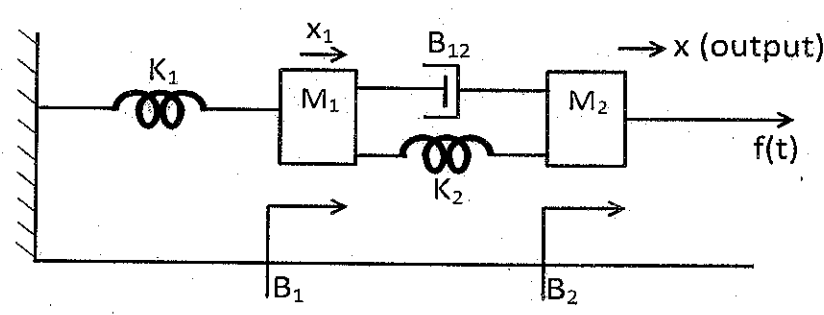


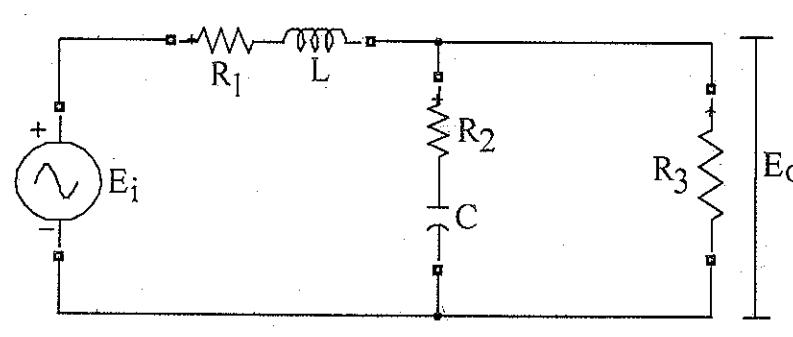
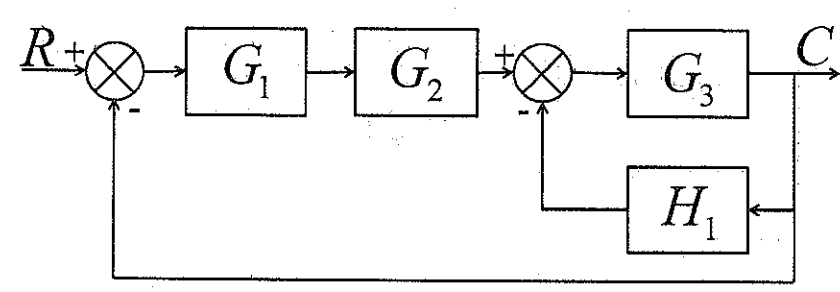
B.E. PRINTING ENGINEERING (3RD YEAR 2ND SEMESTER) EXAMINATION 2019

SUBJECT: CONTROL APPLICATION IN PRINTING

FULL MARKS: 100

TIME: THREE HOURS

<p>CO 1 [10]</p>	<p style="text-align: center;">Answer any one question from (a) and (b) within this block</p> <p>a. Obtain the transfer function of the following mechanical system</p> 	<p>[10]</p>
<p>CO 2 [20]</p>	<p style="text-align: center;">Answer any one question from (a) and (b) within this block</p> <p>a. Derive and define the rise-time, settling time and peak overshoot of a first-order system. A second order mechanical system is represented by the transfer function $\frac{\theta(s)}{I(s)} = \frac{1}{Js^2 + fs + k}$. A step input of 10Nm is applied to the system and the results are: 1. Maximum overshoot = 6% 2. Time at peak overshoot = 1sec 3. $k = 20$ Determine the values of J, f</p> <p>b. Explain with proper diagram the concept of stability. Draw the output response and discuss the stability of the system consisting of a pair of complex conjugate poles lying on the imaginary axis. Draw the pole-zero map and discuss the stability of the following transfer function</p> <p>1. $G(s) = \frac{5(s+1)}{s^3 + 3s^2 + 5s + 3}$ 2. $G(s) = \frac{s-2}{(s+4)(s^2+2)}$</p>	<p>[10+10]</p> <p>[10+10]</p>
<p>CO 3 [20]</p>	<p style="text-align: center;">Answer any two questions from (a), (b) and (c) within this block</p> <p>a. Explain controlled variable and manipulated variable. Define various types of control system with proper diagram. Discuss their advantages and disadvantages.</p> <p>b. Deduce the transfer function of the following electrical network:</p>	<p>[10]</p> <p>[10]</p>

	 <p>c. Find the transfer function of the following block diagram:</p> 	[10]
CO 4 [10]	<p style="text-align: center;">Answer any one from (a) and (b) in this block</p> <p>a. Write short notes on 1. AC servomotors 2. Thyristors</p> <p>b. Explain sensors and transducers with proper example and state the difference between the sensors and transducers. Draw and explain typical hydraulic power system. Draw and explain double-acting cylindrical type pneumatic actuator.</p>	[10] [10]
CO 5 [40]	<p style="text-align: center;">Answer any two questions from (a), (b) and (c) within this block</p> <p>a. Derive and explain CMRR of an OP-AMP. State the ideal OP-AMP characteristics. Also explain the open-loop and closed-loop characteristics of an OP-AMP.</p> <p>b. Draw and derive the output-input voltage relation of an integrator circuit. Draw the output responses of the integrator if a square wave and a sine wave are given in the input of the integrator circuit.</p> <p>c. For the following circuit, prove that $\frac{V_o}{V_i} = 8$</p>	[20] [20] [20]

