SE/SEM III/EXTC/EIC/CBCS

Seat

26 NOV 2019

(3hours) Marks:80

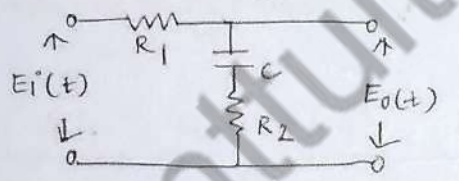
N.B:

(1) Attempt **four** questions. question no:1 is Compulsory.
(2) Assume suitable data wherever required.
(3) Answers to the questions should be grouped together.
(4) Figure to the **right** of question indicates **full** marks.

1. Attempt **all:** 20M

(a) Derive an expression for the resistance using Wheatstone bridge for balanced condition

(b) Find the transfer function of the given electrical network



(c) Explain various criteria for selection of transducers

(d) Compare analog and digital Data Acquisition system.

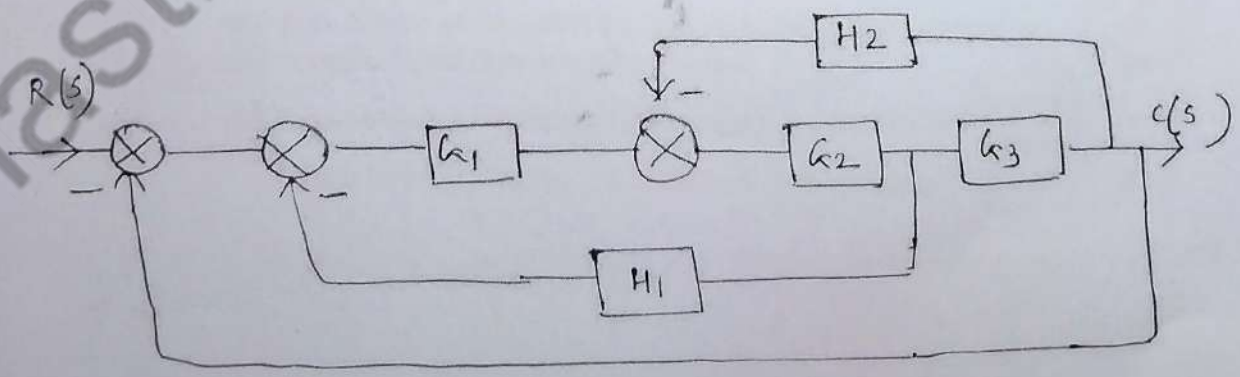
(e) Check whether the given system is stable

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

2.

(a) Describe how Q meter is used for measurement of low impedance. Also List the various sources of errors in Q meter. 10

(b) Using Block diagram reduction techniques. find closed loop transfer function 10



3

(a) Sketch the root locus of a unity feedback control system with $G(s) = \frac{K}{s(s+4)(s+6)}$ and determine the value of k for marginal stability 10

(b) A Unity feedback control system has $G(S) = \frac{10}{s(1+0.4s)(1+0.1s)}$, H(s)=1 10

Draw the bode plot and predict stability

4

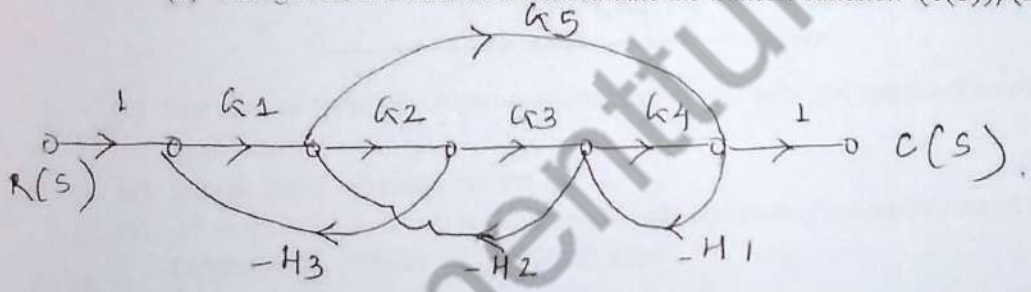
(a) Explain basic telemetry system. 05

(b) For Unity Feedback system $G(S) = \frac{k}{s(1+0.4s)(1+0.25s)}$, find range of K ,marginal value of K and frequency of sustained oscillation . Using Routh`s criterion. 05

(c) Explain with neat diagram working principle of LVDT and Explain advantages and disadvantages of LVDT . 10

5

(a) Using Mason's Gain formula evaluate the transfer function (c(S))/(R(s)) 10



(b) Explain Kelvin's double Bridge and its application for measurement of low resistance and derive expression for unknown resistance. 10

6

(a)

(i) Compare the temperature transducers with respect to their characteristics and measurement range 05

(ii) How stability of the system can be analyzed using Nyquist criterion 05

(iii) Explain Digital Data Acquisition system 05

(iv) A unity feedback systemhas open loop transfer function as $\frac{(1+0.4s)}{s(s+0.6)}$. Obtain Unit step Response, Rise Time and Peak overshoot 05

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