CODE NO: RR 321502

2008 JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

III B.TECH SUPPLEMENTARY EXAMINATIONS
MATHAMATICAL MODELLING AND SIMULATION
(COMPUTER SCIENCE & SYSTEM E ENGINEERING)

AUG/SEP 2008

TIME : 3 HR
MARK : 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is a model? Discuss various classification schemes of models.

(b) Find all basic solutions for the problem

Max z = x1 + 2x2
such that
x1 + x2 ≤ 10
2x1 - x2 ≤ 40
and x1, x2 ≥ 0.

2. A company manufacturing air - coolers has two plants located at Mumbai and Kolkata with capacities of 200 Units and 100 units per week respectively. The company supplies the air coolers to its four show rooms situated at Ranchi, Delhi, Lucknow and Kanapur which have a maximum demand of 75, 100, 100 and 30 units respectively. Due to the difference in raw material cost and transportation cost, the profit per unit in rupees differs which is shown in the table below:

Ranchi Delhi Lucknow Kanpur

Mumbai 90 90 100 100

Kolkata 50 70 130 85
lan the production programme so as to maximize the profit. The company may have its production capacity at any plant partly unused.

3. What are the costs associated with inventory? Distinguish between deterministic and stochastic models in inventory theory.

4. What is the use of ABC, VED and other classifications to departments other than inventory control? What is the use of purchasing, for maintenance, for quality control?

5. With respect to queuing theory, explain the following

(a) Cost models in queuing theory

(b) Non-poisson queues.

6. (a) Discuss in brief

i. Dummy activity

ii. Free float

iii. Independent float

iv. Total float

(b) What are the three estimates needed for PERT analysis? How do you use these estimates to compute the expected activity time and the variance in activity time?

7. (a) What are the various tests used to ensure the desirable properties in random numbers.

(b) Generate a sequence of random numbers with $x0 = 27$, $a = 17$, $c = 43$ and $m = 100$

8. (a) Distinguish model verification and validation

(b) Explain conceptual and operational model-building process.