B.Tech. SEM -IV E & TC 2014 Course (CBCS) : WINTER - 2017

SUBJECT: CONTROL SYSTEM ENGINEERING

Day : **Wednesday** Time: **02.30 PM TO 05.30 PM**

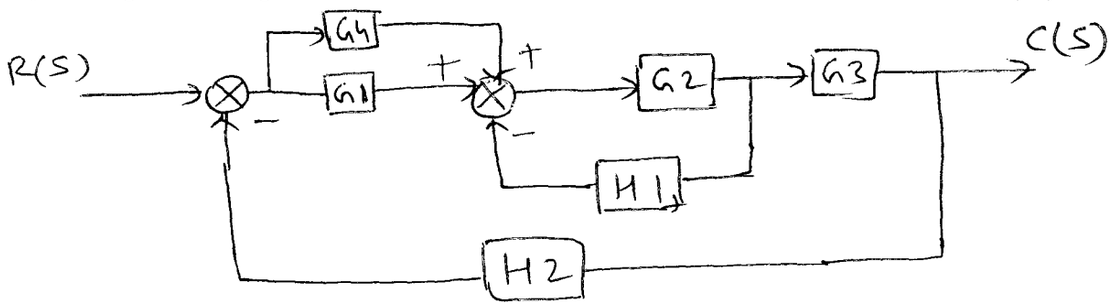
Date : **22/11/2017** **W-2017-2109** Max. Marks: 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the write indicate **FULL** marks.
3) Use suitable data if necessary.

Q.1 **a)** What is the difference between closed loop system and feed forward control system? **(03)**

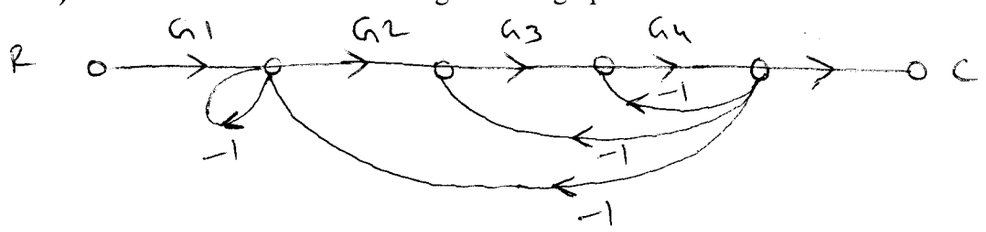
b) Using Block diagram Reduction method find out Transfer Function. **(07)**



OR

a) What are the applications of open loop control system? Explain. **(03)**

b) Find Transfer Function for signal flow graph shown. **(07)**



Q.2 **a)** What is effect of Resistance on temperature coefficient? Explain various types of thermocouple with diagram. **(07)**

b) What is working principle of flow meter? **(03)**

OR

a) Explain working of LVDT with neat diagram. **(07)**

b) What are the applications of strain gauges? **(03)**

Q.3 **a)** Derive the equation for unit step response of second order system. **(07)**

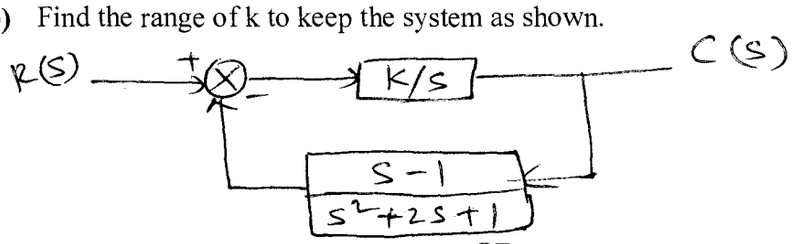
b) What are applications of Root locus technique? **(03)**

OR

G(s)= $\frac{k}{s(s+2)(s+4)}$ sketch the root locus plot and comment on stability. **(10)**

Q.4 **a)** What is Hurwitz stability criteria and its importance? **(04)**

b) Find the range of k to keep the system as shown. **(06)**



OR

Comment on the stability of the system. **(10)**

a) $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$

b) $s^4 + 2s^3 + 8s^2 + 4s + 3 = 0$

Q.5 **a)** Define following i) Gain Margin ii) Phase Margin **(05)**

b) Draw frequency response of following system. $G(s)=\frac{1}{1+4s}$ **(05)**

OR

Sketch the bode plot, with magnitude in decibels and phase angle in degrees as a function of log frequency for T.F. $G(s)=\frac{75(1+0.2s)}{s(s2+16s+100)}$ **(10)**

Q.6 **a)** Illustrate PLC architecture with example and diagram. **(08)**

b) What are the different types of control actions? **(02)**

OR

a) What is compensator? Explain any one type of compensator? **(06)**

b) What is ladder diagram, explain with example. **(04)**

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