

૧. દરેક પ્રશ્નનો [a] અથવા [a(i)] અને [a(ii)] જ લખવાના રહેશે.
 ૨. પ્રશ્ન : ૧[a] અથવા ૧[a(i)] અને ૧[a(ii)] તથા ૨[a] અથવા ૨[a(i)] અને ૨[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૮ માર્ક્સ રહેશે.
 ૩. પ્રશ્ન : ૩[a] અથવા ૩[a(i)] અને ૩[a(ii)] તથા ૪[a] અથવા ૪[a(i)] અને ૪[a(ii)] ના 14 માર્ક્સ ના બદલે ૧૭ માર્ક્સ રહેશે.
 ૪. દરેક પ્રશ્નનો પ્રશ્ન નં (b), પ્રશ્ન નં ૨(b), પ્રશ્ન નં ૩(b) તથા પ્રશ્ન નં ૪(b) (ટૂંકા પ્રશ્નો) વિદ્યાર્થીએ લખવાના નથી.

Q 1 What is Linear Programming Problem? Give general Mathematical Model of Linear Programming Problem. Give the relationship between primal and dual linear programming problem. 14

OR

Q1 A a) Define: Slack variable, Surplus variable and Artificial variable in Linear Programming Problem. 6

Q1 A b) An animal feed company must produce 200 lbs of a mixture containing the ingredients X_1 and X_2 . X_1 costs Rs. 3 per lb and X_2 costs Rs. 8 per lb. Not more than 80 lbs of X_1 can be used and minimum quantity to be used for X_2 is 60 lbs. Use Big – M technique to find how much of each ingredient should be used if the company wants to Minimize the cost. 8

Q1 B i) The linear function of the variables which is to be maximize or minimize is called- 1

A	Constraints	C	Decision variable
B	Objective function	D	None of the above

ii) . Linear programming problem involving more than two variables can be solved by 1

A	Graphical method	C	Simplex method
B	Matrix minima method	D	None of these

iii) In a simplex method, a tabluae is optimal only if all the $Z_j - C_j$ values are 1

A	≤ 0	C	≥ 0
B	$= 0$	D	None of these

iv) For a minimization problem, the objective function coefficient for an artificial variable is 1

A	- M	C	0
B	+ M	D	None of these

Q 2 What is Transportation problem? Give its mathematical formulation. Show that it is a special case of L.P..P. Is degeneracy occurs in T.P.? If yes, explain how will you resolve it? 14

OR

Q2 A a) Explain the Hungarian method of finding optimal solution of A.P. 7

- Q2 A b) Find Initial basic feasible solutions using-
 (i) Least cost method,
 (ii) Vogel's Approximation method.

7

Origin	D ₁	D ₂	D ₃	D ₄	Availability
P ₁	19	30	50	12	7
P ₂	70	30	40	60	10
P ₃	40	10	60	20	18
Required	5	8	7	15	

- Q2 B i) For minimization in TP, the objective is to minimize the total _____ : 1

A	Solution	C	Cost Matrix
B	Cost	D	None of the above

- ii) In transportation problem, the optimal solution occurs, iff Total supply and Total demand are- 1

A	Equal	B	0	C	1	D	None of the above
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- iii) In TP, One can find the initial basic feasible solution by using _____ ? 1

A	Simplex method	C	Hungarian method
B	MODI Method	D	Least cost Method

- iv) Every basic feasible solution of a general assignment problem, having a square pay-off matrix of order n, should have assignment equal to.

A	2n+1	C	m+n-1
B	2n-1	D	m+n

- Q 3 What do you mean Network Analysis. State rules for the construction of network construction. .Give the Distinguish between CPM and PERT. 14

OR

- Q3 A a) Stating various assumptions, describe the Johnson's method of solving n- jobs through 3- machines sequencing problem. 7

- Q3 A b) A book binder has one printing press, one binding machine, and manuscripts of a number of books. The time required performing the printing and binding operations on each book are shown below. The binder wishes to determine the order in which the books should be processed, so that the total time required to process all books is minimized, find idle time For each machine. 7

Book	1	2	3	4	5	6
Printing Time (Hours)	30	120	50	20	90	110
Binding Time (Hours)	80	100	90	60	30	10

- Q3 B i) The completion of project in PERT network follows - 1

A	Uniform distribution	C	Beta distribution
B	Normal distribution	D	All the above distributions

- ii) In solving 2 machine and 'n' jobs, the following assumption is wrong: 1

A	No passing is allowed	C	Handling time is negligible
B	Processing times are known,	D	The time of processing depends on the order of machining

- iii) Given expected duration the project =47 days, variance = 9days. What is probability of not completing the project in 50 days?

Z-values	0.33	1.0
Area	0.1293	0.3413

A	0.1587	B	0.3707	C	0.6293	D	0.8413
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Q 4

Explain giving example each of the following:

- (i) Game, (ii) Zero-Sum game, (iii) Players (iv) Saddle point and (v) Value of the game.

Explain dominance principle in game theory.

OR

- Q4 a) What is replacement? State some important replacement situations.

A

- Q4 b) Assume that two firms are competing for market share for a particular product.

A

Each firm is considering what promotional strategy to employ for the coming period. Assume that the following pay off matrix describes the increase in market share of Firm A and the decrease in market share of the Firm B. Determine the optimal strategies for each firm.

Firm A	Firm B		
	No promotion	Moderate promotion	Much promotion
No promotion	5	0	-10
Moderate promotion	10	6	2
Much promotion	20	15	10

- a. Which firm would be winner, in terms of market share?
 b. Would the solution strategies necessarily maximize profit for either of the firms? What might be two firms do to maximize their profits?

- Q4 i) A machine is replaced with average running cost

B

A	Is not equal to current running cost,	C	If current period is greater than that of next period,
B	Till current period is greater than that of next period,	D	If current period is less than that of next period

- ii) Monte Carlo simulation includes all of the following EXCEPT:

A	data collection	C	computer simulation.
B	random-number assignment.	D	analysis.

- iii) For the game given the value is:

		B	
		I	II
A	I	2	3
	II	-5	5

A	3	B	5	C	-5	D	2
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