

**CONTINUOUS INTERNAL EVALUATION- 1**

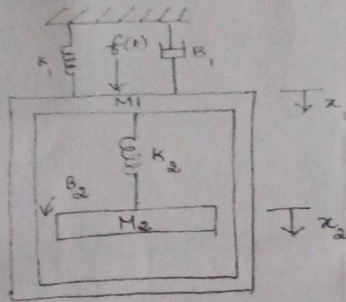
Dept: EC	Sem / Div: IV	Sub: Control Systems	S Code: 18EC43
Date: 05-07-2022	Time: 9:30-11:00 am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

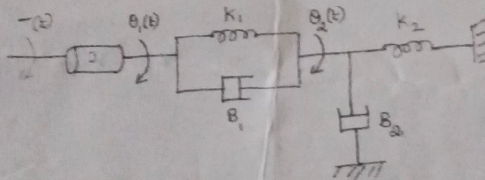
QN	Questions	Marks	RBT	COs
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**PART A**

- 1 a Draw the general block diagram of automatic control system and explain with example.
- b For the mechanical system shown in fig. Draw the mechanical network, write the differential equation and Draw the electrical network based on Force voltage analogy.

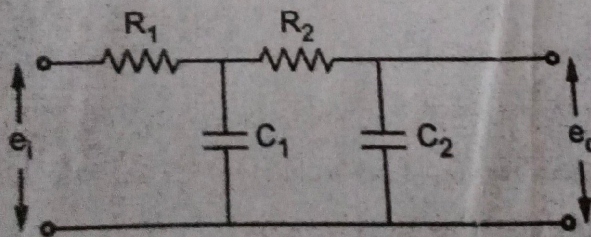


- c Write the torque equation of the rotational system shown in fig. Find the transfer function  $\theta_2(s)/T(s)$

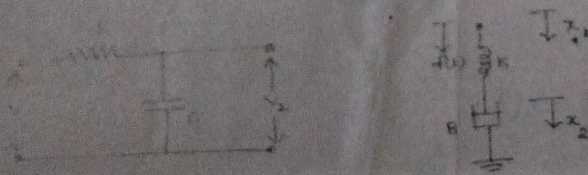


**OR**

- 2 a Find  $E_o(s)/E_i(s)$  for the system given in Fig. 2.b



- b Define Analogous system. Show that the two systems are analogous by comparing their transfer functions.

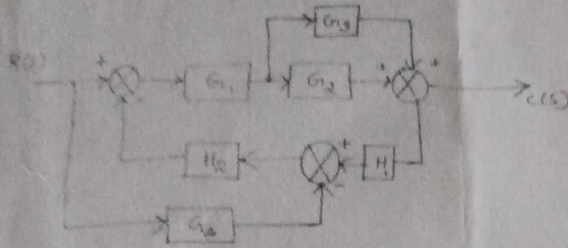


- c For the block diagram shown in figure, determine the transfer function  $C(s)/R(s)$  using block diagram reduction technique.

7      L3      CO2



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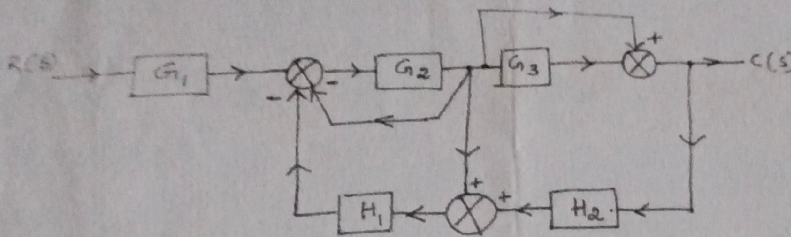
**PART B**

3 a For the block diagram shown in figure, determine the transfer function  $C(s)/R(s)$  using block diagram reduction technique.

9

L3

CO2

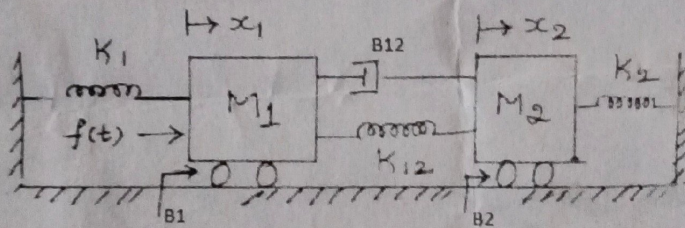


b Draw the mechanical network and write the differential equation for the system in Fig 3.a. Draw the electrical network based on Force voltage and Force current analogy.

10

L3

CO1



c What is block diagram representation. Derive the transfer function of a closed loop system.

6

L2

CO1

**OR**

4 a Define signal flow graph and list the properties of the signal flow graph.

7

L2

CO2

b The performance equations of a controlled system are given by the following set of linear algebraic equations. Draw the block diagram and determine  $C(s)/R(s)$ .  
 $E1(s) = R(s) - H3(s)C(s)$ ,  $E2(s) = E1(s) - H1(s)E4(s)$ ,  $E3(s) = G1(s)E2(s) - H2(s)C(s)$ ,  
 $E4(s) = G2(s)E3(s)$ ,  $C(s) = G3(s)E4(s)$ .

10

L3

CO2

c For the rotational system shown in figure, Draw the electrical network based on T-I analogy.

8

L3

CO1

