INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

MECHANICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**OPTIMIZATION TECHNIQUES**
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Course Faculty	:	**Dr. Paidi Raghavulu, Professor, Mech. Engg.** **Mrs. T. Vanaja, Asst. Professor, Mech. Engg.**

OBJECTIVES:

I	Formulate the mathematical model of real time problems and optimize with LLP techniques.
II	Establish the problem formulation and optimization by using transportation, assignment models.
III	Apply Sequencing and replacement models for optimized decisions
IV	Apply Game theory, Inventory models for effective operational control.
V	.Visualize application of Waiting line, Dynamic programming, Simulation models in real time applications..

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	UNIT-I					
1	Define Operation research.	OR is a scientific method of providing executive departments with a quantitative basis for decision regarding the operations under their control. -Morse and Kimbal(9164)	Remember	CO 1	CLO1	AMEB12.01
2	What is a model?	A model in the sense used in 0R is defined as a representation of an actual object or situation. It shows the relationships (direct or indirect) and inter-relationships of action and reaction in terms of cause and effect. a model is an abstraction of reality, it thus	Remember	CO 2	CLO1	AMEB12.01

		appears to be less complete than reality itself. For a model to be complete, it must be a representative of those aspects of reality that are being investigated.				
3	What is the main objective of a model ?.	The main objective of a model is to provide means for analyzing the behavior of the system for the purpose of improving its performance	Understand	CO 1	CLO1	AMEB12.01
4	What is iconic model ?	Iconic models represent the system as it is by scaling it up or down (i.e., by enlarging or reducing the size). In other words, it is an image.	Understand	CO 1	CLO1	AMEB12.01
5	What is Analogue model?	The models, in which one set of properties is used to represent another set of properties, are called analogue models. After the problem is solved, the solution is reinterpreted in terms of the original system..	Understand	CO 1	CLO1	AMEB12.01
6	What is symbolic or mathematic model?	The symbolic or mathematical model is one which employs a set of mathematical symbols (i.e., letters, numbers, etc.) to represent the decision variables of the system. These variables are related together by means of a mathematical equation or a set of equations to describe the behavior (or properties) of the system..	Understand	CO 1	CLO1	AMEB12.01
7	What is a Descriptive model?	A descriptive model simply describes some aspects of a situation based on observations, survey. Questionnaire results or other available data. The result of an opinion poll represents a descriptive model.	Remember	CO 1	CLO1	AMEB12.01
8	What is predictive model?	Predictive model can answer 'what if' type of questions, i.e. they can make predictions regarding certain events. For example, based on the survey results, television networks such models attempt to explain and predict the election results before all the votes are actually counted.	Understand	CO 1	CLO1	AMEB12.01
9	What is prescriptive model?	Finally, when a predictive model has been repeatedly successful, it can be used to prescribe a source of action. For example, linear programming is a prescriptive (or normative) model because it prescribes what the managers ought to do..	Remember	CO 1	CLO1	AMEB12.01
10	What is deterministic model?	Deterministic models assume conditions of complete certainty and perfect knowledge	Understand	CO 1	CLO1	AMEB12.01
11	What is probabilistic or stochastic model?	Probabilistic (or Stochastic) models. These types of models usually handle such situations in which the consequences or payoff of managerial actions cannot be predicted with certainty. However, it is	Understand	CO 1	CLO2	AMEB12.02

		possible to forecast a pattern of events, based on which managerial decisions can be made.				
12	What is static model?	The model which do not consider the impact of changes that takes place during the planning horizon, i.e. they are independent of time. In static model only one decision is needed for the duration of a given time period.	Remember	CO 1	CLO2	AMEB12.02
13	What is dynamic model?	Dynamic models. In these models, time is considered as one of the important variables and admits the impact of changes generated by time. Also, in dynamic models, not only one but a series of interdependent' decisions is required during the planning horizon	Understand	CO 1	CLO2	AMEB12.02
14	What is iterative method?	In iterative method, procedure starts with a trial solution and a set of rules for improving it. The trial solution is then replaced by the improved solution, and the process is repeated until either no further improvement is possible or the cost of further calculation cannot be justified	Understand	CO 1	CLO2	AMEB12.02
15	what is static model?	i. Static models. These models do not consider the impact of changes that takes place during the planning horizon, i.e. they are independent of time	Remember	CO 1	CLO2	AMEB12.02
16	What is probabilistic model?	These types of models usually handle such situations in which the consequences or payoff of managerial actions cannot be predicted with certainty. However, it is possible to forecast a pattern of events, based on which managerial decisions can be made.	Understand	CO 1	CLO2	AMEB12.02
17	explain principles of modeling.	1. Do not build up a complicated model when simple one will suffice. 2.Beware of molding the problem to fit the technique. 3.The deduction phase of modeling must be conducted rigorously. Models should be validated prior to implementation. A model should never be taken too literally. A model cannot be any better than the information that goes into it.	Remember	CO 1	CLO2	AMEB12.02

		Models cannot replace decision makers.				
18	Explain analytic method	Analytic Method. If the OR model is solved by using all the tools of classical mathematics such as: differential calculus and finite differences available for this task, then such type of solutions are called *analytic solutions*	Remember	CO 1	CLO2	AMEB12.02
19	Explain iterative method	If classical methods fail because of complex- ity of the constraints or of the number of variables, then we are usually forced to adopt an iterative method. Such a procedure starts with a trial solution and a set of rules for improving it. The trial solution is then replaced by the improved solution, and the process is repeated until either no further improvement is possible or the cost of further calculation cannot be justified.	Understand	CO 1	CLO2	AMEB12.02
20	What is Linear Programming ?	Linear programming is a powerful quantitative technique (or operational research technique) designs to solve allocation problem. Linear Program- ming' indicates the planning of decision variables, which are directly proportional, to achieve the 'optimal' result considering the limitations within which the problem is to be solved.	Understand	CO 1	CLO3	AMEB12.03
21	Explain decision variables.	The decision variables refer to the economic or physical quantities, which are competing with one another for sharing the given limited resources. The relationship among these variables must be linear under linear programming. The numerical values of decision variables indicate the solution of the linear pro- gramming problem	Understand	CO 1	CLO3	AMEB12.03
22	What is objective function?	The objective function of a linear programming problem is a linear function of the decision variable expressing the objective of the decision maker.	Understand	CO 1	CLO3	AMEB12.03
23	What is constraint?	The constraints indicate limitations on the resources, which are to be allocated among various decision variables..	Remember	CO 1	CLO3	AMEB12.03

24	What is Non-negativity restriction?	Non-negativity restriction indicates that all decision variables must take on values equal to or greater than zero.	Understand	CO 1	CLO3	AMEB12.03
25	What is feasible solution?	Any non-negative solution which satisfies all the constraints is known as a feasible solution of the problem.	Understand	CO 1	CLO3	AMEB12.03
26	What feasible region?	The collection of all feasible solutions is known as a feasible region.	Remember	CO 1	CLO3	AMEB12.03
27	What is convex set?	A set (or region) is convex if only if for any two points on the set, the line segment joining those points lies entirely in the set. Thus, the collection of feasible solutions in a linear program- ming problem forms a convex set. In other words, the feasible region of a linear programming problem is a convex set.	Understand	CO 1	CLO3	AMEB12.03
28	Explain infeasible problem.	A linear programming problem is said to be infeasible if there is no solution that satisfies all the constraints. It represents a state of inconsistency in the set of constraints.	Remember	CO 1	CLO3	AMEB12.03
29	What is objective function?	The function that is either being minimized or maximized. For example, it may represent the cost that you are trying to minimize.	Remember	CO 1	CLO3	AMEB12.03
30	What is optimal solution?	A vector x, which is both feasible (satisfying the constraints) and optimal (obtaining the largest or smallest objective value).	Understand	CO 1	CLO3	AMEB12.03
33	What is redundant constraint?	Redundant constraint is a constraint, which does not affect the feasible region.	Remember	CO 1	CLO3	AMEB12.03
34	What is unbounded solution?	An unbounded solution of a linear programming problem is a solution whose objective function is infinite. A linear programming problem is said to have unbounded solution if its solution can be made infinitely large without violating any of the constraints in the problem.	Understand	CO 1	CLO3	AMEB12.03

35	What is infeasible problem?	A linear programming problem is said to be infeasible if there is no solution that satisfies all the constraints. It represents a state of inconsistency in the set of constraints.	Understand	CO 1	CLO4	AMEB12.03
36	Write general representation of LPP?	Maximize $P=3x+4y+z$ subject to: $x+2y+z \leq 6$ $2x+2z \leq 4$ $3x+y+z \leq 9$ $x, y, z \geq 0$	Remember	CO 1	CLO4	AMEB12.04
37	What is slack variable?	A variable added to the problem to eliminate less-than constraints.	Remember	CO 1	CLO4	AMEB12.04
38	What is surplus variable?	A variable added to the problem to eliminate greater-than constraints.	Remember	CO 1	CLO4	AMEB12.04
39	What is Artificial variable?	A variable added to a linear program in phase 1 to aid finding a feasible solution.	Remember	CO 1	CLO4	AMEB12.04
	UNIT-II					
1	What is a transportation problem?	The transportation problem is a special type of linear programming problem where the 'objective is to minimize the cost of distributing a product from a number of sources or origins to a number of destinations.	Understand	CO 2	CLO6	AMEB12.06
2	What is dummy origin or destination?	A dummy origin or destination is an imaginary origin or destination with zero cost introduced to make an unbalanced transportation problem balanced. If the total supply is more than the total demand we introduce an additional column which will indicate the surplus supply with transportation cost zero. Likewise, if the total demand is more than the total supply, an additional row is introduced in the Table, which represents unsatisfied demand with transportation cost zero	Remember	CO 2	CLO6	AMEB12.06
3	What is balanced transportation problem?	Balanced Transportation Problem is a transportation problem where the total availability at the origins is equal to the total requirements at the destinations	Understand	CO 2	CLO6	AMEB12.06
4	What is unbalanced transportation problem?	Unbalanced transportation problem is a transportation problem where the total availability at the origins is not equal to the total requirements at the destinations	Remember	CO 2	CLO7	AMEB12.07

5	What is initial Feasible Solution?	A feasible solution to a m-origin, n-destination problem is said to be basic, if the number positive allocations are m+n-1, ie ., one less than the sum of number of rows and columns..	Understand	CO 2	CLO6	AMEB12.06
6	Name the methods to find initial basic feasible solution.	Least Cost Method North-west Corner Method Vogel's Approximation Method	Remember	CO 2	CLO6	AMEB12.06
7	What is North west Corner Method?	Make maximum possible allocation to the Upper-Left Comer Cell (also known as North-West Comer Cell) in the First Row depending upon the availability of supply for that Row and demand requirement for the Column containing that Cell.	Remember	CO 2	CLO6	AMEB12.06
8	What is principle of Least cost Method?	Step 1: Make maximum possible allocation to the Least. Cost Cell depending upon the demand/supply for the Column Row containing that Cell. Step 2: Make allocation to the Second Lowest Cost Cell depending upon the remaining demand/supply for the Row/ Column containing that Cell. Step 3: Repeat the above Steps till all Rim Requirements are exhausted, Le., entire demand and supply is exhausted.	Understand	CO 2	CLO6	AMEB12.06
9	What is degeneracy in transportation problem?	A transport problem is said to be a degenerate transport problem if it has a basic feasible solution with number of non-zero basic variables less than m + n - 1.	Understand	CO 2	CLO7	AMEB12.07
10	What are ways of degeneracy in transportation problem?	Basic feasible solutions may be degenerate from the initial stage onward. They may become degenerate at any intermediate stage.	Understand	CO 2	CLO7	AMEB12.07
11	How Resolution of Degeneracy During the Initial Stag is done?	To resolve degeneracy, allocate an extremely small amount of goods (close to zero) to *one* or *more* of the empty cells so that a number of occupied cells becomes *m* + *n* - I. The cell containing this extremely small allocation is, of course, considered to be an occupied cell.	Remember	CO 2	CLO7	AMEB12.07
12	How the degeneracy is resolved?	To resolve degeneracy, allocate an extremely small amount of goods (close to zero) to one or more of the empty cells so that a number of occupied cells	Remember	CO 2	CLO7	AMEB12.07

		becomes m + n - I.				
13	What is Assignment Problem ?	Assignment Problem is a special type of linear programming problem where the objective is to minimize the cost or time of completing a number of jobs by a number of persons.	Remember	CO 2	CLO8	AMEB12.08
14	What is Hungarian method?	The method used to find solution to the assignment problem is known as Hungarian method. An assignment problem can be formulated as a linear programming problem and is solved by a special method known as Hungarian Method.	Remember	CO 2	CLO8	AMEB12.08
15	How the assignment problem in the general form can be stated?:	"Given n facilities, n jobs and the effectiveness of each facility for each job, the problem is to assign each facility to one and only one job in such a way that the measure of effectiveness is optimized (Maximized or Minimized)."Several problems of management have a structure identical with the assignment problem.	Remember	CO 2	CLO7	AMEB12.07
16	What is a balanced assignment problem?	Balanced Assignment Problem is an assignment problem where the number of facilities is equal to the number of jobs.	Remember	CO 2	CLO7	AMEB12.07
17	What is unbalanced assignment problem?	Unbalanced Assignment problem is an assignment problem where the number of facilities is not equal to the number of jobs. To make unbalanced assignment problem, a balanced one, a dummy facility(s) or a dummy job(s) (as the case may be) is introduced with zero cost or time.	Understand	CO 2	CLO8	AMEB12.08
18	Why it is needed to introduce dummy jobs?	A dummy job or facility is an imaginary job/facility with zero cost or time introduced to make an unbalanced assignment problem into balanced.	Remember	CO 2	CLO8	AMEB12.08
19	What is infeasible assignment problem?	An Infeasible Assignment occurs in the cell (i, j) of the assign- ment cost matrix if ith person is unable to perform jth job. . It is sometimes possible that a particular person is incapable of doing certain work or a specific job cannot be performed on a particular machine	Remember	CO 2	CLO9	AMEB12.09

20	Is assignment problem is originally designed for minimization?	Yes. Assignment problem is originally designed for minimization of cost, time.	Understand	CO 2	CLO9	AMEB12.09
21	When you say that given assignment problem is balanced one.	On observation, if Number of Rows is equal to Number of Columns. Then the problem is said to be balanced.	Remember	CO 2	CLO8	AMEB12.08
22	How the unbalanced assignment problem is converted to balanced problem.	When number of rows are not equal to number of columns, include dummy column or dummy row which ever is short in number. Assign zero cost to the dummy row or column.	Remember	CO 2	CLO9	AMEB12.09
23	Why line drawing is required?	Line drawing procedure is required to draw minimum number of lines covering all zero's.	Remember	CO 2	CLO9	AMEB12.09
24	How the assignment model is used for maximal assignment of sales or profit?	Maximization problem may be solved easily by first converting it to a minimization problem and then applying the usual procedure of assignment algorithm. This conversion can be very easily done by subtracting from the highest element, all the elements of the given profit matrix; or equivalently, by placing minus sign before each element of the profit-matrix in order to make it cost-matrix.	Remember	CO 2	CLO9	AMEB12.09
	UNIT-III-A					
1	What is sequencing?	Suppose there are n jobs (1, 2, 3,..., n), each of which has to be processed one at a time at each of m machines A, *B*, C, ... The order of processing each job through machines is given . The time that each job must require on each machine is known. The problem is to find a sequence among *(n!)m* number of all possible sequences (or combinations) (or order) for processing the jobs so that the total elapsed time for all the jobs will be minimum.	Remember	CO 3	CLO10	AMEB12.10
2	Johnson's iterative procedure is adapted to solve which type of	Johnson's iterative procedure is adapted to solve sequencing problems of following type: Processing of 'n' jobs through two machines A and B, in the order A,B . Processing of 'n' jobs through two	Remember	CO 3	CLO10	AMEB12.10

	problems?	machines A,B and C, in the order A,C,B .				
3	What is Processing Order?	It refers to the order in which various machines are required for completing the job.	Remember	CO 3	CLO10	AMEB12.10
4	What is processing time?	Processing Time is the time required by each job on each machine.	Understand	CO 3	CLO10	AMEB12.10
5	What is idle time?	Idle Time on a Machine. This is the time for which a machine remains idle during the total elapsed time.	Remember	CO 3	CLO10	AMEB12.10
6	What is total elapsed time?	Total Elapsed Time is the time between starting the first job and completing the last job. This also includes idle time, if exists	Understand	CO 3	CLO10	AMEB12.10
7	Explain processing order.	It refers to the order in which various machines are required for completing the job.	Understand	CO 3	CLO10	AMEB12.10
8.	Explain No-passing rule.	This rule means that passing is not allowed, ie, the same oder of jobs is maintained over each machine. If each of the --jobs is to be processed through two machines A and B in the order AB, then this rule means that each job will go to the machine A first and then to machine B.	Understand	CO 3	CLO10	AMEB12.10
9	Explain assumptions of Sequencing problems.	No machine can process more than one operation at a time. Each operation once started, must be performed till completion. A job is an entity Each operation must be completed before any other operation , which it must precede, can begin There is one of each type of machine A job is processed as soon as possible subject to ordering requirements The time required to transfer jobs between machines is negligible.	Understand	CO 3	CLO10	AMEB12.10
10	How the Total elapsed time is are computed from graphical method?	Total elapsed time = processing time of job 1 + idle time for job 1 Or = Processing time of job1 + idle time for job 2	Understand	CO 3	CLO11	AMEB12.11

11	What is the condition to solve processing of n jobs through 3 machines A,B and C. in the order ABC.	At least one of the following condition is to be satisfied to process problem. The minimum time on mahine A ≥ the maximum of time on machine B The minimum time on machine C ≥ the maximum time on the Machine B.	Remember	CO 3	CLO11	AMEB12.11
12	How sequencing if found, for n jobs processing through three machines	Given problem is transformed to quivalent problem, involving n jobs and two fictitious machines denoted by G and H, and corresponding time Gj and Hj are defined by $G_i = A_i + B_i,\ H_i = B_i + C_i.$	Remember	CO 3	CLO11	AMEB12.11
13	What is the condition to solve processing of n jobs through 3 machines A,B and C. in the order ABC.	At least one of the following condition is to be satisfied to process problem. The minimum time on mahine A ≥ the maximum of time on machine B The minimum time on machine C ≥ the maximum time on the Machine B.	Remember	CO 3	CLO11	AMEB12.11
14	What is a gantt chart?	Gantt chart is graphycal representation of representing the sequence of operations that are to be done on a perticular machine/machines. It indicates total elapsed time and idle time of echa of the machine,	Remember	CO 3	CLO11	AMEB12.11
15	What method is used to solve two jobs through m machines?	Graphycal metod is used to solve two jobs through m machines to calculate total time needed to complete both the jobs.	Remember	CO 3	CLO11	AMEB12.11
16	What is gradual failure?	In gradual failure, as the life of an item increases, its efficiency deteriorates, causing: Increased expenditure for operating costs, decreased productivity of the equipments, Decrease in the value of the equipment, *i.e.*, the resale of saving value decreases.	Understand	CO 3	CLO12	AMEB12.12

17	What is sudden failure?	This type of failure is applicable to those items that do not deteriorate markedly with service but which ultimately fail after some period of using. The period between installation and failure is not constant for any particular equipment.	Understand	CO 3	CLO12	CAMEB.12
18	Explain progressive failure?	Under this mechanism, probability of failure increases with the increase in the life of an item. For example, electric light bulbs, automobile tubes etc.	Understand	CO 3	CLO12	AMEB12.12
19	Explain Retrogressive failure?	Certain items have more probability of failure in the beginning of their life, and as the time passes the chances of failure becomes less. That is, the ability of the unit to survive in the initial period of life increases its expected life.	Remember	CO 3	CLO12	AMEB12.12
20	Explain Random failure.	Under this failure, constant probability of failure is associated with items that fail from randomcauses such as physical shocks, not related to age.	Understand	CO 3	CLO12	AMEB12.12
21	What is replacement Problem?	The replacement problems are concerned with the situations that arise when some items such as men, machines, electric-light bulbs, etc. need replacement due to their decreased efficiency, failure or breakdown. Such decreased efficiency or complete breakdown may either be gradual or all of a sudden.	Understand	CO 3	CLO12	AMEB12.12
22	What is objective of replacement ?	The main objective of replacement is to direct the organization for maximizing its profits or minimizing the cost.	Understand	CO 3	CLO12	AMEB12.12
23	When the replacement problem arises?	When the old item has become in worse condition and work Badly require expensive maintenance. When the old item fails due to accident or does not work at all or old item is expected to fail shortly. When a better or more efficient design of machine or equipment has become available in the market	Remember	CO 3	CLO12	AMEB12.12

24	Explain replacement situations.	Replacement of capital equipment that becomes worse with time, Group replacement of items that fail completely.	Understand	CO 3	CLO12	AMEB12.12
24	What is the optimal replacement policy when money value is constant.	Replace the equipment at the end of 'n' years, if the effective maintenance cost in the (n+1) the year is more than the average total cost in the 'n"th year and the 'n'th years effective maintenance cost is less than the previous year's average total cost.	Remember	CO 3	CLO12	AMEB12.12
25	What is present worth factor?	If 'r' is the interest rate, then $(1+r)^n$ is called the present worth factor or present value one rupee spent in n years time from now onwards.	Remember	CO 3	CLO13	AMEB12.13
22	What is individual replacement policy?	Replacing of failure item individually as when it fails.	Remember	CO 3	CLO13	AMEB12.13
23	What is Group replacement policy?	Group replacement is concerned with those items that either work or fail are completely replaced with new items after fixed interval of time.	Remember	CO 3	CLO13	AMEB12.13
	UNIT - IV					
1	What is game theory	A game theory is a type of decision theory in which one's choice of action isd determined after taking into account all possible alternatives available to an opponent playing the same game rather than just by the possibilities of several outcomes.	Remember	CO 4	CLO15	AMEB12.15
2	Define Game?	A Game is defined as an activity between two or more persons involving activities by each person according to a ser=t of rules, at the which each person receives some benefit or satisfaction or suffers loss (negative benefit)	Remember	CO 4	CLO15	AMEB12.15
3	Name the characteristics of game theory.	Chance of strategy Number of persons Number of activities Number of alternatives available to each player Information to the players about the past activities of other player Payoff	Understand	CO 4	CLO15	AMEB12.15
4	What is pay off	A quantitative measure of satisfaction a person gets at ythe end of each play is called a payoff.	Understand	CO 4	CLO15	AMEB12.15

5	What is competitive game?	A competitive situation is called a competitive game.	Remember	CO 4	CLO15	AMEB12.15
6	What is Zero-sum game?	If the player make a payments only to each other , i.e. the loss of one is the gain of others, and nothing comes from out side, the competitive game is said to be zero-sum game.	Remember	CO 4	CLO15	AMEB12.15
7	What is non-zerosum game?	A game which is not zero-sum is called a nonzero-sum game. Example: 'poker ' game in which a certain part of the pot is removed from the house before final payoff.	Understand	CO 4	CLO15	AMEB12.15
8	Define strategy?	A strategy of a player is defined as a rule for decision making in advance of all the plays by which he decides the activities he should adopt. Strategy for a given player is a set of rules (programmes) that specifies which of the available course of action he should make at the play.	Remember	CO 4	CLO15	AMEB12.15
9	Define pure strategy?	If a player knows exactly what other player is going to do, a deterministic situation is obtained and the objective function is to minimize the gain. Therefore , the pure strategy is decision rule always to select a particular course of action.	Remember	CO 4	CLO15	AMEB12.15
10	Explain Minimax (Maximin) criterion of optimality.	It states that if a player lists the worst possible outcomes of all is potential strategies, he will choose that strategy to be the most suitable for him which corresponds to the best of these worst outcomes, such a strategy is called an optimal strategy. Minimax = Maximin	Remember	CO 4	CLO15	AMEB12.15
11	Define saddle point of a game.	A saddle point of a payoff matrix is the position of such an element in the payoff matrix which is minimum in its row and maximum in its column.	Remember	CO 4	CLO15	AMEB12.15
12	Explain value of game.	the payoff (v_{rs}) at the saddle point (r,s) is called the value of the game and it is obviously equal to the maximin and minimax value of the game.	Remember	CO 4	CLO15	AMEB12.15
13	Define mixed strategy?	If a player is guessing as to which activity is to be selected by the other on any particular occasion, a probability situation is obtained and objective function is to maximize the expected gain. Thus mixed strategy is a selection among pure strategies with fixed probabilities.	Understand	CO 4	CLO16	AMEB12.16

14	Explain principle of dominance.	If all the elements in a row are less than or equal to the corresponding elements in another row, then that row is said to be dominated and can be deleted from the matrix. if all the elements in column are greater than or equal to the corresponding elements in another column, then that column is said to be dominated and can be deleted from the matrix	Remember	CO 4	CLO16	AMEB12.16
15	Name the methods for solving mixed strategy game problem without saddle point	Algebraic method Calculus method Linear Programming method.	Understand	CO 4	CLO17	AMEB12.17
16	Which method is used for solving 2*n or m*2 game?	Graphical method and method of sub games are used for solving 2 * n and m*2 game problems.	Remember	CO 4	CLO17	AMEB12.17
17	Define Inventory?	inventory is defined as the stock of goods, commodities or economic resources that are stored or reserved in order to ensure smooth and efficient running of business affairs.	Remember	CO 4	CLO18	AMEB12.18
18	What are the forms of inventory?	Raw material inventory work-in-process inventory finished goods inventory	Understand	CO 4	CLO18	AMEB12.18
19	what is direct inventories?	the items which play a direct role in the manufacture and become an integral part of finished goods are included in the category of direct inventories	Understand	CO 4	CLO18	AMEB12.18
20	list direct inventories.	Raw material inventories work-in-process inventories finished –goods inventories spare parts	Remember	CO 4	CLO18	AMEB12.18
21	What is a fluctuation inventories?	These are to carried because sales and production times cannot be predicted accurately. Such type of reserve stocks or safety stocks are called fluctuation inventories.	Understand	CO 4	CLO18	AMEB12.18
22	What are the inventory decisions?	How much amount of an item should be ordered when the inventory of that item is to be replenished. when to replenish the inventory of that item.	Remember	CO 4	CLO18	AMEB12.18
23	Name the costs involved n inventory problems?	- Holding costs - Shortage cost or stock-out costs - Se-up costs -	Remember	CO 4	CLO18	AMEB12.18

24	Why the inventory is maintained?	The inventory is maintained for efficient and smooth running of business affairs.	Understand	CO 4	CLO18	AMEB12.18
25	What is EOQ	Economic order quantity (EOQ) is that size order which minimizes the total annual cost of carrying inventory and cost of ordering under the assumed conditions of certainty and those annual demands are known.	Remember	CO 4	CLO18	AMEB12.18
26	What is reserve stock?	We use reserve stock due to variations in demand during re-order point.	Remember	CO 4	CLO19	AMEB12.19
27	what is safety stock?	safety stock is used due to variation in demand during lead time.	Understand	CO 4	CLO19	AMEB12.19
28	what is fixed-order quantity system?	In this system , the inventory position is reviewed continuously and maintained up to a prescribed level. As and when the inventory level reaches the reorder level, an order is placed for a fixed quantity , which is equal to the economic order quantity.	Remember	CO 4	CLO19	AMEB12.19
29	what is service level?	It is ratio of number of units supplied with no delay to number of units demanded.	Understand	CO 4	CLO19	AMEB12.19
30	what is lead time?	The time between the placement f the requisition for an item and its receipt for actual use is called lead time.	Remember	CO 4	CLO19	AMEB12.19
31	What is ordering cycle?	An ordering cycle may be identified by the time period between two successive placement of orders.	Understand	CO 4	CLO19	AMEB12.19
32	What is continuous review?.	Where a record of the inventory level is updated continuously until a certain lower limit is reached at which point a new order is placed	Remember	CO 4	CLO19	AMEB12.19
33	What is periodic review?	Where the orders are placed usually at equally spaced intervals of time	Remember	CO 4	CLO19	AMEB12.19
34	What is all units discount?	When the discount is applicable for all the units purchased , it is known as all units discount.	Understand	CO 4	CLO19	AMEB12.19
35	what is incremental discount?	If the discounts are offered only for items which are in excess of the specified amount, it is known as incremental discount.	Understand	CO 4	CLO19	AMEB12.19

	UNIT-V					
1	define a queuing model.	A Queuing Model is a suitable model to represent a service- oriented problem where customers arrive randomly to receive some service, the service time being also a random variable.	Remember	CO 5	CLO20	AMEB12.20
2	What are the characteristics of a waiting line system?	The characteristics of waiting line system are Arrival , server, service, time spent in the queuing system, queue discipline, size of population, maximum size of a queue.	Remember	CO 5	CLO20	AMEB12.20
3	What is objective queuing model	The objective of a queuing model is to find out the optimum service rate and the number of servers so that the average cost of being in queuing system and the cost of service are minimized.	Understand	CO 5	CLO20	AMEB12.20
4	Explain service?	The time taken by a server to complete service is known as service time	Remember	CO 5	CLO20	AMEB12.20
5	Explain time spent in queuing system.	The time spent by a customer in a queuing system is the sum of waiting time before service and the service tim	Remember	CO 5	CLO20	AMEB12.20
6	Explain queue discipline.	The queue discipline indicates the order in which members of the queue are selected *for* service. It is most frequently assumed that the customers are served on a first come first serve basis. This is commonly referred to as FIFO (first in, first out) system	Understand	CO 5	CLO20	AMEB12.20
7	Explain Kendall's Notation.	Kendall (Kendall, 1951) has introduced a set of notations, which have become standard in the literature of queuing models. A general queuing system is denoted by (a/b/c) :(d/e) where a = probability distribution of the inter arrival time. b = probability distribution of the service time. c = number of servers in the system. d = maximum number of customers allowed in the system. e = queue discipline	Remember	CO 5	CLO20	AMEB12.20

8	Explain M/M/1 : ∞/FIFO queuing model	The M/M/1 queuing model is a queuing model where the arrivals follow a Poisson process, service times are exponentially distributed and there is one server, infinity population , first in first out discipline.	Remember	CO 5	CLO20	AMEB12.20
9	What is Balking ?	A customer may leave the que because the queue is too long and he has no time to wait, or there is no sufficient waiting space.	Remember	CO 5	CLO20	AMEB12.20
10	Explain Reneging.	This occurs when a waiting customer leaves the queue due to impatience	Understand	CO 5	CLO20	AMEB12.20
11	Explain priorities	In certain applications, some customers are served before others regardless of their order of arrival.	Remember	CO 5	CLO20	AMEB12.20
12	explain Jockeying	Customers may jockey from one waiting line to another. It may be seen that this occurs in the super market.	Understand	CO 5	CLO20	AMEB12.20
13	Define Traffic intensity for M/M/1 : ∞/FIFO model	Traffic intensity= mean arrival rate/mean service rate $p = \lambda/\mu = (1/\mu) / (1/\lambda)$ = mean service time/mean inter-arrival time	Remember	CO 5	CLO20	AMEB12.20
14	Explain M/M/C : ∞/FIFO queuing model	it is queuing model where the arrivals follow as on process, service times are exponentially distributed and there are C servers.	Remember	CO 5	CLO20	AMEB12.20
15	What is constant service model?	It is a queuing model where the service time is constant.	Understand	CO 5	CLO20	AMEB12.20
16	Expand FIFO and LIFO.	FIFO= First In First out LIFO = Last In First out	Remember	CO 5	CLO22	AMEB12.21
17	Define Simulation?	Simulation is the process of designing a model of real systems and conducting experiments with this model for the purpose of understanding the behavior within the limits imposed by criterion for the operation of the system .	Remember	CO 5	CLO22	AMEB12.21
18	Name types of simulation. models	-Deterministic models -Stochastic models -Static models - Dynamic models	Remember	CO 5	CLO22	AMEB12.22

19	What are the phases of simulation model?	Phases of simulation model are Phase-1:Data generation Phase-2: Book- keeping	Remember	CO 5	CLO23	AMEB12.23
20	What is principle of Monte-Carlo simulation?	the principle of Monte-Carlo technique is replacement of actual statistical universe described by some assumed probability distribution and then sampling from this theoretical population of random numbers.	Remember	CO 5	CLO22	AMEB12.22
21	Name the applications of simulation.	Application of simulation in queuing problem solving b) Application of simulation in inventory problem solving.	Remember	CO 5	CLO22	AMEB12.22

Signature of the Faculty

Signature of HOD