Paper / Subject Code: 51225 / Electronics Instrumentation and Control System

1T01033 - S.E.(Electronics and Telecommunication)(SEM-III)(Choice Base Credit Grading System) (R- 19) (C Scheme) / 51225 - Electronics Instrumentation and Control System

QP CODE: 10039407 DATE: 02/12/2023

Time: 3 Hours Marks: 80

- (1) Question No. 1 is compulsory.
- (2) Attempt any three questions from the remaining five questions.
- (3) Assume suitable data if needed.

Q1. Attempt any four

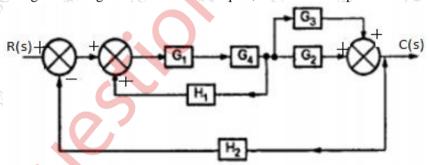
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- a. Explain various criteria for selecting a transducer for an application.
- b. What is a compensator? State its types and explain any one in detail.
- Given the transfer function $T(s) = \frac{36}{s^2 + 4.2s + 36}$, find the damping factor and natural frequency of the system. Find the response of the system when a unit step is applied.
- d. Draw Schering bridge circuit and derive formula for unknown parameters.
- e. What is the correlation between time domain and frequency domain characteristics?
- f. Explain the use of Nyquist stability criterion.

O2 Answer the following

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- a. Using Routh's stability criterion, comment on the stability of the given system, having the characteristic equation $s^6+2s^5+8s^4+12s^3+20s^2+16s+16=0$.
- b. Using block diagram reduction techniques, find closed loop transfer function C(s)/R(s):



O3 Answer the following

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- a. What is the use of Kelvin's double bridge? Explain Kelvin's double bridge with a neat diagram.
- b. Explain various types of errors in the measurement system.

Q4. Answer the following

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- a. For a unity feedback system having open loop transfer function $G(s) = \frac{20(s+4)}{s(s+1)(s+2)}$, find steady state error and error constants for applied step, ramp and parabolic inputs.
- b. For the given unity feedback system $G(s)H(s) = \frac{k}{s(s+4)(s^2+4s+20)}$. Sketch the root locus and comment on the system stability.

Q5. Answer the following

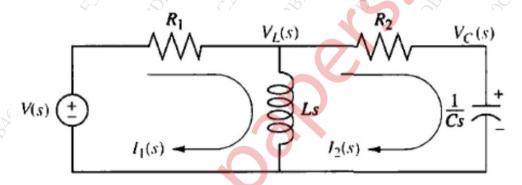
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- a. Draw Bode plot for a unity feedback control system with open loop transfer function $G(s) = \frac{75(s+1)}{s(0.2s+1)(5s+1)}$. Also find gain margin and phase margin.
- b. Sketch polar plot of $G(s) = \frac{1}{(s+2)(s+4)}$

Q6. Answer the following

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a. Obtain transfer function Vc(s)/V(s) of the following system :



b. Obtain transfer function C(s)/R(s) of the system using signal flow graph:

