X1 \\ X2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$$

*****