

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – I • EXAMINATION – WINTER 2012****Subject code: 711104N****Date: 10-01-2013****Subject Name: Modeling, Simulation and Computer Application****Time: 02.30 pm – 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain – What is system modeling and simulation? Give any two examples to strengthen your answer. **07**
(b) Explain static and dynamic systems using suitable practical examples. **07**

- Q.2** (a) Give a physical model of (i) an automobile and (ii) its suspension system. Write only system equations for the suspension system. **07**
(b) Give transfer function form of a second order differential equation representing a damped system. **07**

OR

- (b) Describe Monte Carlo simulation technique with a suitable example. **07**

- Q.3** (a) For the system as shown in figure 1, make a state variable model, write system equations and get transfer function form. **07**
(b) Classify system variables and write their significance. **07**

OR

- Q.3** (a) For the system shown in figure 2, write statespace representation. Excitation, F is given to the mass M1. **07**
(b) Classify different models. Explain the importance of each model keeping in view their characteristics. **07**

- Q.4** (a) What are different simulation tools available? Give the basic features that are required in any simulation tool. **07**
(b) How will you model a DC motor for predicting its performance? Write system equations and give a MATLAB program for the same. **07**

OR

- Q.4** (a) Make a model of any one thermo-mechanical system. **07**
(b) Describe system concept of Automobile control system for tank level control. **07**

- Q.5** (a) Explain RC circuit and its importance. Write a program for showing the effect of circuit parameters. Give resembling mechanical system. **07**
(b) For the truck trailer system shown in figure 3, write system equations and hence get only the transfer function form, if mass of truck is M1 **07**

OR

- Q.5** (a) Explain the method of modeling a DC motor. Write down system equations and get a transfer function of the system. **07**
(b) With the help of MATLAB program explain, importance of each parameters, the RLC circuit and make a model to simulate a second order system. **07**

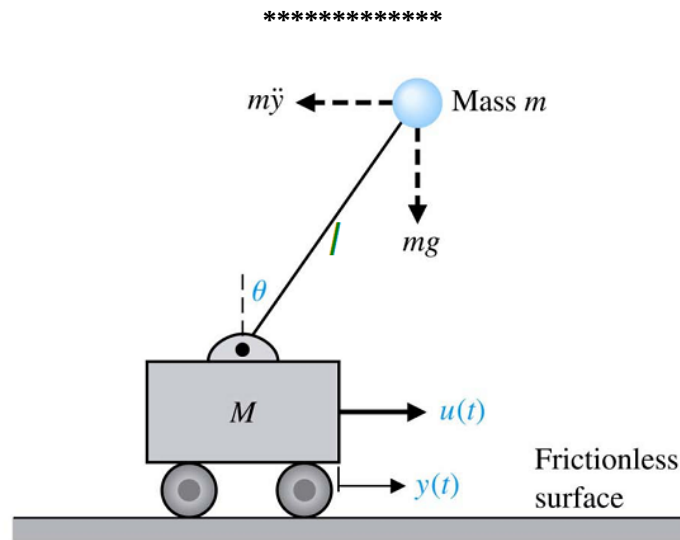


Figure – 1 [Q-3 (a)]

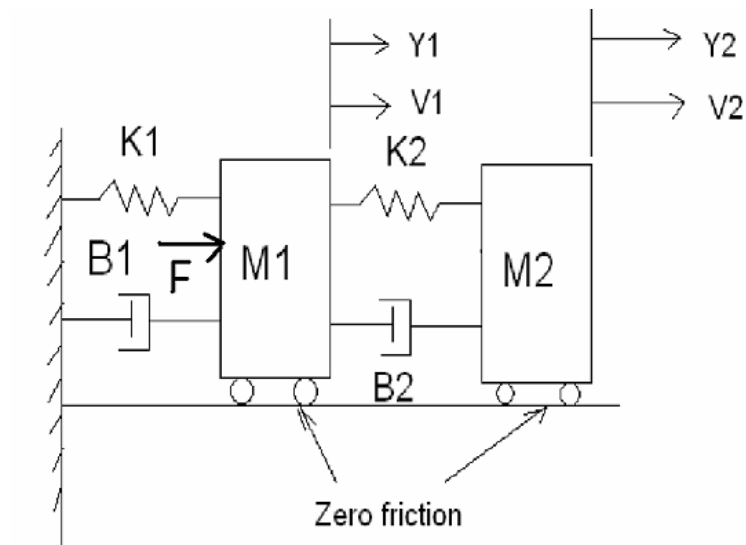


Figure – 2 [Q-3 (a) OR]

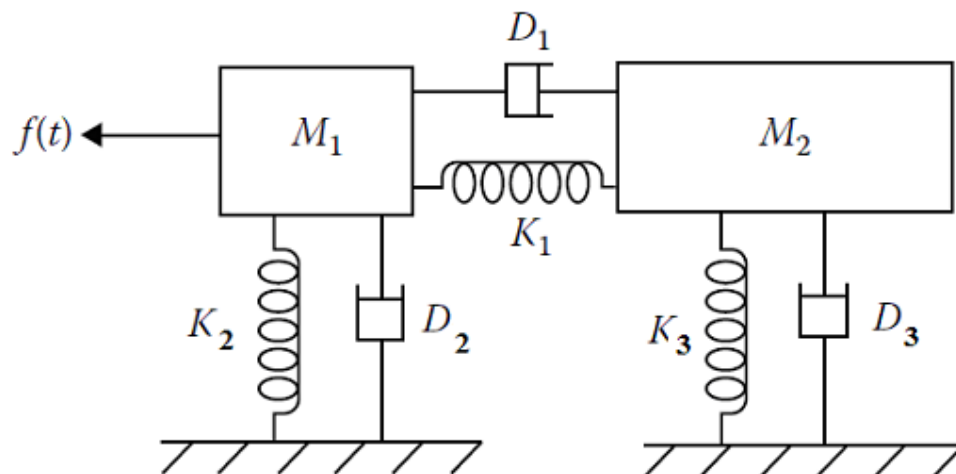


Figure – 3 [Q-5 (b)]