Register Number: ……..

MCA DEGREE EXAMINATIONS : MAY / JUNE 2013

Fourth Semester

MASTER OF COMPUTER APPLICATIONS

MAT510: Resource Management Techniques

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

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. Write any two limitations of LPP.
2. Write the standard form of an LPP: Minimize $Z = x_1 + 2x_2 + 3x_3$ subject to $2x_1 + 3x_2 + 3x_3 \geq -4$, $3x_1 + 5x_2 + 2x_3 \leq 7$ and $x_1, x_2 \geq 0, x_3$ is unrestricted in sign.
3. What is degeneracy in transportation problem?
4. Is assignment problem a special case of transportation? If so when?
5. List the difference between PERT and CPM.
6. Construct the network for the project whose activities with their relationships are given below: A, D, E can start simultaneously; Activities : B ; C > A ; F > D, C; H > E, F.
7. Write the normal equations used in Least square method to fit a straight line.
8. Write the components of time – series and uses of it?
9. Name the methods which over estimates and under estimates the true value in weighted aggregate index numbers.
10. Write the various methods of construction of index numbers.

PART B (5 x 16 = 80 Marks)

11. a) A retailer wishes to buy a number of transistor radio sets of types A and B. Type A cost Rs.360/- each and type B cost Rs.240/- each. The retailer knows that he cannot sell more than 20 sets, so he does not want to buy more than 20 sets and he cannot afford to pay more than Rs.5760/-. His expectation is that he would get a profit of Rs.50/- for each set of type A and Rs.40/- for each set of type B. Formulate this as an LPP and find how many of each type should be purchased in order to make his total profit as large as possible? 16

(OR)

b) Using Big M- method solve the LPP : Maximize $Z = 3x_1 - x_2$ Subject to the constraints $2x_1 + x_2 \geq 2$, $x_1 + 3x_2 \leq 3$, $x_2 \leq 4$ and $x_1, x_2 \geq 0$.

12. a) Find the IBFS by least cost method and hence find the optimal solution.

	A	B	C	Supply
1	4	8	8	56
2	16	24	16	82
3	8	16	24	77
Demand	72	102	41	

(OR)

b) A marketing manager has 5 salesmen and there are 5 sales districts. Considering the capabilities of the salesman and the nature of districts, the estimates made by the marketing manager for the sales per month (in 1000 rupees) for each salesman in each district would be as follows:

	A	B	C	D	E
1	32	38	40	28	40
2	40	24	28	21	36
3	41	27	33	30	37
4	22	38	41	36	36
5	29	33	40	35	39

Find the assignment of salesman to the districts that will result in the maximum sales.

13. a) The following table indicates the details of a project durations in day where 'a' refers to optimistic time, 'm' refers to most likely time and 'b' refers to pessimistic time duration.

Activity :	1-2	1-3	1-4	2-5	3-5	4-6	5-6
a :	1	1	2	1	2	2	3
m :	1	4	2	1	5	5	6
b :	7	7	8	1	14	8	15

(a) Draw the project network

(b) Find the expected duration and variance of each activity.

(c) What is the probability that the project will be completed in

(i) atleast 4 weeks earlier than expected? (ii) no more than 4 weeks later than expected.

(OR)

b) The following data is pertaining to a project with normal time and crash time.

Jobs	Normal time	Normal cost	Crash time	Crash cost
1 – 2	8	100	6	200
1 – 3	4	150	2	350
2 – 4	2	50	1	90
2 – 5	10	100	5	400
3 – 4	5	100	1	200
4 – 5	3	80	1	100

If the indirect cost is Rs 100 per day find the least cost schedule. Also crash the activity to complete the project in 12 days.

14. a) (i) From the following data calculate seasonal indices by the ratio to moving average method. (8)

Year	1st quarter	2nd quarter	3rd quarter	4th quarter
1981	68	62	61	63
1982	65	58	56	61
1983	68	63	63	67
1984	70	59	56	62
1985	60	55	51	58

(ii) Fit a straight line trend equation by the method of least squares and estimate the trend values. (8)

Year:	1981	1982	1983	1984	1985	1986	1987
Values:	60	72	75	65	80	85	95

(OR)

b) (i) Calculate the three – monthly moving average from the following data: (8)

Jan.	Feb.	March	April	May	June	July
57	65	63	72	69	78	82
Aug.	Sept.	Oct.	Nov.	Dec.		
81	90	92	95	97		

(ii) Calculate the seasonal variation indices by the method of link relatives for the following figures. (8)

	Year				
Quarter	1993	1994	1995	1996	1997
I	45	48	49	52	60
II	54	56	63	65	70
III	72	63	70	75	84
IV	60	56	65	72	66

15. a) (i) Construct index numbers of price from the following data by applying: (12)

i) Laspeyre's method ii) Paache's method

iii) Fisher's Ideal method iv) Marshall – Edge worth method.

Commodity	1994		1995	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

(ii) Write the characteristics of Index numbers. 4

(OR)

b) (i) Write the uses of Index numbers. (6)

(ii) Compute the cost of living index by Family budget method and Aggregate Expenditure method for the following data. (10)

Commodity	Consumption in base year	Price in base year	Price in current year
A	200	10	12
B	50	30	35
C	50	40	50
D	20	200	300
E	40	25	50
F	50	100	150
G	60	20	25
H	40	150	180

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