Total No. of Questions – [3] Total No. of Printed Pages:2

G.R. No.	

PAPER CODE	U222-241(ESE)

May 2022 (ENDSEM) EXAM

S.Y. B. TECH. (SEMESTER - II) – E&TC

COURSE NAME: CONTROL SYSTEM

COURSE CODE: ETUA22201

(PATTERN 2020)

Time: [1Hr] [Max. Marks: 30]

(*) Instructions to candidates:

1) **Figures to the right indicate full marks.**
2) **'a' part of every question is compulsory**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1 a) Estimate stability of closed loop system with following characteristic equation, using Routh-Hurwitz criterion, - [4]

$s^5+2s^4+3s^3+6s^2+10s+15 = 0$

Q.1 b) Draw the root locus of a feedback system whose OLTF is given as follows – [6]

$G(s)H(s) = \frac{k}{s(s+2)(s+3)}$. Comment on stability.

OR

Q.1 b) Comment on stability of the control system whose OLTF is given as follows – [6]

$G(s)H(s) = \frac{s}{(s^2+4)(s+2)}$. Use Root locus technique.

Q.2 a) Realize $H(s)= \frac{s(s+2)}{(s+1)(s+3)(s+4)}$ in parallel form. [4]

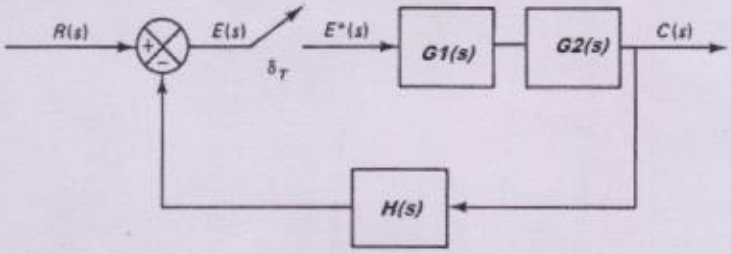
Q.2 b) Express State Transition Matrix. Derive any 3 properties of State Transition Matrix. [6]

OR

Q.2 b) Compute state transition matrix given – [6]

$A=\begin{bmatrix}1 & 0\\ 1 & 1\end{bmatrix}$; $B= \begin{bmatrix}0\\ 1\end{bmatrix}$. Also find x(t) if $x(0) = \begin{bmatrix}1\\ 0\end{bmatrix}$. Use inverse Laplace Transform Technique

Q.3 a) Calculate Pulse Transfer Function of the following Digital System. [4]



Q.3 b) Draw and explain block diagram of a sampled data control system. [6]

OR

Q.3 b) Elaborate advantages of digital control systems. Explain working of PID controller. [6]