Code No: RR410508 **RR** **Set No. 2**

IV B.Tech I Semester Examinations,December 2010
MATHEMATICAL MODELING AND SIMULATION
Common to Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Derive the E. O. Q formula for the manufacture model without shortages. [6]
   (b) The cost of holding an item in stock is Rs. 2 per unit and the shortage cost is Rs. 8. If Rs. 2 is the purchasing cost per unit, determine the optimum order level of inventory, given the following probability distribution:

R	0	1	2	3	4	5
P_R	0.05	0.25	0.20	0.15	0.20	0.15

   [10]

2. A company distributes its products by trucks loaded at its only loading station. Both, company's trucks and contractor's trucks are used for this purpose. It was found out that on an average every five minutes, one truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out:
   (a) The probability that a truck has to wait
   (b) The waiting time of truck that waits, and
   (c) The expected waiting time of contractors trucks per day, assuming a 24 hours shift [16]

3. (a) Explain the basis of selective inventory control. [6]
   (b) State the different selection techniques adopted in inventory control system. Give a brief note on each. [10]

4. (a) Explain the role of state descriptor in discrete system simulation [6]
   (b) Define the terms [6]
      i. Discrete event
      ii. Simulation time
      iii. Clock time
   (c) Explain the representation of time in discrete system simulation. [4]

5. (a) State mathematical model of assignment problem. [6]
   (b) Solve the minimal assignment problem whose effectiveness matrix is :

	1	2	3	4
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

[10]

6. (a) Distinguish model verification and validation [4]
   (b) Explain conceptual and operational model-building process. [12]

7. (a) What is simplex? Write the steps used in the simplex method. [4]
   (b) Express the following L. P. problem in standard from; and solve using simplex method.
   Minimize z = $x_1 - 2x_2 + x_1$
   subject to the constraints:
   $2x_1 + 3x_2 + 4x_3 \geq -4$
   $3x_1 + 5x_2 + 2x_3 \geq -7$
   $x_1 \geq 0$, $x_2 \geq 0$ and x_3 is unrestricted in sign. [12]

8. The following information is available about the various activities of a network.

Activity	Normal		Crash	
	Duration (weeks)	Cost (Rs.)	Duration (weeks)	Cost (Rs.)
1-2	4	4,000	3	7,000
1-3	8	5,000	7	8,000
2-3	5	8,000	3	10,000

Project overhead costs are at Rs.2,000 per week. Determine:

(a) Direct cost duration relationship
(b) Total cost duration relationship
(c) Also draw the least cost network. [16]

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Code No: RR410508 **RR** **Set No. 4**

IV B.Tech I Semester Examinations,December 2010
MATHEMATICAL MODELING AND SIMULATION
Common to Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. The following information is available about the various activities of a network.

Activity	Normal		Crash	
	Duration (weeks)	Cost (Rs.)	Duration (weeks)	Cost (Rs.)
1-2	4	4,000	3	7,000
1-3	8	5,000	7	8,000
2-3	5	8,000	3	10,000

Project overhead costs are at Rs.2,000 per week. Determine:

(a) Direct cost duration relationship

(b) Total cost duration relationship

(c) Also draw the least cost network. [16]

2. A company distributes its products by trucks loaded at its only loading station. Both, company's trucks and contractor's trucks are used for this purpose. It was found out that on an average every five minutes, one truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out:

(a) The probability that a truck has to wait

(b) The waiting time of truck that waits, and

(c) The expected waiting time of contractors trucks per day, assuming a 24 hours shift [16]

3. (a) State mathematical model of assignment problem. [6]

(b) Solve the minimal assignment problem whose effectiveness matrix is :

	1	2	3	4
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

[10]

4. (a) Derive the E. O. Q formula for the manufacture model without shortages. [6]

(b) The cost of holding an item in stock is Rs. 2 per unit and the shortage cost is Rs. 8. If Rs. 2 is the purchasing cost per unit, determine the optimum order level of inventory, given the following probability distribution:

R	0	1	2	3	4	5
P_R	0.05	0.25	0.20	0.15	0.20	0.15

[10]

5. (a) What is simplex? Write the steps used in the simplex method. [4]

(b) Express the following L. P. problem in standard from; and solve using simplex method.
Minimize z = $x_1 - 2x_2 + x_1$
subject to the constraints:
$2x_1 + 3x_2 + 4x_3 \geq -4$
$3x_1 + 5x_2 + 2x_3 \geq -7$
$x_1 \geq 0$, $x_2 \geq 0$ and x_3 is unrestricted in sign. [12]

6. (a) Explain the role of state descriptor in discrete system simulation [6]

(b) Define the terms [6]

i. Discrete event
ii. Simulation time
iii. Clock time

(c) Explain the representation of time in discrete system simulation. [4]

7. (a) Explain the basis of selective inventory control. [6]

(b) State the different selection techniques adopted in inventory control system. Give a brief note on each. [10]

8. (a) Distinguish model verification and validation [4]

(b) Explain conceptual and operational model-building process. [12]

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Code No: RR410508 **RR** **Set No. 1**

IV B.Tech I Semester Examinations,December 2010
MATHEMATICAL MODELING AND SIMULATION
Common to Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the basis of selective inventory control. [6]
   (b) State the different selection techniques adopted in inventory control system. Give a brief note on each. [10]
2. (a) What is simplex? Write the steps used in the simplex method. [4]
   (b) Express the following L. P. problem in standard from; and solve using simplex method.
   Minimize z = $x_1 - 2x_2 + x_1$
   subject to the constraints:
   $2x_1 + 3x_2 + 4x_3 \geq -4$
   $3x_1 + 5x_2 + 2x_3 \geq -7$
   $x_1 \geq 0$, $x_2 \geq 0$ and x_3 is unrestricted in sign. [12]
3. (a) Explain the role of state descriptor in discrete system simulation [6]
   (b) Define the terms [6]
      i. Discrete event
      ii. Simulation time
      iii. Clock time
   (c) Explain the representation of time in discrete system simulation. [4]
4. (a) State mathematical model of assignment problem. [6]
   (b) Solve the minimal assignment problem whose effectiveness matrix is :

	1	2	3	4
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

   [10]
5. A company distributes its products by trucks loaded at its only loading station. Both, company's trucks and contractor's trucks are used for this purpose. It was found out that on an average every five minutes, one truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out:
   (a) The probability that a truck has to wait

(b) The waiting time of truck that waits, and

(c) The expected waiting time of contractors trucks per day, assuming a 24 hours shift [16]

6. (a) Distinguish model verification and validation [4]

(b) Explain conceptual and operational model-building process. [12]

7. The following information is available about the various activities of a network.

Activity	Normal		Crash	
	Duration (weeks)	Cost (Rs.)	Duration (weeks)	Cost (Rs.)
1-2	4	4,000	3	7,000
1-3	8	5,000	7	8,000
2-3	5	8,000	3	10,000

Project overhead costs are at Rs.2,000 per week. Determine:

(a) Direct cost duration relationship

(b) Total cost duration relationship

(c) Also draw the least cost network. [16]

8. (a) Derive the E. O. Q formula for the manufacture model without shortages. [6]

(b) The cost of holding an item in stock is Rs. 2 per unit and the shortage cost is Rs. 8. If Rs. 2 is the purchasing cost per unit, determine the optimum order level of inventory, given the following probability distribution:

R	0	1	2	3	4	5
P_R	0.05	0.25	0.20	0.15	0.20	0.15

[10]

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Code No: RR410508 **RR** **Set No. 3**

IV B.Tech I Semester Examinations,December 2010
MATHEMATICAL MODELING AND SIMULATION
Common to Electronics And Computer Engineering, Computer Science And Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) State mathematical model of assignment problem. [6]
   (b) Solve the minimal assignment problem whose effectiveness matrix is :

	1	2	3	4
I	2	3	4	5
II	4	5	6	7
III	7	8	9	8
IV	3	5	8	4

[10]

2. (a) What is simplex? Write the steps used in the simplex method. [4]
   (b) Express the following L. P. problem in standard from; and solve using simplex method.
   Minimize z = $x_1 - 2x_2 + x_1$
   subject to the constraints:
   $2x_1 + 3x_2 + 4x_3 \geq -4$
   $3x_1 + 5x_2 + 2x_3 \geq -7$
   $x_1 \geq 0$, $x_2 \geq 0$ and x_3 is unrestricted in sign. [12]

3. (a) Explain the role of state descriptor in discrete system simulation [6]
   (b) Define the terms [6]
      i. Discrete event
      ii. Simulation time
      iii. Clock time
   (c) Explain the representation of time in discrete system simulation. [4]

4. (a) Derive the E. O. Q formula for the manufacture model without shortages. [6]
   (b) The cost of holding an item in stock is Rs. 2 per unit and the shortage cost is Rs. 8. If Rs. 2 is the purchasing cost per unit, determine the optimum order level of inventory, given the following probability distribution:

R	0	1	2	3	4	5
P_R	0.05	0.25	0.20	0.15	0.20	0.15

[10]

5. The following information is available about the various activities of a network.

Activity	Normal		Crash	
	Duration (weeks)	Cost (Rs.)	Duration (weeks)	Cost (Rs.)
1-2	4	4,000	3	7,000
1-3	8	5,000	7	8,000
2-3	5	8,000	3	10,000

Project overhead costs are at Rs.2,000 per week. Determine:

(a) Direct cost duration relationship

(b) Total cost duration relationship

(c) Also draw the least cost network. [16]

6. A company distributes its products by trucks loaded at its only loading station. Both, company's trucks and contractor's trucks are used for this purpose. It was found out that on an average every five minutes, one truck arrived and the average loading time was three minutes. 50% of the trucks belong to the contractor. Find out:

(a) The probability that a truck has to wait

(b) The waiting time of truck that waits, and

(c) The expected waiting time of contractors trucks per day, assuming a 24 hours shift [16]

7. (a) Explain the basis of selective inventory control. [6]

(b) State the different selection techniques adopted in inventory control system. Give a brief note on each. [10]

8. (a) Distinguish model verification and validation [4]

(b) Explain conceptual and operational model-building process. [12]

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