R18

Code No: 154AK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, August/September - 2021

CONTROL SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions

All Questions Carry Equal Marks

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1. Find the transfer function $\theta(s)/T(s)$ of the following system shown in figure 1. [15]

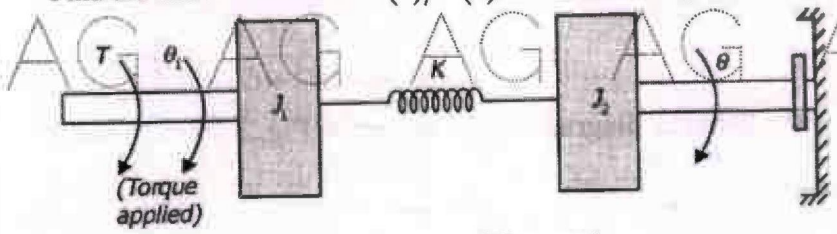

Figure: 1

2. Using block diagram algebra, find C(s)/R(s) for the following figure 2. [15]

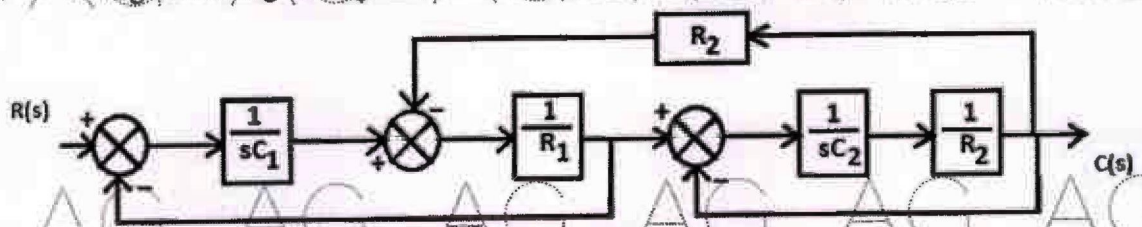

Figure: 2

3. The forward path transfer function for a unity feedback system is given by

$$G(s)=\frac{K(s+2)}{s(s+3)(s^2+s+4)}$$

Draw the root locus for $K \geq 0$. [15]

4. Using Routh stability criterion, determine the stability of the unity feedback control system with the following open loop transfer function $\frac{C(S)}{R(S)}=\frac{9}{S(S+1)(S+6)}$. [15]

5. The forward path transfer function of a unity feedback control system is $G(S)=\frac{2}{S^3(S+6)}$. Sketch the Nyquist Plot. [15]

6. Draw the polar plot for the forward path transfer function of a unity feedback control system which is given below $G(S)=\frac{1}{S(S+9)}$. [15]

7. Explain in detail about lead compensation design procedure. [15]

8.a) Explain in detail about diagonalization of state matrix.

b) Obtain the state space representation of the following differential equation $\dddot{y}+3\ddot{y}+12\dot{y}+y=u$, where y is the output and u is the input. [7+8]

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