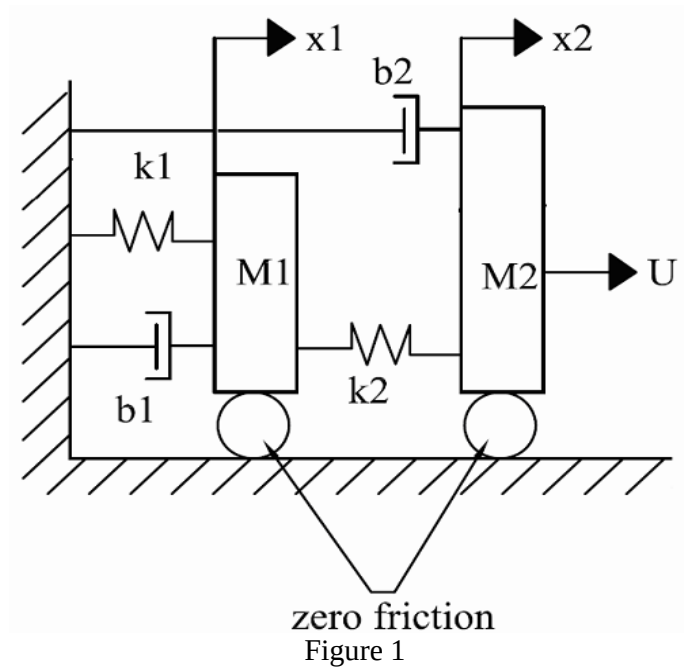


GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER • 2013

Subject code: 711104N**Date: 30-12-2013****Subject Name: Modeling, Simulation & Computer Application****Time: 10.30 am – 01.00 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 modern concept of system modeling and simulation. Give any three examples to strengthen your answer. **07**
- (b)** Discuss advantage of Matlab and discuss various simulation toolboxes available in it. **07**
- Q.2 (a)** Describe Monte Carlo simulation technique with a suitable example. **07**
- (b)** Model and simulate a mechanical accelerometer which is mounted on a jet engine test sled. Show clearly the characteristics of the accelerometer and mention how can reduce the response time. **07**
- OR**
- (b)** Model any first order system and write a Matlab program for it. State inputs and outputs of the system clearly. **07**
- Q.3 (a)** Discuss types of model with an example of each. **07**
- (b)** What are Random variables? Explain their significance. **07**
- OR**
- Q.3 (a)** Extract from the following description the entities, attributes, and activities of the system. Ships arrives at a port. They dock at a berth if one is available; otherwise, they wait until one becomes available. They are unloaded by one of several work gangs whose size depends upon the ship's tonnage. A warehouse contains new cargo for the ship. The ship is loaded and then departs. Suggest two exogenous events (other than arrivals) that may need to be taken into account. **07**
- (b)** Explain the use of probability in simulation. Describe the following probability density function and cumulative distribution function: (i) Binomial distribution (ii) Exponential distribution, (iii) Poisson's distribution and (iv) Gamma distribution. **07**
- Q.4 (a)** Explain static and dynamic systems using suitable practical examples. **07**
- (b)** Make a model of any one thermo-mechanical system. **07**
- OR**
- Q.4 (a)** For modeling mechanical systems, describe idealized translational and rotational passive elements. Mention only governing equations clearly with appropriate sketches. **07**
- (b)** Give transfer function form of a second order differential equation representing a damped system. **07**
- Q.5 (a)** Explain RLC circuit and its importance. Write a program for showing the effect of circuit parameters. Give resembling practical system. **07**
- (b)** A practical system is simplified as shown in Figure 1, develop a model using blocks available in MATLAB SIMULINK. And write the commands to be given at command window for running successful running of program. **07**



OR

- Q.5 (a)** Give a physical model of (i) an automobile and (ii) its suspension system. Write only system equations for the suspension system. **07**
- (b)** Make a state space model only for the system shown in Figure 2. **07**

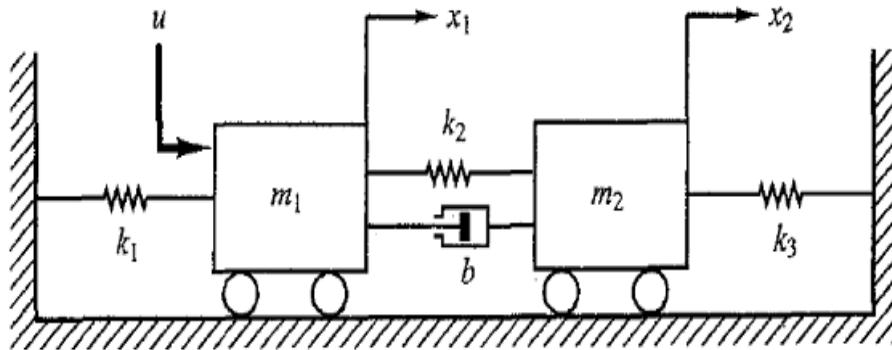


Figure 2
