**Q. P. Code: 22929**

**(3Hours)** **Total Marks:**

**80**

**Instructions** – i) Questions 1 is Compulsory
ii) Out of remaining questions attempt any three questions
Iii) Assume suitable additional data if required.
iv) Figures in the bracket to the right hand side indicate full marks.

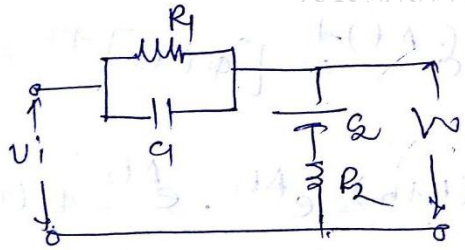
Q.1 **Solve any five**

a) Describe how Q Meter is used for measurement of low impedance. **(04)**

b) Explain various criteria for selection of transducers. **(04)**

c) Give basic block diagram of telemetry system and explain each component. **(04)**

d) Find transfer function for following system **(04)**

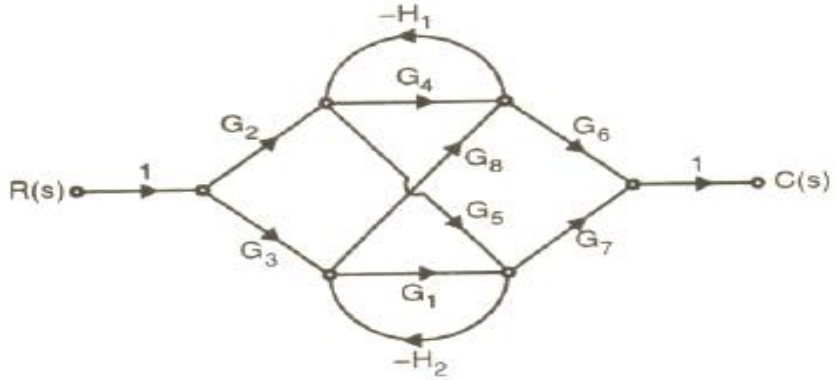



e) Explain concept of stability, absolute stability and conditional stability. **(04)**

f) Draw polar plot of **(04)**

$$G(s)H(s) = \frac{14}{s(s+1)(s+2)}$$

Q.2 a) 1)Find C(s)/R(s) using Mason's gain formula **(10)**




2) A unity feedback system has **(05)**
$G(s) = \frac{K}{S(s+2)(1+0.5S)}$. Find steady state error if r(t)=3t and K=4.Also calculate K for $e_{ss}$=0.4.

Q.2 b) What are the various sources of errors in Q meter? **(05)**

Q.3 a) A unity feedback system has **(10)**

$$G(S) = \frac{K}{S(S+1)(S+2)(S+4)}$$

Find the following using Routh –Hurwitz's criterion
1) the range of K for stability
2)The value of K for marginal stability

Q.3 b) Explain with neat diagram principle of operation of LVDT. An LVDT produces output of 5V; when the core displacement is 20mm from zero postion.Calculate core displacement when the output is 2.5V. **(10)**

Q.4 a) Draw the Bode Plot for a system having **(15)**
G(s) H(s) = 100/s(s+1)(s+2)
Find-
(a) Gain Margin
(b) Phase Margin
(c) Gain Crossover freq.
(d) Phase crossover freq.

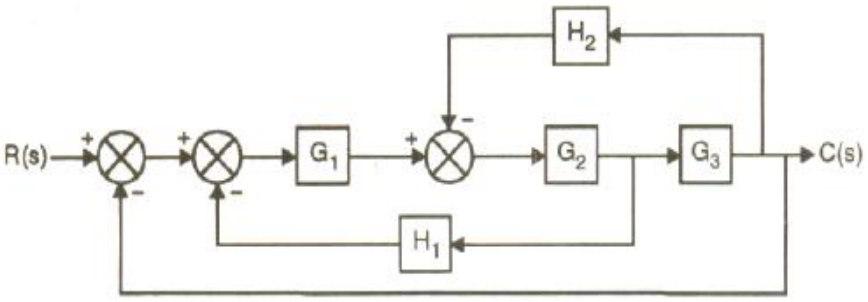
Q.4 b) Derive expression for inductance measurement using Hey Bridge. **(05)**

Q.5 a) Sketch root locus for the following transfer function **(10)**

$$G(S)H(s) = \frac{K}{S(S+4)(S+6)}$$

Q.5 b) Explain Kelvin's double bridge and its application in low resistance measurement and derive expression for unknown resistance. **(10)**

Q.6 a) Find C(s)/R(s) for the given system **(10)**




Q.6 b) 1) Define accuracy, precision and sensitivity with the help of examples. **(05)**
2) Draw generalized block diagram of data acquisition system and explain the blocks. **(05)**

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