KUMARAGURU college of technology
character is life

Register Number:……

MCA DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

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 = 10 Marks)

1. State the limitations of the graphical method of solving a linear programming problem .
2. Name two physical problems which can be modeled as a linear programming problem.
3. When a transportation problem is said to be unbalanced? How to make it balanced?
4. How assignment problem and transportation problem are related?
5. What are the three phases of a project work?
6. Distinguish between a CPM and a PERT.
7. Comment on 'trend by moving averages is better than a least square trend'.
8. Explain the components of time series.
9. What are the main uses of index numbers?
10. Mention the limitations of an index number.

PART B (5 x 16 = 80 Marks)

11. a) A company manufacturers 2 types of printed circuits. The requirements of transistors, resistors and capacitors for each type of printed circuits along with other data are given below:

	Circuit		**Stock available**
	A	B	
Transistor	15	10	180
Resistor	10	20	200
Capacitor	15	20	210
Profit	Rs.500	Rs.800	

How many circuits of each type should the company produce from the stock to earn maximum profit?

(OR)

b) Solve the LPP using Big – M method minimize $Z = 4x_1 + 2x_2$

$$\text{Subject to} \quad \begin{aligned} 3x_1 + x_2 &\geq 27 \\ x_1 + x_2 &\geq 21 \\ x_1 + 2x_2 &\geq 30 \\ x_1, x_2 &\geq 0. \end{aligned}$$

12. a) A company has a team of four salesman and there are four districts where the company wants to start its business. After taking into account the capabilities of salesman and the nature of districts, the company estimates that the profit per day in rupees for each salesman in each district is as below:

	1	2	3	4
A	16	10	14	11
B	14	11	15	15
C	15	15	13	12
D	13	12	14	15

Find the assignment of salesman(A,B,C,D) to various districts which will yield maximum profit.

(OR)

b) Find the optimum solution for the following transportation problem by Vogel's Approximation Method.

	D1	D2	D3	D4	Availability
S1	11	13	17	14	250
S2	16	18	14	10	300
S3	21	24	13	10	400
Requirements	200	225	275	250	

13. a) The three estimates for the activities of a project are given below:

Activity	**Estimated duration (days)**		
	a	**m**	**b**
1-2	5	6	7
1-3	1	1	7
1-4	2	4	12
2-5	3	6	15
3-5	1	1	1
4-6	2	2	8
5-6	1	4	7

Draw the project network. Calculate the total slack and free slack of each activity. Find out the critical path of the project and project duration. What is the probability that the project will be completed atleats 5 days earlier than expected? What is the probability of completing the project on or before 22 days?What is the probability that the project will be completed on 22 days?

(OR)

b) A small CPM project consist of 11 activites A, B….. J, K. the precedence relationship are : A, B can start immediately. A < C, D, I; B < G, F; D < G, F; F<H, K; G, H<J; I, J,K<E. the durations of the activities are as below:

Activity	A	B	C	D	E	F	G	H	I	J	K
Duration (days)	5	3	10	2	8	4	5	6	12	8	9

Draw the project network. Calculate the total slack and free slack of each activity. Find out the critical path of the project and project duration.

14. a) Calculate the seasonal variation indices by the method of link relatives for the following data.

Quarterly data for Five years

Quarter	Year				
	1992	1993	1994	1995	1996
I	72	76	74	76	78
II	68	70	66	74	74
III	80	82	84	84	86
IV	70	74	80	78	82

(OR)

b) Calculate the trend values by the method of least squares. Also calculate the monthly increase in sales and trend value for 2002.

Year	1991	1992	1993	1994	1995	1996	1997
Sales (Rs. Lakhs)	125	128	133	135	140	141	143

Also plot the data and trend values.

15. a) Calculate Laspayre's, Paache's and Fisher's ideas index from the following data.

Commodity	Price	Value	Price	Value
A	10	100	8	96
B	16	96	14	98
C	12	36	10	40
D	15	60	5	25

(OR)

b) From the following data construct Quantity index number by Marshal – Edge worth's method.

	Base year		Current year	
Commodity	Price(Rs)	Quantity	Expenditure(Rs)	Quantity
A	25	40	2000	50
B	22	18	1200	30
C	54	16	1320	44
D	20	40	1350	45
E	18	30	630	15

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