(Subject Code and Roll No. to be filled in your Answer Book)

Roll No. | | | | | | | | | | |

M.Tech. – Manufacturing Science and Technology

I SEM. THEORY EXAMINATION 2011–12

SIMULATION MODELLING AND ANALYSIS

Time : 3 Hours *Total Marks : 100*

Note :– (i) All questions carry equal marks.

(ii) All questions are compulsory.

(iii) Assume suitably any missing data.

1. Answer any **two** of the following : **(10×2=20)**

(a) Explain the significance of random variables in detail. Also elaborate the properties of random variables.

(b) Write short notes on :

(i) System Environment

(ii) System Modelling

(iii) Stochatic Activities

(iv) Continuous and Discrete Systems.

(c) Define entities, attributes and activities of a system. Name four principal entities, attributes and activities to be considered if you were to simulate (i) a gasoline filling station (ii) a barber shop.

(a) A builder observes that the rate at which he can sell houses depends directly upon the number of families who do not have a house. As the number of people without houses diminishes the rate at which he can sell houses drops. Further consider a manufacturer of central air conditioners. His sales depends on the number of houses built. The rate of sales diminishes as the unfilled market diminishes. Simulate the above situations in continuous simulation.

(b) Elaborate the Monte Carlo method of simulation in detail.

(c) With the help of standard symbols for drawing block diagrams representing analog computer arrangements explain the automobile suspension model.

3. Answer any two of the following : (10×2=20)

(a) What is the role of computers in simulation studies ? Briefly describe different simulation software packages.

(b) With suitable examples explain the growth and decay models. Explain the significance of system dynamics diagrams with examples.

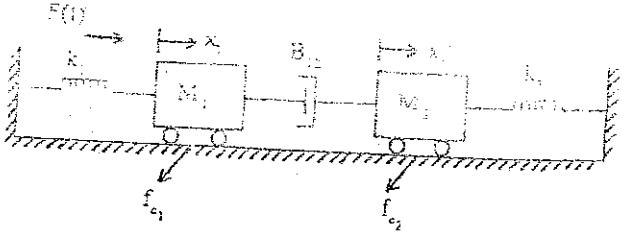
(c) What are Random Numbers ? Elaborate different methods of generation of random numbers in detail.

4. Answer any two of the following : (10×2=20)

(a) Elaborate the basic building blocks used for simulation of mechanical and hydraulic systems.

Derive the system eqⁿ and find the value

$X_1(s)/F(s)$ for the system shown in fig.



(c) Derive the system equations and value of $H_2(s)/Q_i(s)$ for the system shown in fig. 2:

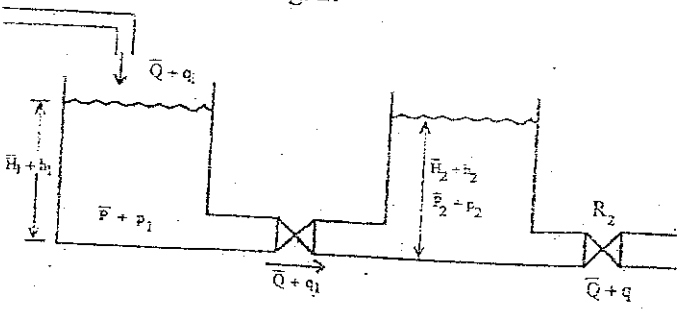


Fig. 2

5. Answer any two of the following : **(10×2=20)**

(a) Explain the role of computers in manufacturing. Also describe some simulation software for manufacturing.

(b) What is FMS ? What are the components of a FMS ? How would you decide where to apply FMS technology ?

(c) Write short notes on :

(i) Hybrid simulation

(ii) Wating line systems

(iii) Variance reduction techniques

(iv) Role of probability and statistics in simulation.