

Registration No. :

--	--	--	--	--	--	--	--	--	--

Total number of printed pages – 3

MBA
MGT 103

First Semester Examination – 2013

QUANTITATIVE TECHNIQUES

QUESTION CODE : C- 619

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 and 2 which are compulsory and any **four** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10
- Describe the role of slack and surplus variables in LPP.
 - What do you mean by unbalanced assignment problem. How can it be balanced ?
 - Write Kendall's notation.
 - Write the mathematical formulation for the transportation problem.
 - Define the terms 'pay off table', 'courses of action', 'state-of nature'.
 - What do you mean by simulation ?
 - What do you mean by queue discipline ?
 - What do you mean by a two person zero sum game ?
 - Write the characteristics of the Markov process.
 - What do you mean by dummy activity in a project ?
2. (a) A firm manufactures two products A and B on which the profits earned per unit are Rs. 3 and Rs. 4 respectively. Each product is processed on two machines M_1 and M_2 . Product A requires one minute of processing time on machine M_1 and two minutes on M_2 while B requires one minute of processing time on machine M_1 and one minute on M_2 . Machine M_1 is available for not more than 7 hours and 30 minutes, while machine M_2 is

P.T.O.

available for 10 hours during any working day. Find the number of units of products A and B to be manufactured to get maximum profit. Formulate the Linear programming problem. 5

(b) Solve the LPP graphically. 5

3. (a) Solve the given assignment problem by using Hungarian Method. 5

Jobs :

Workers	A	B	C	D
1	45	40	51	67
2	57	42	63	55
3	49	52	48	64
4	41	45	60	55

(b) A manufacturer has distribution centers located at Agra, Allahabad and Kolkata. These centers have available 40, 20, and 40 units of his product. His retail outlets at A, B, C, D and E requires 25, 10, 20, 30, 15 units of the product respectively, The shipping cost per unit (in rupees) between each center and outlet is given in the following table.

Distribution Centers	Retail Outlets				
	A	B	C	D	E
Agra	55	30	40	50	40
Allahabad	35	30	100	45	60
Kolkata	40	60	95	35	30

Find the initial basic solution by VAM. 5

4. (a) Calculate the steady state probabilities from the transition probability matrix given in the table, when the system can either start in state 1 or state 2. 5

To	State 1	State 2
From State 1	0.8	0.2
From State 2	0.4	0.6

(b) Solve the following game : 5

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

5. (a) Self-help canteen employs one cashier at its counter, 8 customers arrive every 10 minutes on an average. The cashier can serve at the rate of one customer per minute. Assume Poisson's distribution for arrival and exponential distribution of service patterns. Determine 5
- (i) Average number of customers in the system
- (ii) Average queue length
- (iii) Average time a customer spends in the system.
- (b) Describe the different steps of Monte Carlo Simulation. 5
6. A vendor sells a weekly magazine for Rs. 10 and purchases the same for Rs. 8. At the end of the week, the unsold copies of the magazine are disposed off for Rs. 3 each. According to the past experience the weekly demand for this magazine is between 70 and 75 copies. Construct the pay off table. How many magazines should he purchase each week to maximize his profit ? 10
7. Draw a network from the following activities and find a critical path and total project duration : 10

Activity	Duration (in weeks)	Activity	Duration (in weeks)
1-2	4	4-7	3
1-4	3	5-6	3
1-5	3	6-9	6
2-3	5	7-8	6
3-8	1	8-9	2
4-9	6		

8. (a) Give a general structure of the queueing system and explain giving examples. 5
- (b) Differentiate between CPM and PERT. 5

