



Department of Electrical and Electronic Engineering

Level-4, Term-I

Mid Term Examination, Spring-2023

Course Code: EEE 401

Course Title: Control System I

Notes:

Time: 1 Hour

- Each question carries 30 marks.
- Figure on the right of each question indicate marks for respective question.
- Answer any **TWO (2)** including Question **ONE (1)**

Full Marks: 60

1. i. For the translational mechanical system shown in figure 1(i) identify transfer function [10]
 $G(s) = X_3(s)/F(s)$.

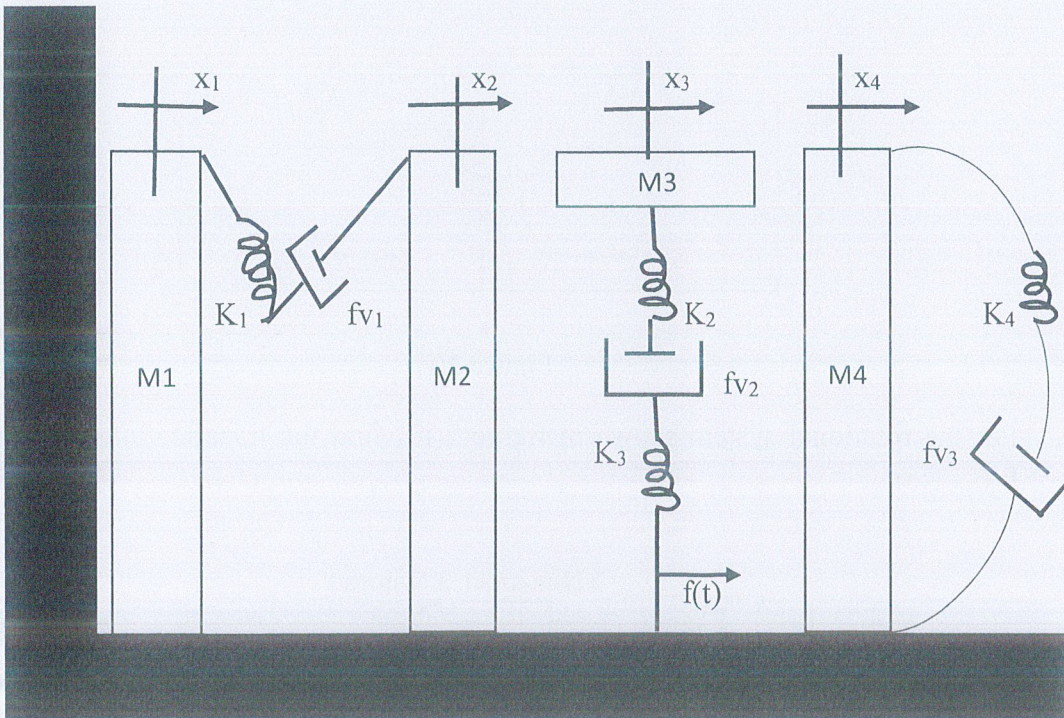


Figure 1(i)

- ii. For the rotational mechanical system with gears shown in figure 1(ii), determine the transfer function, $G(s) = \theta_3(s)/T(s)$. The gears have inertia and bearing friction as shown. [10]

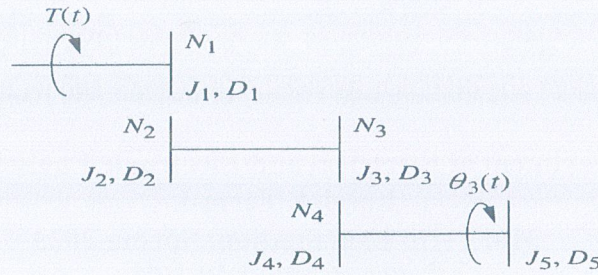
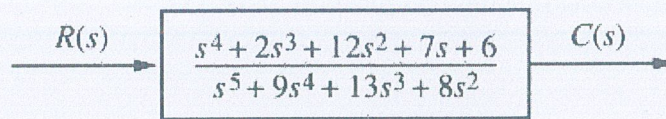


Figure 1(ii)

- iii. Evaluate the state space representation of the transfer function given below [10]



2. i. For the network of figure 2(i), determine the transfer function, $V_c(s)/V(s)$, using nodal analysis and a transformed circuit with current sources. [15]

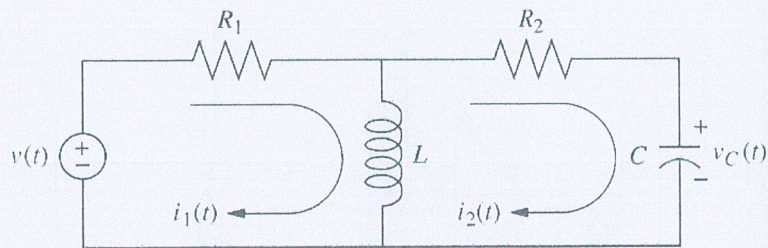


Figure 2(i)

- ii. For the rotational system shown in figure 2(ii), find the transfer function, $G(s) = \theta_L(s)/T(s)$. [15]

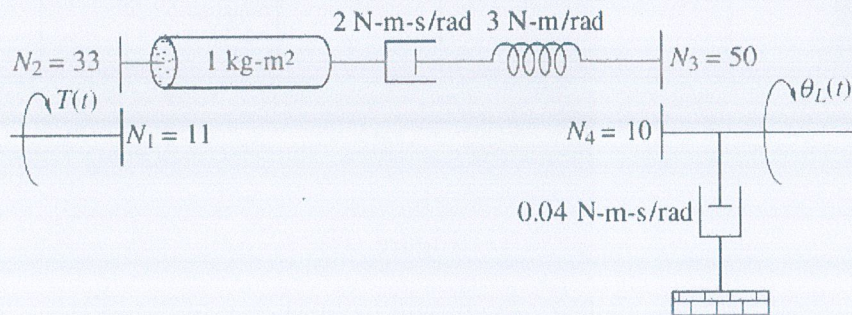


Figure 2(ii).

3. i. Find the state equations for the translational mechanical system shown in figure 3(i). [15]

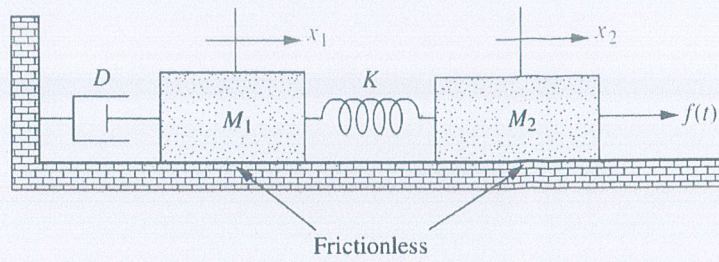


Figure 3(i).

- ii. For the translational mechanical system shown in figure 3(ii) identify transfer function $G(s) = X_1(s)/F(s)$. [15]

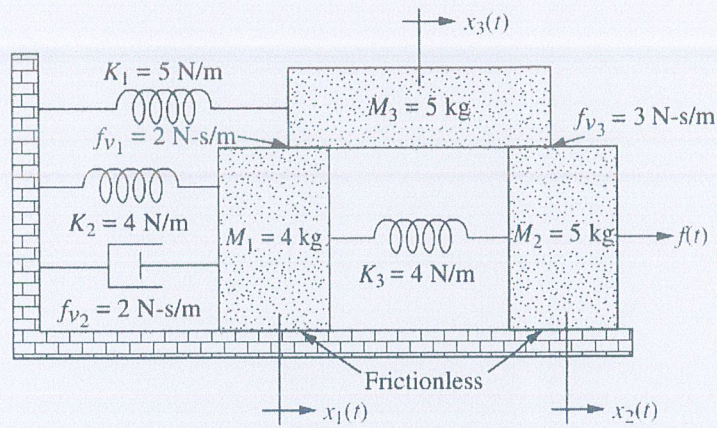


Figure 3(ii)