M.B.A. DEGREE EXAMINATIONS: NOVEMBER 2009

First Trimester

P07BA117: DECISION MODELS FOR MANAGEMENT

Time: Three Hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (1 x 20 = 20 Marks)

Case Study:-

1 (A) A small project is composed of seven activities whose time estimates are listed in the table below. Activities are identified by their beginning (i) and ending (j) node numbers.

(14)

Activity (i–j)	Estimated Duration (in weeks)		
	Optimistic	Most likely	Pessimistic
1-2	1	1	7
1-3	1	4	7
1-4	2	2	8
2-5	1	1	1
3-5	2	5	14
4-6	2	5	8
5-6	3	6	15

a) Draw the project network.

b) Find the expected duration and variance foe each activity. What is the expected project length?

c) Calculate the variance and standard deviation of the project length.

d) What is the probability that the project will be completed :

   i) at least 4 weeks earlier than expected time.

   ii) not more than 4 weeks later than expected time.

e) If the project due date is 19 weeks, what is the probability of not meeting the due date.

Given :

Z	0.50	0.67	1.00	1.33	2.00
Probability	0.3085	0.2514	0.1587	0.0918	0.0228

(B) Discuss the advantages and limitations of CPM.

(6)

2. What is decision modeling?

3. Explain Deterministic Model.

4. In the optimal table of a linear programming problem an artificial variable is present at the non level what do you understand from that?

5. Define slack variable.

6. How to solve a transportation problem of maximization type?

7. Explain unbalanced assignment problem.

8. Construct the network diagram for the following:

Activity	A	B	C	D	E	F	G	H	I	J	K	
Immediate Predecessors	-	-	B	A	C	C	F	F	H	I	D,E,G,J	

9. Define Independent float.

10. What are behaviors of the customer in a queuing model?

11. A supermarket has a single cashier. During the peak hours, customers arrive at a rate customers per hour. The average number of customers that can be processed by the cashier i hour. Calculate the probability that the cashier is idle.

PART C (4 x 15 = 60 Marks)

12. (a) Explain the steps involved in Decision Modeling.

(OR)

(b) Discuss briefly the spreadsheet model for tax computation and break even analysis

13. (a) Solve the following LPP by graphical method.

Maximize $Z = 60 x_1 + 90x_2$

Subject to

$$x_1 - 2x_2 \leq 40$$

$$2x_1 + 3x_2 \leq 90$$

$$x_1 - x_2 \geq 10$$

and $x_1, x_2 \geq 0$.

(OR)

Solve the following LPP using Big M method.

Maximize $Z = 3x_1 - x_2$

Subject to

$$2x_1 + x_2 \leq 2$$
$$x_1 + 3x_2 \geq 3$$
$$x_2 \leq 4,$$

and $x_1, x_2 \geq 0$.

14. (a) Consider the following transportation problem and find the optimal distribution using vogel's approximation method in the first stage to get the initial basic feasible solution.

Market

	1	2	3	4	5	Supply
1	10	2	16	14	10	300
2	6	18	12	13	16	500
3	8	4	14	12	10	825
4	14	22	20	8	18	375
Demand	350	400	250	150	400	

Plant (rows 1–4), Demand row.

(OR)

(b) Alpha Construction company has five crew. The skills of the crew differ from one another because of the difference in the composition of the crew. The company has five different projects on hand. The time (in days) taken by different crew to complete different projects are summarized in the following table. Find the best assignment of the crew to different projects such that the total time taken to complete all the project is minimized.

Project Execution Time in Days

Project

Crew	A	B	C	D	E
1	20	30	25	15	35
2	25	10	40	12	28
3	15	18	22	32	24
4	29	8	34	10	40
5	35	23	17	26	45

...House has one tailor specialized in men's shirts. The number of cus[...] requiring stitching of shirts appears to follow Poisson distribution with mean arrival rate [...] per hour. Customers are attended to by the tailor on a first- come-first served bas is and th[...] willing to wait for service if there be queue.

The time the tailor takes to attend a customer is exponentially distributed with a mean of 4 minutes. Calculate:

(i) The utilization parameter.

(ii) The Probability that the queuing system is idle.

(iii) The average time the tailor is free on 8-hour working day.

(iv) What is the probability that there shall be 5 customers in the shop?

(v) How much time should a customer expect to spend in the shop?

(vi) How much time should a customer expect to spend in the queue?

(OR)

(b) The data collected in running a machine, the cost of which is Rs.60,000 are given below:

Year	:	1	2	3	4	5
Resale value (Rs)	:	42,000	30,000	20,400	14,400	9,650
Cost of spares (Rs)	:	4,000	4,270	4,880	5,700	6,800
Cost of labour(Rs)	:	14,000	16,000	18,000	21,000	25,000

Determine the optimum period of the machine.

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b. Why

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2. Information

3. Transaction