

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mid Term Examination-I, September 2014

B. Tech. in Electrical Engineering and Electronics & Communication Engineering, Semester V



Roll No.....

EE501: LINEAR CONTROL SYSTEM

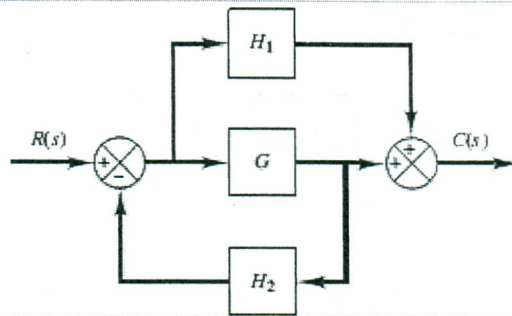
Time: 1.5 hours

Max. Marks: 40

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

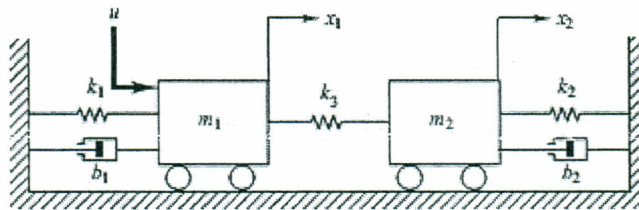
Q.1A	Objective type multiple choice questions (5 questions @ 1 mark)	05
i.	Laplace transform of df/dt is; (a) $F(s)-f(0+)$, (b) $F(s)/s$, (c) $sF(s)$, (d) $s^2F(s)$.	
ii.	The overshoot due to decrease of damping factor; (a) decreases, (b) increases, (c) remains unchanged, (d) none of these.	
iii.	Which of the following system is generally preferred; (a) overdamped, (b) critically damped, (c) underdamped, (d) oscillatory.	
iv.	If the gain K of the system increases, the steady state error of the system; (a) remains unchanged, (b) increases, (c) may increase or decrease, (d) decreases.	
v.	For type -1 system, the steady state error due to step input is equal to; (a) zero, (b) infinity, (c) one, (d) none of these.	
Q.1B	Short answer type questions (2 questions @ 2.5 marks)	05
i.	Find out the time response for a first order system with unit step input.	
ii.	Find out expression for maximum overshoot.	
Q.2A	What do you mean by control system? Give its applications. Define the types of control system.	2+1 +2
Q.2B	What are the elements of control system? Draw the closed loop control system for 'automatic electric iron' and 'control system for moving on a prescribed path'.	3+1 +1
Q.3A	A system with input R and output C is shown below. Find the transfer function of the system using block diagram reduction technique.	05
Q.3B	Find the transfer function $C(s)/R(s)$ for the system shown below.	05



OR

Q.3B Draw the current and voltage analogous system for the given mechanical system. Here u is the applied force.

2.5+
2.5



Q.4A Draw the expression for a second-order system to a unit-step input with damping factor ranges from 0 to 1.

05

Q.4B A system has $G(s) = \frac{k}{s(1+as)}$ with unity feedback with a and k are constant. Determine the factor by which k should be multiplied to reduce the overshoot from 80% to 45%.

05

OR

Q.4B A unity feedback system has $G(s) = \frac{100}{s(s+10)}$ and $r(t)=3t$. Determine: (i) steady state error, (ii) the value of K to reduce the error by 15%.

05

