

- 314 ELL
7. (a) Explain Nyquist stability criterion.
(b) Draw Bode plot and find GM and PM

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

8. Write short notes on :
- (a) Constant μ circles.
(b) Electrical and mechanical system analogy.

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III/IV B.E. DEGREE EXAMINATION.

Second Semester

Electrical and Electronics Engineering

CONTROL SYSTEMS

(Common with ECE)

(Effective from the admitted batch of 2006-2007).

Time : Three hours

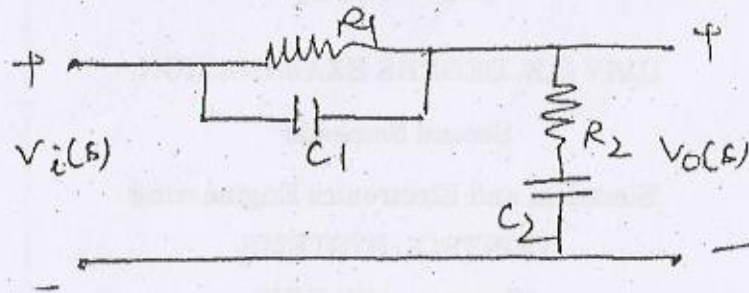
Maximum : 70 marks

[2537/1/1/12]

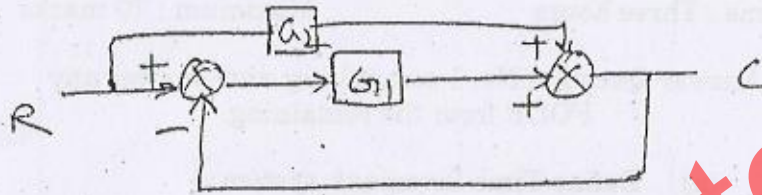
Answer Question No. 1 compulsory and Answer any FOUR from the remaining.

1. (a) Define Time Invariant system.
(b) Write any two advantages of closed loop system.
(c) Define Error constant.
(d) What is the main feature of Derivative control?
(e) Define Asymptotic stability.
(f) What is Break away/in point in Root locus?
(g) Define phase margin and phase cross over frequency.

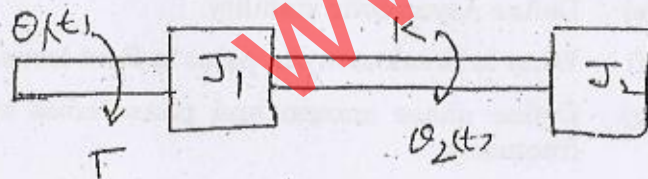
2. (a) Write the differential equations for the following system.



- (b) Obtain the overall transfer function of the block diagram given as,



3. (a) Explain Mason's gain formula.
 (b) Derive transfer function for the following system $\left(\frac{\theta_1(s)}{T(s)}\right)$.



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4. (a) Measurements conducted as a system show the system response to be

$$c(t) = 1 + 0.2e^{-60t} - 1.2e^{-10t}$$

find the expression for the closed loop transfer function.

- (b) Derive an expression to find the rise time of the time response of a typical second order system.

5. (a) Check the stability :

$$p(s) = s^4 + s^3 + 2s^2 + 2s + 3 = 0.$$

- (b) Find the Range of 'K' for the system to be stable $p(s) = s^3 + 3s^2 + 3s + K + 1$.

6. Sketch the Root locus and comment upon stability

$$G(s) + i(s) = \frac{K}{s(s+4)(s+5)}$$

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