



BRAINWARE UNIVERSITY

Term End Examination 2018 - 19

Programme – Master of Business Administration

Course Name – Quantitative Techniques

Course Code – MBA208

(Semester – 2)

Time allotted: 3 Hours

Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) The objective function for a L.P model is $3x_1+2x_2$, if $x_1 = 20$ and $x_2 = 30$, what is the value of the objective function?

a. 0	b. 60
c. 50	d. 120
 - (ii) Operations research is the application of _____ methods to arrive at the optimal solutions to the problems

a. economical	b. scientific
c. a and b both	d. artistic
 - (iii) In graphical method the restriction on number of constraint is _____

a. 2	b. 3
c. Not more than 3	d. None of the above
 - (iv) For a minimization problem, the objective function coefficient for an artificial variable is

a. +M	b. -M
c. 0	d. 1
 - (v) The Penalty in VAM represents difference between _____ cost of respective row / column.

a. Two Largest	b. largest and smallest
c. smallest two	d. none of them

- (vi) The solution to a transportation problem with m-rows and n-columns is feasible if number of positive allocations are
 - a. $m + n$
 - b. $m * n$
 - c. $m + n - 1$
 - d. $m - n$
- (vii) The linear function of variables which is to be maximized or minimized is called
 - a. constraints
 - b. objective function
 - c. basic requirements
 - d. none of them
- (viii) The _____ variable is added to the constraint of less than equal to type.
 - a. slack
 - b. artificial
 - c. surplus
 - d. basic
- (ix) Network models have advantage in terms of project
 - a. Planning
 - b. Scheduling
 - c. Controlling
 - d. All of the above
- (x) Two person zero-sum game means that the
 - a. Sum of losses to one player is equal to the sum of gains to other
 - b. Sum of losses to one player is not equal to the sum of gains to other
 - c. Both a and b
 - d. None of the above.

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

- 2. Find the feasible solution of the following transportation problem using North West Corner Method: 5

	W1	W2	W3	W4	Supply
F1	14	25	45	5	6
F2	16	25	35	55	8
F3	35	3	65	15	16
Demand	4	7	6	13	

- 3. Obtain the dual problem of the following primal LP problem: 5
 Maximize $Z = 40x_1 + 120x_2$
 Subject to constraints,
 $x_1 - 2x_2 \leq 8$
 $3x_1 + 5x_2 \geq 90$
 $5x_1 + 4x_2 = 66$
 $x_1, x_2 \geq 0$
- 4. Explain two person zero-sum game with a suitable example. 5
- 5. Discuss the objectives of Operations Research. 5

6. A chemist requires 10, 12 and 12 units of chemicals X, Y, Z respectively for his garden. A liquid product contains 5, 2 and 1 units of X, Y and Z respectively. A dry product contains 1, 2 and 4 units of X, Y and Z per carton. If the liquid product sells for Rs. 30 per jar and the dry product sells for Rs. 20 per carton, how many of each should be purchased in order to minimize the cost and meet the requirements? Formulate the problem. 5

Group – C

(Long Answer Type Questions)

3x 15 = 45

Answer any *three* from the following

7. (a) Given the following pay-off matrix: 10

Act	Pay-off (in Rs.) State of Nature	
	Cold Water	Hot Water
Sell Cold Drinks	50	100
Sell Hot Drinks	120	40

Given the probability of weather being hot is 0.8, set up the opportunity loss table and compute opportunity loss of each action. Select the best act.

- (b) Write down the steps of decision making process. 5
8. (a) Draw the Network Diagram for the following activities and find the critical path. 10

Job	Job time(days)	Immediate predecessors
A	13	-
B	8	A
C	10	B
D	9	C
E	11	B
F	10	E
G	8	D, F
H	6	E
I	7	H
J	14	G, I
K	18	J

- (b) Illustrate similarities and differences between PERT and CPM. 5

9. (a) Solve the following 2 person zero sum game based on the concept of dominance. 10

	I	II	III
I	-4	6	3
II	-3	-3	4
III	2	-3	4

- (b) A and B play a game as follows, they simultaneously and independently write one of the three numbers 1, 2 and 3. If the sum of the numbers written is even, B pays to A this sum in rupees. If it is odd, A pays the sum to B in rupees. Form the payoff matrix of player A. 5
10. (a) Write down the types of decision making environment. 5
- (b) A self-service store employs one cashier at its counter. Every 5 minutes nine customers arrive at an average, while the cashier can serve ten customers in five minutes. Assuming Poisson Distribution for arrival rate and exponential distribution for service rate, find 10
- i) Average number of customers in the system
 - ii) Average number of customers in queue or average queue length
 - iii) Average time a customer spends in the system and
 - iv) Average time a customer waits before being served.
11. Solve by using simplex method: 15
- Maximize $Z = 3x_1 + 2x_2$
 Subject to constraints
 $x_1 + x_2 \leq 4$
 $x_1 - x_2 \leq 2$
 $x_1, x_2 \geq 0$
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