



MUTHAYAMMAL ENGINEERING COLLEGE
(An Autonomous Institution)



(Approved by AICTE, New Delhi, Accredited by NAAC &
Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

MKC

Department of Management Studies
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Subject		Quantitative Methods for Techniques - I MBA (EVEN SEM)		
S.No	Term	Notation (Symbol)	Concept/Definition/Meaning/Units/Equation/Expression	Units
1	Operational Research		It encompasses a wide range of problem-solving techniques and methods applied in the pursuit of improved decision-making.	I
2	Methodology of Operation Research		Quantitative basis for decision making is provided to managers by O.R	I
3	objective of operation research		to provide better quantitative information's for making decision	I
4	Problem solving		The process of identifying a difference between the actual and the desired state of affairs and then taking action to resolve the difference	I
5	Decision making		The process of defining the problem, identifying the alternatives, determining the criteria, evaluating the alternatives, and choosing an alternative	I
6	Objective function		A mathematical expression that describes the problem's objective.	I
7	Constraints		Restrictions or limitations imposed on a problem.	I
8	Decision variable		A controllable input for a linear programming model	I
9	Linear programming model		A mathematical model with a linear objective function, a set of linear constraints, and nonnegative variables.	I
10	Feasible solution		A solution that satisfies all the constraints.	I
11	Feasible region		The set of all feasible solutions	I
12	Surplus variable		A variable subtracted from the left-hand side of a greater-than-or equal- to constraint to convert the constraint into an equality.	I
13	Infeasibility		The situation in which no solution to the linear programming problem satisfies all the constraints.	I
14	Simplex method		The simplex method uses elementary row operations to iterate from one basic feasible solution (extreme point) to another until the optimal solution is reached	I

15	Basic feasible solution		A basic solution that is also feasible; that is, it satisfies the non negativity constraints	I
16	Pivot element		The element of the simplex tableau that is in both the pivot row and the pivot column	I
17	Iteration		The process of moving from one basic feasible solution to another	I
18	Artificial variable		A variable that has no physical meaning in terms of the original linear programming problem, but serves merely to enable a basic feasible solution to be created for starting the simplex method	I
19	Dual problem		A linear programming problem related to the primal problem. Solution of the dual also provides the solution to the primal.	I
20	Alternative optimal solutions		The case in which more than one solution provides the optimal value for the objective function.	I
21	O.R. Tools		Linear Programming Game Theory Decision Theory	I
22	Applications of Operations Research		Accounting Construction Facilities Planning Finance	I
23	Limitations of Operations Research		Distance between O.R. specialist and Manager Money and Time Costs	I
24	Optimization		Means maximization or minimization	I
25	Criterion		It is measurement, which is used to evaluation of the results.	I
26	Transportation problem		A network flow problem that often involves minimizing the cost of shipping goods from a set of origins to a set of destinations; it can be formulated and solved as a linear program by including a variable for each arc and a constraint for each node.	II
27	Transportation simplex method		A special-purpose solution procedure for the transportation problem.	II
28	Minimum cost method		A heuristic used to find an initial feasible solution to a transportation problem; it is easy to use and usually provides a good (but not optimal) solution	II
29	MODI method		A procedure in which a modified distribution method determines the incoming arc in the transportation simplex method.	II
30	Degenerate solution		A solution to a transportation problem in which fewer than $m - n - 1$ arcs (cells) have positive flow; m is the number of origins and n is the number of destinations.	II
31	Dummy destination		A destination added to a transportation problem to make the total supply equal to the total demand. The demand assigned to the dummy destination is the difference between the total supply and the total demand.	II

32	Stepping-stone method		Using a sequence or path of occupied cells to identify flow adjustments necessary when flow is assigned to an unused arc in the transportation simplex method. This identifies the outgoing arc	II
33	Vogel Approximation Method		VAM is an improved version of the least cost method that generally produces better solutions	II
34	Least Cost Method		The least cost method is also known as matrix minimum method in the sense we look for the row and the column corresponding to which C_{ij} is minimum.	II
35	North West Corner Method		The method starts at the North West (upper left) corner cell of the tableau (variable x_{11}).	II
36	basic feasible solution		1. North West Corner Method 2. Least Cost Method 3. Vogel Approximation Method	II
37	Optimal solution		MODI (Modified Distribution Method) or UV Method.	II
38	Unbalanced Transportation Problem		when the total supply is not equal to the total demand, which are called as unbalanced transportation problem	II
39	Modified Distribution Method		The Modified Distribution Method, also known as MODI method or u-v method, which provides a minimum cost solution (optimal solution) to the transportation problem.	II
40	Hungarian Method		It is a technique of solving assignment problems	II
41	Transportation Problem Maximization		There are certain types of transportation problem where the objective function is to be maximized instead of minimized.	II
42	Assignment Problem		n facilities, n jobs and the effectiveness of each facility to each job, here the problem is to assign each facility to one and only one job so that the measure of effectiveness is optimized	II
43	balanced Assignment Problem		In the previous section we assumed that the number of persons to be assigned and the number of jobs were same. Such kind of assignment problem is called as balanced assignment problem	II
44	Unbalanced Assignment Problem		Suppose if the number of person is different from the number of jobs then the assignment problem is called as unbalanced	II
45	Maximization in an Assignment Problem		There are situations where certain facilities have to be assigned to a number of jobs so as to maximize the overall performance of the assignment	II
46	Original Problem		This is the original linear programming problem, also called as primal problem	II
47	Hungarian Method		It is a technique of solving assignment problems	II
48	Destination		It is the location to which the shipments are transported	II
49	Unit Transportation Cost		It is the transportation cost per unit from an origin to destination.	II
50	Origin		It is the location from which the shipments are dispatched	III

51	Game theory		Game theory is the study of how people behave in strategic situations.	III
52	Strategies		A strategy, or a decision rule, is a complete contingent plan that specifies how a player will act at every information set that she is the decision-maker at, should it be reached during play of the game	III
53	Mixed Strategies		We have taken it that when a player acts at any information set, he deterministically picks an action from the set of available actions.	III
54	Strategic decisions		Those in which each person, in deciding what actions to take, must consider how others might respond to that action.	III
55	Four elements to describe a game		Players, rules, outcomes of the moves, payoffs of each possible outcome:.	III
56	Dominant Strategy		A strategy that gives higher payoffs no matter what the opponent does;	III
57	Players		Two or more for most games that are interesting	III
58	Saddle point		A saddle point of a matrix is the position of such an element in the payoff matrix, which is minimum in its row and the maximum in its column	III
59	Pure strategy		A pure strategy provides a complete definition of how a player will play a game .	III
60	Mixed strategy		A mixed strategy is an assignment of a probability to each pure strategy . This allows for a player to randomly select a pure strategy .	III
61	Inventory		It is a stock of physical assets.	III
62	Objectives of Inventory		To supply the raw material, sub-assemblies, semi-finished goods, finished goods, etc. to its users as per their requirements at right time and at right price.	III
63	Inventory is an Essential Requirement		Inventory is a part and parcel of every facet of business life. Without inventory no business activity can be performed, whether it being a manufacturing organization or service organization such as libraries, banks, hospitals etc	III
64	Role of Inventory		To maintain more work force levels To facilitate economic production runs To advantage of shipping economies To smooth seasonal or critical demand	III
65	Basic Functions of Inventory		Geographical Specialization, Decoupling Balancing supply and demand and Safety stock	III
66	Safety Stock		The safety stock also called as buffer stock	III
67	Types of Inventory		Raw Material/Manufacturing Inventory Production Inventory Work-in-Process Inventory M.R.O. Inventory Finished Goods Inventory	III

68	Carrying Cost		Cost of maintaining one unit of an item in the stock per unit of time (normally one year). The carrying cost also called as Holding Cost.	III
69	ABC Classification		Classifications of inventories in terms of annual usage value in different categories of high value (A), medium value (B) and low value (C).	III
70	VED Classification		Vital Essential Desirable Classification. This is based on experience/judgment. VED classification when coupled with ABC classification enhances the inventory control efficiency.	III
71	Purchase Cost		The cost of the item is the direct manufacturing cost if it is produced in in-house or the cost paid to the supplier for the item received.	III
72	Procurement Costs		The costs of placing a purchase order is known as ordering costs and the costs of initial preparation of a production system (if in-house manufacturing) is called as set up cost	III
73	Holding Costs		The holding costs also called as carrying costs. The cost associated with holding/carrying of stocks is called holding cost or carrying cost or possession cost	III
74	Shortage Costs		These costs are penalty costs as a result of running out of stock at the time of item is required.	III
75	Demand		A commodity demand pattern may be deterministic or probabilistic.	III
76	CPM		Critical Path Method	IV
77	Objectives		Be able to construct activity networks	IV
78	Activity		n activity is a part of the project denoted by an arrow on the network.	IV
79	Dummy Activity		The activity which neither uses any resources nor any time for its completion is called dummy activity. It is represented by a dotted arrow or a solid arrow with zero time duration.	IV
80	Event		Event is the stage or point where all previous jobs merging in it are completed and the jobs bursting out are still to be completed.	IV
81	Network		The diagrammatic representation of the activities of the entire project is called network of flow diagram.	IV
82	Early Start Time (E.S.T.)		The earliest possible time at which an activity may start, is called early start time	IV
83	Early Finish Time (E.F.T.)		The sum of the earliest start time of an activity and the time required for its completion is called early finish time.	IV
84	Late Start Time (L.S.T.)		The latest possible time at which an activity may start without delaying the date of the project, is called late start time.	IV
85	Late Finish Time (L.F.T.)		The sum of the late start time of an activity and the time required for its completion is called late finish time.	IV
86	Total Float		The difference between the maximum time allowed for an activity and its estimated duration is called total float	IV

87	Free Float		The duration of time by which the completion time of an activity can be delayed without affecting the start of succeeding activities is called free float	IV
88	Critical Activities		The event which has no float, are called critical activities	IV
89	Critical Path		The path in the network joining the critical events is called the critical path of the work.	IV
90	purpose of Critical Path		The critical path method is one of the most frequently used and effective techniques in project planning.	IV
91	advantages of CPM		Saves time and helps in the management of deadlines	IV
92	critical path method		The critical path method is one of the most frequently used and most effective techniques in project planning	IV
93	PERT		Program Evaluation and Review Technique	IV
94	Meaning of PERT		It analyzes the time required to complete each task and its associated dependencies to determine the minimum time to complete a project	IV
95	Milestone		A milestone (known also as a PERT event) is an element of a PERT chart, marking the start or completion of a task or several tasks.	IV
96	Task		The actual performance of a task which consumes time and requires resources (such as labor, materials, space, machinery)	IV
97	Optimistic Time		Optimistic time is the minimum possible time required to accomplish an activity or a path, assuming everything proceeds better than is normally expected.	IV
98	Pessimistic Time		Pessimistic time is the maximum possible time required to accomplish an activity or a path, assuming everything goes wrong	IV
99	Most Likely Time		Most likely time is the best estimate of the time required to accomplish an activity or a path, assuming everything proceeds as normal.	IV
100	Expected Time		Expected time is the best estimate of the time required to accomplish an activity (te) or a path (TE), accounting for the fact that things don't always proceed as normal	IV
101	Standard Deviation of Time		The standard deviation of time is the variability of the time for accomplishing an activity or a path	IV
102	slack		Slack (or float) is a measure of the excess time and resources available to complete a task	IV
103	Importance of PERT		A PERT chart uses circles or rectangles called nodes to represent project events or milestones.	IV
104	Advantages Of PERT		PERT analysis improves planning and decision-making by integrating and presenting data from multiple departments	IV
105	Why is PERT used		PERT is a project management planning tool used to calculate the amount of time it will take to realistically finish a project.	IV

106	Replacement models		The replacement problems are concerned with the situations that arise when some items such as men, machines and usable things etc need replacement due to their decreased efficiency, failure or breakdown	V
107	Type of Maintenance		i) Preventive Maintenance ii) Breakdown Maintenance	V
108	Total cost		Preventive maintenance cost + Breakdown maintenance cost	V
109	Types of replacement problem		Replacement of assets that deteriorate with time simple probabilistic model for assets which will fail completely	V
110	Determination of Economic Life of an asset		Average operating and maintenance cost.	V
111	Individual replacement policy		each item is replaced immediately after failure	V
112	Group replacement policy		A decision is made with regard the replacement at what equal intervals, all the items are to be replaced simultaneously	V
113	Replacement Decisions		It is necessary to decide whether to replace by the same item or by a different type of item	V
114	C		Capital cost of a certain item say a machine	V
115	s(t)		The selling or scrap value of the item after t years	V
116	f(t)		Operating (or maintenance) cost of the item at time t	V
117	n		Optimal replacement period of the item	V
118	job sequencing		The purpose of sequencing problems is to complete the job within the minimum possible time, keeping the minimum idle time of the machines (or services).	V
119	Sequence problems		Sequence problems arise when we are concerned with situations where there is a choice in which a number of tasks can be performed	V
120	Job		The jobs or items or customers or orders are the primary stimulus for sequencing	V
121	Number of Machines		A machine is characterized by a certain processing capability or facilities through which a job must pass before it is completed in the shop	V
122	Processing Time		Every operation requires certain time at each of machine	V
123	Total Elapsed Time		It is the time between starting the first job and completing the last one	V
124	Idle time		it is the time the machine remains idle during the total elapsed time.	V
125	Types of sequencing problems		<ul style="list-style-type: none"> • Problem with 'n' jobs through one machine. • Problem with 'n' jobs through two machines. • Problem with 'n' jobs through three machines 	V

General Questions			
1	Time Horizon		Time horizon is, the planning period over which inventory is to be controlled. The planning period may be finite or infinite in nature
2	Stages of Inventory		In the sequential production process, if the items/parts are stocked at more than one point they are called multi-stage inventories
3	Backlog		Accumulation of unsatisfied demands
4	Delivery Lag		Time between the placing of an order for the item and receipt of the items for use.
5	Decoupling		Use of inventories to break apart operations so that one operations supply is independent of another.
6	VED Classification		Vital Essential Desirable Classification
7	Price Discounts Model		Incremental Discount All units Discount
8	Advantages of Bulk Purchase		less unit price less ordering cost• cheaper transportation• fewer stock outs• sellers preferential treatment•
9	Disadvantages of Bulk Purchase		high carrying cost lower stock turnover• huge capital required• less flexibility• older stocks•
10	Expected Value		The average value or mean
11	Reorder Level		The stock level which is sufficient for the lead time consumption, and an order
12	Safety Stock		Extra Stocks
13	Inventory		stores of goods or stocks.
14	Perishable Product		The inventories that deteriorate with time
15	Payoff		The benefit which accrues form a given combination of decision alternative courses of
16	Over Stocking Cost		This is the cost of keeping more units than demanded.
17	Opportunity Cost Matrix		Matrix of opportunity Costs.
18	Predecessor Event		The event just before another event is called the predecessor event
19	Successor Event		The event just following another event is called the successor event
20	Event		It is the beginning or the end of an activity.
21	Expected Times of an event		An event occurs at a point of time. We can consider (i) Earliest Expected Time of Occurrence of an event and (ii) Latest Allowable Time of Occurrence an event.
22	Technical OR skills		The ability to build and code a model. This is where we can get really deep into the OR methods and technical de

23	Communication skills		The ability to communicate findings and results to both technical and non-technical people.	
24	Problem definition skills		The ability to go from a loosely defined problem to a well-defined problem that can be solved using OR-methods	
25	Decisions Operations Managers Make		Operations managers must plan the production schedule.	
Faculty Team Prepared			Signature	

HoD