**Time: 3 Hours**   **Total Marks: 80**

N.B:

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

1. Attempt **all:**   **20**
    (a) Define accuracy, precision, linearity and sensitivity
    (b) Find the transfer function of the given electrical network
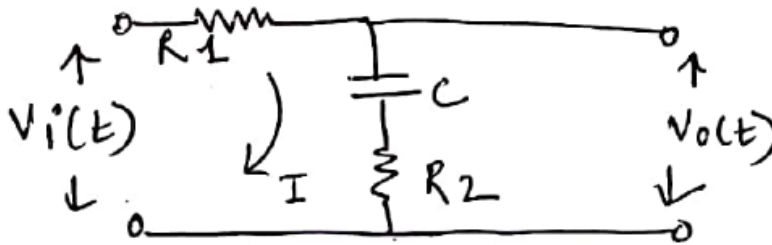
    (c) List various types of temperature transducers and write the applications of each transducers
    (d) Explain basic telemetry system
    (e) $s^3 - 4s^2 + s + 6 = 0$ is the characteristic equation of a certain control system. Determine its stability by Hurwitz method

2.

    (a) Explain measurement of inductance using Maxwell bridge .Also list the applications of it   **10**
    (b) Using Block diagram reduction techniques, find closed loop transfer function   **10**
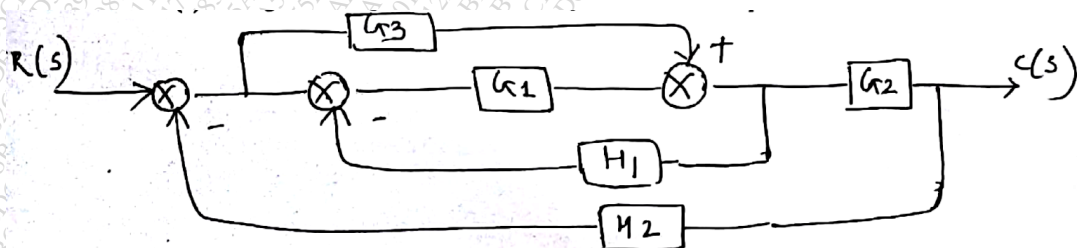
3

    (a) Sketch the root locus of a unity feedback control system with
    $$G(s) = \frac{K}{s(s+5)(s+10)}$$ .Comment on the stability   **10**

    (b) A Unity feedback control system has $G(S) = \frac{80}{s(s+2)(S+20)}$. Draw the bode plot and predict stability y

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4

(a) Explain the components of analog data acquisition system **05**

(b) For a unity feedback system

$$G(s) = \frac{k}{s(1+0.4s)(1+0.25s)}$$ find range of values of K, marginal value of K
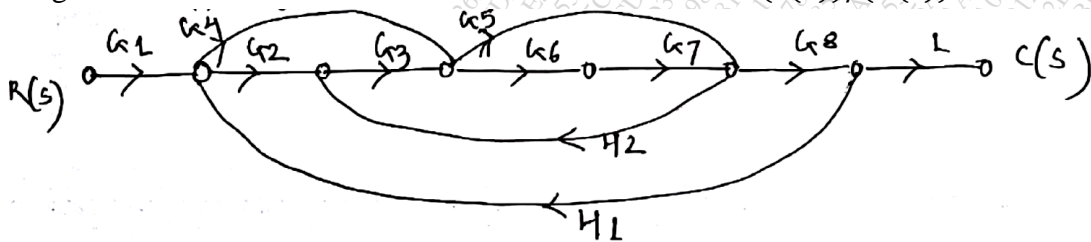
and frequency of sustained oscillations **05**

(c) Explain in detail the working principal of LVDT with neat diagram and explain its application **10**

5

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

(b) Explain the working principle of Q meter Mention the sources of errors in Q meter **10**

6

(a)

(i) Explain multiplexing and discuss any one multiplexing system **05**

(ii) For a unity feedback system having open loop transfer function

$$\frac{K(s+2)}{s(s^3 + 7S^2 + 12S)}$$

Find the type of system and all error coefficients **05**

(i) Draw and explain the working of capacitive transducer for pressure measurement **05**

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

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