SUBJECT CODE:- 268
FACULTY OF ENGINEERING AND TECHNOLOGY
B.E.(MECH) Examination Nov/Dec 2015
Automatic Control System
(Revised)

[Time: Three Hours]   [Max. Marks: 80]

"Please check whether you have got the right question paper."

N.B   i) Attempt any three questions from each section.
         ii) Use of semi log and graph paper allowed
         iii) make necessary assumptions and state them clearly
         iv) Figures to the right indicate full marks.

Section A

Q.1   a)   What are the requirements of an ideal control system?   06
           b)   Find the transfer function for electrical network show.   07
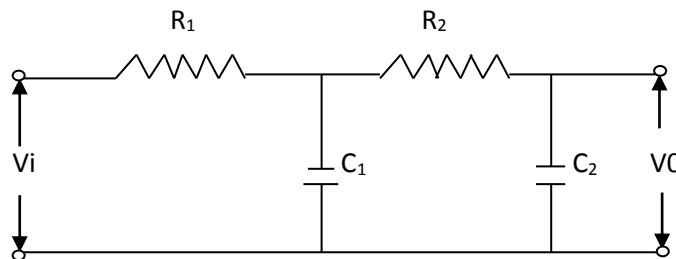
Q.2   a)   Explain in detail the thermal system?   06
           b)   Write note on synchro transmitter and receiver?   07
Q.3   a)   Using block diagram techniques find the closed loop transfer functions of the system whose block diagram   07
                is as shown.
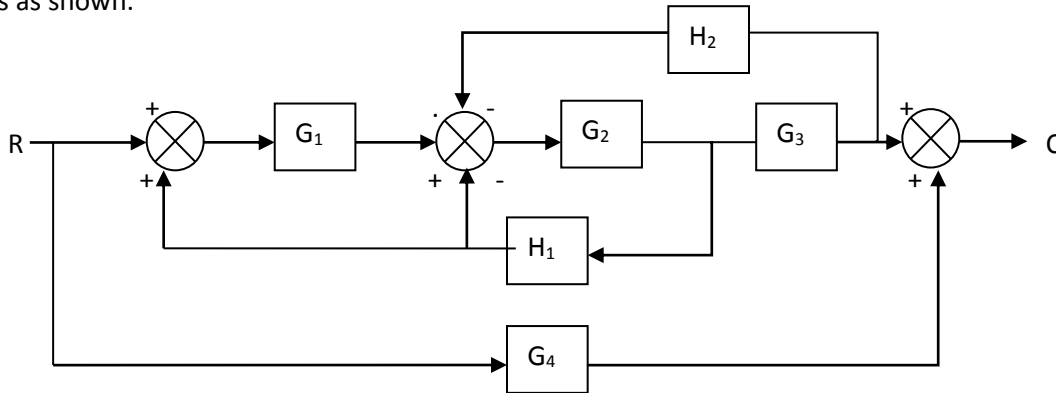
           b)   Explain mason gain formula in detail?   07
Q.4   a)   Draw a signal flow graph and determine the closed loop transfer function of a system whose block diag. is   07
                given as using mason gain formula.

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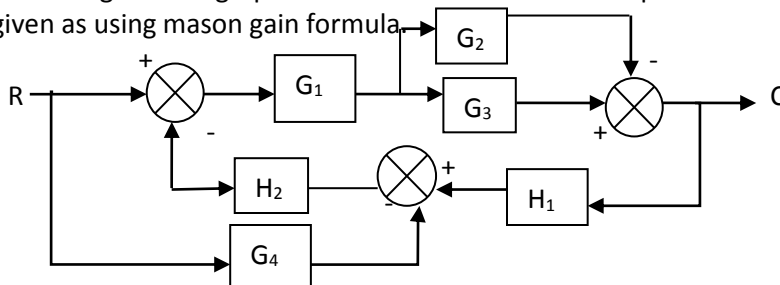
b) Explain in detail hydraulic control system. 06

Q.5 a) Write short note on DC servomotor. 06
b) Explain in detail on-off control system. 07

SECTION-B

Q.6 a) What is mean by second order system? Show that the time domain unit step response of under-damped second order system is given by. 07

$$(ct) = 1 - \frac{e^{-\delta w_n t}}{\sqrt{1-\delta^2}} \sin\left[t\left(wn\sqrt{1-\delta^2}\right) + \tan^{-1}\frac{\sqrt{1-\delta^2}}{\delta}\right]$$

b) Find peak time, rise time, delay time and setting time for 06

$$\frac{(CS)}{R(S)} = \frac{64}{S^2 + 5S + 64}$$

Q.7 a) For the system given below determine 1) Static error coefficients 2) The steady state error for an input r(t)=3-t+t² 07
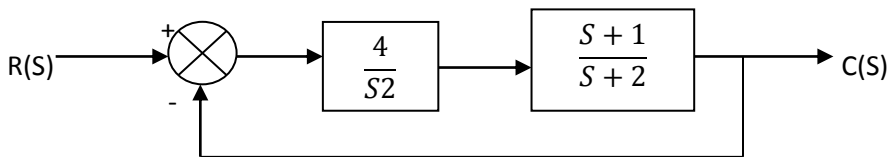
b) A system has $G(s) = \frac{K}{s(1+ST)}$ with unity feedback where K and T are const. the overshoot is to be reduced from 75% to 25%. Find the faculty by which K should be multiplied. 07

Q.8 a) Examine the system is stable or unstable using R-H criterion $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$ 06
b) Write note on polar plots. 07

Q.9 Sketch the bode plots for the transfer function and find Gm pm, wgc, wpc and comment on stability of the system. $G(S) = \frac{10}{S(1+0.5S)(1+0.1S)}$ 13

Q10 a) Explain the rules for sketching the root locus? 07
b) Sketch the root locus for the open loop transfer function $GS) = \frac{K}{S(S+2)(S+4)}$ 06

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