

IV B.Tech I Semester Supplementary Examinations, April/May 2005
SIMULATION & MODELLING
(Common to Computer Science & Engineering and Information Technology)

Time: 3 hours

Max Marks: 70

Answer any FIVE Questions
All Questions carry equal marks

1. Define what is meant by a "system"? What are continuous and discrete systems? Discuss with examples. Discuss the basic types of system models in brief.
2. What are corporate models? Discuss how the following elements of a production subsystem are related to each other using a neat block diagram: supply, distribution, production, labour, machinery. How does national and world economics affect any of these?
3. Explain the Cobb Douglas model $S = F(L, M)$ of production segment S of a corporate model. If we include the financial model relating the investment k to the labour L and machinery M as $k = eL + m$, show that there is an optimal assignment of L and M which maximizes production s , for a given investment k .
4. Distinguish between "numerical computations" and "system simulation". Is this distinguish valid for static systems? Explain what is meant by Monte Carlo Simulation? Explain how you would evaluate the two dimensional integral $\int_0^x dx \int_0^y dy f(x, y)$ using Monte Carlo method.
5. Write short notes on
 - (a) Continuous system models.
 - (b) Analog computation.
 - (c) Hybrid computation.
 - (d) Real time simulation.
6. What is meant by "System dynamics"? Discuss exponential and modified exponential and modified exponential growth models. Discuss how these could be applied to modeling population growth or market growth. Under what conditions can the logistic junction model a population growth?
7. Draw a system dynamics diagram to represent the following problems. The birth rate a country is adding 100,000 people to an initial population of 5,000,000. The average life expectancy is 65 years. It is estimated that one tone of coal is consumed per annum per individual. Show how the countrys resources of $5 * 10^8$ tonnes of coal is getting to depleted.

8. Distinguish between probability density function and probability mean function. What is cumulative distribution function? It is observed that one day the number of customers who bought 1, 2, 3, 4, 5 items in a supermarket are respectively 125, 605, 215, 187 and 53. Find the probability distribution of customers against the number of items bought. What percentile of customer bought four or less items?
