Register Number.....

**M.B.A. DEGREE EXAMINATIONS: DECEMBER 2009**

First Trimester

**MBA507: DECISION MODELS FOR MANAGEMENT**

**Time: Three Hours** **Maximum Marks: 100**

**Answer ALL the Questions:-**

**PART A (1 x 20 = 20 Marks)**

1. Case Study:-

(a) Discuss the Merits and Demerits of PERT. (6)

(b) A small assembly plant assembles PCs through 9 interlinked stages according to adjoining precedence / process: (14)

| Stage from to | Duration (hours) |
|---|---|
| 1-2 | 4 |
| 1-3 | 12 |
| 1-4 | 10 |
| 2-4 | 8 |
| 2-5 | 6 |
| 3-6 | 8 |
| 4-6 | 10 |
| 5-7 | 10 |
| 6-7 | 0 |
| 6-8 | 8 |
| 7-8 | 10 |
| 8-9 | 6 |

(i) Draw an arrow diagram representing above assembly work.

(ii) Tabulate earliest start, earliest finish, and latest finish time for all the stages.

(iii) Find the critical path and the assembly duration.

(iv) Tabulate total float, free float and independent float.

## PART B (10 x 2 = 20 Marks)

2. State the types of Decision models.
3. How to Compute the Break-Even Point?
4. Graphical solution is not possible for LP problems with more than two constraints. True or False? Justify your answer.
5. Explain briefly the term artificial variables.
6. When do the solution for the transportation problem degenerate?
7. Assignment problem is special kind of Transportation problem – Justify.
8. Explain Kendall's notation for representing Queue.
9. State the individual replacement policy.
10. Define total float.
11. What are the three time estimates in PERT network?

## PART C (4 x 15 = 60 Marks)

12. (a) Discuss in detail the types of Decision Models with example.

**(OR)**

(b) Explain briefly the possible problems in developing decision models.

13. (a) Consider the following LPP and solve it using Big M method.

Minimize $Z = 9x_1 + 10x_2$

Subject to the constraints $2x_1 + 4x_2 \geq 50$

$4x_1 + 3x_2 \geq 24$

$3x_1 + 2x_2 \geq 60$

and $x_1, x_2 \geq 0$.

**(OR)**

(b) Solve graphically:

Maximize $Z = 300x_1 + 400x_2$

Subject to $5x_1 + 4x_2 \leq 200$

$3x_1 + 5x_2 \leq 150$

$5x_1 + 4x_2 \geq 100$

$8x_1 + 4x_2 \geq 80$

and $x_1, x_2 \geq 0$.

(a) Solve the following transportation problem, starting with the initial feasible solution of matrix minima .

| | $D_1$ | $D_2$ | $D_3$ | $D_4$ | Supply |
|---|---|---|---|---|---|
| $S_1$ | 21 | 16 | 25 | 13 | 11 |
| $S_2$ | 17 | 18 | 14 | 23 | 13 |
| $S_3$ | 32 | 27 | 18 | 41 | 19 |
| Demand | 6 | 10 | 12 | 15 | |

**(OR)**

(b) Five men are available to do five different jobs. From past records, the time (in hours) that each man takes to do each job is known and given in the following table:

| | Job | | | | |
|---|---|---|---|---|---|
| | I | II | III | IV | V |
| A | 2 | 9 | 2 | 7 | 1 |
| B | 6 | 8 | 7 | 6 | 1 |
| Man C | 4 | 6 | 5 | 3 | 1 |
| D | 4 | 2 | 7 | 3 | 1 |
| E | 5 | 3 | 9 | 5 | 1 |

Find the assignment of men to jobs that will minimize the total time taken.

15. (a) A departmental store has a single cashier. During the rush hours, customers arrive at the rate of 20 customers per hour. The average number of customers that can be processed by the cashier is 24 per hour. Assume that the conditions for use of the single channel queuing model apply.

(i) What is the probability that the cashier is idle?

(ii) What is the average number of customers in the queuing system?

(iii) What is the average time a customer spends in the system?

(iv) What is the average number of customers in the queue?

(v) What is the average time a customer spends in the queue waiting for service?

**(OR)**

(b) A computer contains 20,000 resistors. When any resistor fails, it is replaced. The cos
replacing a resistor individually is Re.1.If all the resistors are replaced at the same t
the cost per resistor is reduced to Re.0.40. The percent surviving at the end of the mo
t, and the probability of failure during the month t are given below:

| Percent surviving At the end of t | 100 | 96 | 90 | 65 | 35 | 20 | 0 |
|---|---|---|---|---|---|---|---|
| Probability of failure during The month t | _ | 0.04 | 0.06 | 0.25 | 0.30 | 0.15 | 0.20 |

What is the optimum replacement plan?

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