



## Dr.G.R.Damodaran College of Science

(Autonomous, affiliated to the Bharathiar University, recognized by the UGC)  
Re-accredited at the 'A' Grade Level by the NAAC and ISO 9001:2008 Certified  
CRISL rated 'A' (TN) for MBA and MIB Programmes

### MCA II YEAR A(2016-2019)

### NON-MAJOR: RESOURCE MANAGEMENT TECHNIQUES-354E

### Semester : III

### Multiple Choice Questions

- 1) \_\_\_\_\_ is employed in construction and business problems.
  - a) Critical.
  - b) Non-critical.
  - c) **Program evaluation and review techniques.**
  - d) Critical path method.
  
- 2) \_\_\_\_\_ method is an alternative method of solving a Linear Programming Problem involving artificial variables.
  - a) Simplex.
  - b) Two-phase simplex method.
  - c) **Big M method.**
  - d) Dual simplex method.
  
- 3) \_\_\_\_\_ is a completely degenerate form of a transportation problem.
  - a) **Assignment.**
  - b) North-west corner rule.
  - c) Modi Method.
  - d) Vogel's Approximation Method.
  
- 4) \_\_\_\_\_ is a mathematical technique used to solve the problem of allocating limited resource among the competing activities.
  - a) **Linear programming.**
  - b) Assignment problem.
  - c) Traveling sales-man problem.
  - d) Replacement problem.
  
- 5) A company stock an item which is consumed at the rate of 100 units per months. It costs the company Rs. 48 each time an order is placed. A unit inventory held in stock for one month costs Re.0.24. The number of order that the company has to placed each year to optimize costs will be \_\_\_\_\_.
  - a) **6.**
  - b) 8.
  - c) 4.
  - d) 2.

- 6) A degenerate solution is one that \_\_\_\_\_.
- gives an optimum solution to the LPP.
  - gives zero value to one or more of the basic variables.**
  - yields more than one way to achieve the objective.
  - makes use of all the available resources.
- 7) A feasible solution to an Linear programming problem \_\_\_\_\_.
- must satisfy all of the problems constraints simultaneously.**
  - need not satisfy all of the constraints, only some of them.
  - must be a corner point of the feasible region.
  - must optimize the value of the objective function.
- 8) A petrol pump has two pumps; Vehicles arrive at the petrol pump according to Poisson input process at average of 12 per hour. The service time follows exponential distribution with a mean of 4 minutes. The pumps are expected to be idle for \_\_\_\_\_.
- 33% .
  - 43%.**
  - 28% .
  - 19%.
- 9) A queuing system is said to be a \_\_\_\_\_ when its operating characteristic are independent upon time.
- pure birth.
  - pure death.
  - transient state.
  - steady state.**
- 10) All equality constraints can be replaced equivalently by \_\_\_\_\_ inequalities.
- 1.
  - 2.**
  - 3.
  - 4.
- 11) All of the following assumptions of the ERL model except \_\_\_\_\_.
- the usage rate is reasonably constant.
  - replenishment is instantaneous.**
  - production rate is greater than demand rate.
  - there are no quantity discount price.
- 12) All the basis for a transportation problem is \_\_\_\_\_.
- square.
  - rectangle.
  - circle.
  - triangular.**

- 13) An \_\_\_\_\_ represent the start or completion of some activity and as such it consumes no time.
- a) activity.
  - b) event.**
  - c) program evaluation and review techniques.
  - d) critical path method.
- 14) An activity is critical if its \_\_\_\_\_ float is zero.
- a) event.
  - b) total.**
  - c) free.
  - d) independent.
- 15) An activity is represented by \_\_\_\_\_.
- a) a circle.
  - b) a square.
  - c) an arrow.**
  - d) a triangle.
- 16) An activity which does not consume neither any resource nor time is known as \_\_\_\_\_.
- a) predecessor.
  - b) successor.
  - c) dummy activity.**
  - d) preceding event.
- 17) An assignment problem is a particular case of \_\_\_\_\_.
- a) transportation problem.**
  - b) linear programming problem.
  - c) network problem.
  - d) simplex problem.
- 18) An n-tuple of real numbers which satisfies the constraints of Linear Programming Problem is called \_\_\_\_\_.
- a) solution.**
  - b) basic variables.
  - c) non- basic variables.
  - d) degenerate.
- 19) At any iteration of the usual simplex method, if there is at least one basic variable in the basis at zero level and all the index numbers are non-negative, the current solution is \_\_\_\_\_.
- a) degenerate.**
  - b) non-degenerate.
  - c) infeasible.
  - d) unbounded.

- 20) Charnes method of penalty is called \_\_\_\_\_.
- graphical method.
  - simplex method.
  - big M method.**
  - dual simplex method.
- 21) Chose the correct statement: A degenerate solution is one that\_\_\_\_\_.
- gives an optimum solution to the Linear Programming Problem.
  - gives zero value to one or more of the basic variables.**
  - yields more than one way to achieve the objective.
  - makes use of all available resources.
- 22) Closed loops may be \_\_\_\_\_ in shape.
- square.**
  - triangle.
  - rectangle.
  - parallel.
- 23) Customers arrive at a box office window, being manned ny single individual,according to Poisson input process with mean rate of 20 per hour, while the mean service time is 2 minutes. Which of the following is not true for this system?
- $E(n) = 2$  customers.**
  - $E(m) = 4/3$  customers.
  - $E(v) = 6$  minutes.
  - $P(>n) = 2/3$ .
- 24) Economics order quantity results in \_\_\_\_\_.
- equalisation of carrying cost and procurement cost.**
  - favourable procurement price.
  - reduced chances of stock outs.
  - minimization of set up cost.
- 25) For a 2.5% increase in order quantity (under fundamental EOQ problem) the total relevant cost would \_\_\_\_\_.
- increase by 2.5%.**
  - decrease by 2.5%.
  - increase by 0.25%.
  - decrease by 0.25%
- 26) For a given LPP max  $z = -5y$  subject to the constraints  $x + y \leq 1$ ,  $0.5x + 5y \geq 0$ ,  $x, y \geq 0$ , the solution is \_\_\_\_\_.
- unbounded.
  - not feasible.**
  - optimum.
  - an alternate optimum.

- 27) For any primal problem and its dual\_\_\_\_\_.
- optimal vaule of objective functions is same.
  - primal will have an optimal solution iff dual does too.**
  - both primal and dual cannot be infeasible.
  - dual will have an optimal solution iff primal does too.
- 28) Given arrival rate = 15/hr, service rate = 20/hr, the value of traffic intensity is\_\_\_\_\_.
- 4/3.
  - 3/4.**
  - 3/2.
  - 5.
- 29) Graphical method is also known as \_\_\_\_\_.
- two-phase method.
  - simplex method.
  - big M method.
  - search approach method.**
- 30) Graphical method of linear programming is useful when the number of decision variable are \_\_\_\_\_
- two.**
  - three.
  - finite.
  - infinite.
- 31) If an activity has zero slack, it implies that\_\_\_\_\_.
- the project is progressing well.
  - it is a dummy activity.
  - it lies on the critical path.**
  - it lies a non critical path.
- 32) If an artificial variable is present in the basic variable column of optimal simplex table, then the solution is \_\_\_\_\_.
- infeasible.**
  - unbounded.
  - degenerate.
  - feasible.
- 33) If any value in basic variable column of final simplex table is negative , then the solution is\_\_\_\_.
- unbounded.
  - infeasible.**
  - optimal.
  - feasible.

- 34) If one or more variable vanish then a basic solution to the system is called\_\_\_\_\_.
- basic solution.
  - optimal solution.
  - degenerate solution.**
  - optimal basic feasible solution.
- 35) If primal linear programming problem has a finite solution, then dual linear programming problems should have\_\_\_\_\_.
- finite solution.**
  - infeasible solution.
  - unbounded solution.
  - degenerate.
- 36) If the constraint of an Linear Programming Problem has an in equation of = type, the variables to be added are\_\_\_\_\_.
- slack.
  - surplus.**
  - artificial.
  - decision.
- 37) If the given Linear Programming Problem is in its standard form then primal-dual pair is \_\_\_\_\_.
- symmetric.
  - unsymmetric.**
  - degenerate.
  - feasible region.
- 38) If the order quantity (size of order) is increased, \_\_\_\_\_.
- holding costs decrease and ordering costs increase.
  - holding costs increase and ordering costs decrease.**
  - the total costs increase and then decrease.
  - storage cost as well as stock-out cost increase.
- 39) If the primal has an unbold objective function value then the other problem has\_\_\_\_\_ solution.
- feasible.
  - infeasible.
  - optimum.
  - no feasible.**
- 40) If the primal problem has n constraints and m variables then the number of constraints in the dual problem is \_\_\_\_\_.
- mn.**
  - n.
  - m+n.
  - m-n.

- 41) If there is no non-negative replacement ratio in a solution which is sought to be improved, then the solution is\_\_\_\_\_.
- a) bounded.
  - b) unbounded.**
  - c) feasible solution.
  - d) degenerate.
- 42) In a given system of  $m$  simultaneous linear equations in  $n$  unknowns ( $m < n$ ) there will be \_\_\_\_\_.
- a)  $n$  basic variables.
  - b)  $m$  basic variables.**
  - c)  $(n-m)$  basic variables.
  - d)  $(n+m)$  basic variables.
- 43) In a transportation table, an ordered set of \_\_\_\_\_ or more cells is said to form a loop.
- a) 2.
  - b) 3.
  - c) 4.**
  - d) 1.
- 44) In an assignment problem involving 5 workers and 5 jobs, total number of assignments possible are \_\_\_\_\_.
- a) 5!
  - b) 10.
  - c) 25.
  - d) 5.**
- 45) In an Linear Programming Problem functions to be maximized or minimized are called \_\_\_\_\_.
- a) constraints.
  - b) objective function.**
  - c) unrestricted values.
  - d) basic solution.
- 46) In marking assignments, which of the following should be preferred?
- a) Only row having single zero.
  - b) Only column having single zero.
  - c) Only row/column having single zero.**
  - d) Column having more than one zero.
- 47) In program evaluation review technique network each activity time assume a beta distribution because\_\_\_\_\_.
- a) it is a unimodal distribution that provides information regarding the uncertainty of time estimates of activities.**
  - b) it has got finite non-negative error.
  - c) it need not be symmetrical about model value.
  - d) the project is progressing well.

- 48) In Program Evaluation Review Technique the maximum time that is required to perform the activity under extremely bad conditions is known as\_\_\_\_\_.
- a) **pessimistic time.**
  - b) optimistic time.
  - c) most likely time.
  - d) delay time.
- 49) In program evaluation review technique the span of time between the optimistic and pessimistic time estimates of an activity is\_\_\_\_\_.
- a) 3
  - b) **6**
  - c) 8
  - d) 12
- 50) In the basic EOQ model, if the lead time increases from 2 to 4 days, the EOQ will \_\_\_\_\_.
- a) double.
  - b) increase, but not double.
  - c) **remain constant.**
  - d) decrease by a factor of two.
- 51) In the network, only one activity may connect any \_\_\_\_\_ nodes.
- a) 1.
  - b) **2.**
  - c) 3.
  - d) 4.
- 52) In the production lot size model, increasing the rate of production \_\_\_\_\_.
- a) **increase the optimal number of orders to place each year.**
  - b) does not influence the optimal number of orders.
  - c) decrease the optimal number of orders to place each year.
  - d) exactly the optimal number of orders to place each year.
- 53) In the transportation table, empty cells will be called \_\_\_\_\_.
- a) occupied.
  - b) **unoccupied.**
  - c) basic.
  - d) non-basic.
- 54) In transportation model, the opportunity cost is given by \_\_\_\_\_.
- a) implied cost + actual cost of the cell.
  - b) actual cost of the cell - implied cost.
  - c) **implied cost - actual cost of the cell.**
  - d) implied cost x actual cost of the cell.



- 55) Key element is also known as \_\_\_\_\_.
- a) slack.
  - b) surplus.
  - c) artificial.
  - d) pivot element.**
- 56) Linear Programming Problem involves \_\_\_\_\_ variable can be solved by the graphical method.
- a) 1.
  - b) 2.**
  - c) 3.
  - d) 4.
- 57) Linear Programming Problem is a technique of finding the \_\_\_\_\_.
- a) optimal value.**
  - b) approximate value.
  - c) initial value.
  - d) infeasible value.
- 58) Linear Programming Problem that can be solved by graphical method has \_\_\_\_\_.
- a) quadratic constraints.
  - b) linear constraints.**
  - c) cubic constraints.
  - d) bi-quadratic constraints.
- 59) Mathematical model of linear programming problem is important because \_\_\_\_\_.
- a) it helps in converting the verbal description and numerical data into mathematical expression.**
  - b) decision makers prefer to work with formal models.
  - c) it captures the relevant relationship among decision factors.
  - d) it enables the use of algebraic technique.
- 60) Maximization assignment problem is transformed into a minimization problem by \_\_\_\_\_.
- a) adding each entry in a column from the maximum value in that column.
  - b) subtracting each entry in a column from the maximum value in that column.
  - c) subtracting each entry in the table from the maximum value in that table.**
  - d) adding each entry in the table from the maximum value in that table.
- 61) If there is no non-negative replacement ratio in solving a Linear Programming Problem ,then the solution is \_\_\_\_\_.
- a) feasible.
  - b) unbounded.**
  - c) infeasible.
  - d) degenerate.

- 62) If an activity has zero slack, it implies that\_\_\_\_\_.
- a) the project is progressing well.
  - b) it is a dummy activity.
  - c) it lies on the critical path.**
  - d) it lies a non critical path.
- 63) If the solution of a LPP is unbounded then \_\_\_\_\_
- a) there is no non-negative replacement ratio**
  - b) there is non-negative replacement ratio
  - c) there is infinity replacement ratio
  - d) none.
- 64) When we solve a system of simultaneous linear equations by using two-phase method, the values of decision variables will be \_\_\_\_\_.
- a) positive.
  - b) negative.
  - c) zero.
  - d) positive and / or negative.**
- 65) The transportation problem deals with the transportation of \_\_\_\_\_.
- a) a single product from a source to several destinations.**
  - b) a single product from several sources to several destinations.
  - c) a single product from several sources to a destination.
  - d) a multi-product from several sources to several destinations.
- 66) In an assignment problem involving 10 workers and 10 jobs, total number of assignments possible are \_\_\_\_\_.
- a) 5!
  - b) 10.
  - c) 25.
  - d) 10.**
- 67) In marking assignments, which of the following should be preferred?
- a) Only row having single zero.
  - b) Only column having single zero.
  - c) Only row/column having single zero.**
  - d) Column having more than one zero.

- 68) Customers arrive at a box office window, being manned by single individual, according to Poisson input process with mean rate of 20 per hour, while the mean service time is 2 minutes. Which of the following is not true for this system?
- E(n) = 2 customers.**
  - $E(m) = 4/3$  customers.
  - $E(v) = 6$  minutes.
  - $P(\geq n) = 2/3$ .
- 69) The time between the placement of an order and its delivery is called as \_\_\_\_\_.
- buffer time.
  - capital time.
  - EOQ.
  - lead time**
- 70) If all the constraints of the primal problem in equations are of type = then the constraints in the dual problem is \_\_\_\_\_.
- $\leq$
  - =.**
  - $\geq$ .
  - 0.
- 71) In a standard form of Linear Programming Problem the constraint type must be \_\_\_\_\_.
- =.
  - $\leq$ .
  - $\geq$ .
  - =.**
- 72) One disadvantage of using North-West Corner Rule to find initial solution to the transportation problem is that \_\_\_\_\_.
- it is complicated to use.
  - it does not take into account cost of transportation.**
  - it leads to a degenerate initial solution.
  - it does take into account cost of transportation.
- 73) Operation research approach is typically based on the use of \_\_\_\_\_.
- physical model.
  - mathematical model.**
  - iconic model.
  - descriptive model.

- 74) Operations Research approach is \_\_\_\_\_.
- a) **multi-disciplinary.**
  - b) scientific.
  - c) intuitive.
  - d) collect essential data.
- 75) Principle of complementary slackness states that\_\_\_\_\_.
- a) **primal slack\*dual main=0.**
  - b) primal main+dual slack=0.
  - c) primal main+dual surplus=0.
  - d) dual slack\*primal main = 1.
- 76) Priority queue discipline may be classified as\_\_\_\_\_.
- a) finite or infinite.
  - b) limited.
  - c) **unlimited.**
  - d) pre-emptive or non-pre-emptive.
- 77) Replace an item when\_\_\_\_\_.
- a) **average annual cost for n years becomes equal to current running cost.**
  - b) next year running cost in more than average cost of nth year.
  - c) present years running cost is less than the previous years average cost.
  - d) average cost to date is equal to the current maintenance cost.
- 78) Service mechanism in a queuing system is characterized by\_\_\_\_\_.
- a) customers behaviour.
  - b) **servers behaviour.**
  - c) customers in the system.
  - d) server in the system.
- 79) Slack is also known as \_\_\_\_\_.
- a) event.
  - b) activity.
  - c) **float.**
  - d) critical path.
- 80) Solution of a Linear Programming Problem when permitted to be infinitely large is called \_\_\_\_\_.
- a) bounded.
  - b) **unbounded.**
  - c) optimum basic feasible solution.
  - d) initial basic feasible solution.

- 81) The \_\_\_\_\_ time for an activity can be reduced by using increased resources.
- a) **normal.**
  - b) optimistic.
  - c) pessimistic.
  - d) most likely.
- 82) The \_\_\_\_\_ large square are called the cells in a transportation problem.
- a) m.
  - b) n.
  - c) m+n.
  - d) **mn.**
- 83) The activity which can be delayed without affecting the execution of the immediate succeeding activity is determined by\_\_\_\_\_.
- a) float.
  - b) **free float.**
  - c) total float.
  - d) independent float.
- 84) When an activity has zero Total float, Free float will \_\_\_\_\_.
- a) **zero**
  - b) less than 1
  - c) greater than 1
  - d) undefined
- 85) The allocation cells in the transportation table will be called \_\_\_\_\_ cell.
- a) **occupied.**
  - b) unoccupied.
  - c) basic.
  - d) non-basic.
- 86) The area bounded by all the given constraints is called \_\_\_\_\_.
- a) **feasible region.**
  - b) basic solution.
  - c) optimal basic feasible solution.
  - d) basic feasible solution.
- 87) The assignment algorithm was developed by \_\_\_\_\_.
- a) Modi.
  - b) Kuhn.
  - c) **Hungarian.**
  - d) Vogel's.

- 88) The assignment matrix is always a \_\_\_\_\_.
- a) rectangular matrix.
  - b) square matrix.**
  - c) identity matrix.
  - d) diagonal matrix.
- 89) In assignment problem \_\_\_\_\_.
- a) number of origins equals the number of destinations.**
  - b) number of origins are less than the number of destinations.
  - c) number of origins are greater than the number of destinations.
  - d) number of origins are greater than or equal to the number of destinations.
- 90) The assignment problem is a special case of transportation problem in which \_\_\_\_\_.
- a) number of origins equals the number of destinations.**
  - b) number of origins are less than the number of destinations.
  - c) number of origins are greater than the number of destinations.
  - d) number of origins are greater than or equal to the number of destinations.
- 91) The assignment problem will have alternate solutions when the total opportunity cost matrix has \_\_\_\_\_.
- a) atleast one zero in each row and column.
  - b) when all rows have two zeros.
  - c) when there is a tie between zero opportunity cost cells.**
  - d) if two diagonal elements are zeros.
- 92) If the average cost to date is equal to the current maintenance cost then the annualized cost will be \_\_\_\_\_.
- a) minimum**
  - b) maximum
  - c) zero
  - d) one
- 93) The average annual cost will be minimized by replacing a machine when \_\_\_\_\_.
- a) average cost to date is equal to the current maintenance cost.**
  - b) average cost to date is greater than the current maintenance cost.
  - c) average cost to date is less than the current maintenance cost.
  - d) next year running cost in more than average cost of nth year.
- 94) The average arrival rate in a single server queuing system is 10 customers per hour and average service rate is 15 customers per hour. The average time that a customer must wait before it is taken up for service shall be \_\_\_\_\_.
- a) 12 minutes.
  - b) 8 minutes.**
  - c) 9 minutes.
  - d) 6 minutes.

- 95) The average arrival rate in a single server queuing system is 10 customers per hour and average service rate is 15 customers per hour. The average time that a customer must wait before it is taken up for service shall be \_\_\_\_\_.
- a) 12 minutes.
  - b) 8 minutes.**
  - c) 9 minutes.
  - d) 6 minutes.
- 96) The calling population is assumed to be infinite when\_\_\_\_\_.
- a) arrivals are independent of each other.**
  - b) capacity of the system is infinite.
  - c) service rate is faster than arrival rate.
  - d) all customers arrive at once.
- 97) The calling population is considered to be infinite when \_\_\_\_\_.
- a) all customers arrive at once.
  - b) capacity of the system is infinite.**
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- 98) The calling population is considered to be infinite when \_\_\_\_\_.
- a) all customers arrive at once.
  - b) capacity of the system is infinite.**
  - c) service rate is faster than arrival rate.
  - d) arrivals are independent of each other.
- 99) The coefficient of an artificial variable in the objective function of penalty method are always assumed to be \_\_\_\_\_.
- a) zero.
  - b) non-zero.
  - c) -1.
  - d) -M.**
- 100) The cost of a slack variable is \_\_\_\_\_.
- a) 1.
  - b) -1.
  - c) 0.**
  - d) M.
- 101) The cost of a surplus variable is \_\_\_\_\_.
- a) 1.
  - b) -1.
  - c) 0.**
  - d) M.

- 102) The difference between total and free float is \_\_\_\_\_.
- a) event float.
  - b) independent float.
  - c) interference float.**
  - d) critical path.
- 103) The dual of the dual is \_\_\_\_\_.
- a) dual.
  - b) primal-dual pair.
  - c) dual-primal pair.
  - d) primal.**
- 104) The dummy source or destination in a transportation problem is added to \_\_\_\_\_.
- a) satisfy rim conditions.**
  - b) prevent solution from becoming degenerate.
  - c) ensure that total cost does not exceed a limit.
  - d) the solution not be degenerate.
- 105) The EOQ model is based on all the following assumptions except \_\_\_\_\_.
- a) annual demand is known and constant.
  - b) estimates of carrying and ordering costs are accurate.
  - c) the ratio of ordering cost per order placed to carrying cost as a percentage of average inventory is always constant.**
  - d) instantaneous receipt of orders occurs exactly when previous inventory is just used up.
- 106) The EOQ model is of particular importance because \_\_\_\_\_.
- a) it is fairly simple and easy to understand.
  - b) it is the most realistic model which can be formulated.
  - c) there are only a few assumptions to satisfy and the needed information is always easy to obtain.**
  - d) no other model can be applied if it can not be used.
- 107) The following are assumptions of the EOQ model except \_\_\_\_\_.
- a) the usage rate is reasonably constant.
  - b) replenishment is not instantaneous.**
  - c) only one product is involved.
  - d) there are no quantity discount price.
- 108) The following may be used to find the EOQ except \_\_\_\_\_.
- a) optimal number of days supply to order.
  - b) number of orders which minimize ordering costs.
  - c) optimal number of rupees per order.
  - d) optimal number of orders per year.**



- 109) The general linear programming problem is in standard form if \_\_\_\_\_.
- the constraints are equations.**
  - the constraints are inequalities of  $>=$  type.
  - the constraints are equalities of  $<=$  type.
  - the decision variables are negative.
- 110) The Hungarian method used for finding the solution of the assignment problem is also called \_\_\_\_\_.
- reduced matrix method.
  - matrix minima method.
  - modi method.**
  - simplex method.
- 111) The initial event which has all outgoing arrows with no incoming arrow is numbered \_\_\_\_\_.
- 0.**
  - 2.
  - 1.
  - 3.
- 112) The initial solution of a transportation problem can be obtained by applying any known method. However, the only condition is that \_\_\_\_\_.
- the solution be optimal.
  - the rim conditions are satisfied.**
  - the solution not be degenerate.
  - the few allocations become negative.
- 113) The inventory level drops to a pre-specified level are called \_\_\_\_\_.
- periodic review.
  - continuous review.
  - inventory.
  - re-order point.**
- 114) The linear function to be maximized or minimized is called \_\_\_\_\_.
- injective function.
  - subjective function.
  - bijective function.
  - optional function.**
- 115) The master production schedule in MRP is used to specify \_\_\_\_\_.
- the raw materials required to complete the product.
  - the labor hours required for production.
  - what product is to be made, when, and what quantities.**
  - the financial resources required for production.

- 116) The method used to solve Linear Programming Problem without use of the artificial variable is called \_\_\_\_\_.
- a) **dual simplex method.**
  - b) transportation problem method.
  - c) big M method.
  - d) duality method.
- 117) The minimum number of lines covering all zeros in a reduced cost matrix of order  $n$  can be \_\_\_\_\_.
- a) **at the most  $n$ .**
  - b) at the least  $n$ .
  - c)  $n-1$ .
  - d)  $n + 1$ .
- 118) The minimum number of lines covering all zeros in a reduced cost matrix of order  $n$  can be \_\_\_\_\_.
- a) **at the most  $n$ .**
  - b) at the least  $n$ .
  - c)  $n-1$ .
  - d)  $n + 1$ .
- 119) The model in which only arrivals are counted and no departure takes place are called \_\_\_\_\_.
- a) **pure birth model.**
  - b) pure death model.
  - c) traffic intensity.
  - d) steady state.
- 120) The non basic variables are called \_\_\_\_\_.
- a) **shadow cost.**
  - b) opportunity cost.
  - c) artificial variable.
  - d) slack variable.
- 121) The number of time estimates involved in Program Evaluation Review Technique problem is \_\_\_\_\_.
- a) 2.
  - b) 3.**
  - c) 4.
  - d) 5.
- 122) The technique that relates costs to time and shows how to accelerate the project for the lowest possible cost is \_\_\_\_\_.
- a) minimize total project duration.
  - b) CPM**
  - c) PERT
  - d) maximize total project duration.

- 123) The objective of network analysis is to\_\_\_\_\_.
- a) **minimize total project duration.**
  - b) minimize total project cost.
  - c) minimize production delays, interruption and conflicts.
  - d) maximize total project duration.
- 124) The primary input for MRP which contains a listing of all assemblies, parts, and subassemblies that are needed to produce one unit of an end item is \_\_\_\_\_.
- a) the master production schedule.
  - b) **the bill of materials.**
  - c) the inventory record file.
  - d) the stochastic stock file.
- 125) The problem of replacement is felt when job performing units fail\_\_\_\_\_.
- a) **suddenly and gradually.**
  - b) either gradually.
  - c) either suddenly.
  - d) neither suddenly nor gradually.
- 126) The process that performs the services to the customer is known as \_\_\_\_\_.
- a) queue.
  - b) **service channel.**
  - c) balking.
  - d) jockeying.
- 127) The right hand side constant of a constraint in a primal problem appears in the~~~corresponding dual as\_\_\_\_\_.
- a) **a coefficient in the objective function.**
  - b) a right hand side constant of a function.
  - c) an input output coefficient.
  - d) a left hand side constraint coefficient variable.
- 128) The server utilization factor is also known as \_\_\_\_\_.
- a) erlang distribution.
  - b) poisson distribution.
  - c) exponential distribution.
  - d) **traffic intensity.**
- 129) The similarity between assignment problem and transportation problem is \_\_\_\_\_.
- a) both are rectangular matrices.
  - b) both are square matrices.
  - c) both can be solved by graphical method.
  - d) **both have objective function and non-negativity constraints.**

- 130) The slack variables indicate \_\_\_\_\_.
- a) excess resource available.
  - b) shortage of resource available.
  - c) nil resources.
  - d) idle resource.**
- 131) The solution to a transportation problem with m-sources and n-destinations is feasible if the numbers of allocations are \_\_\_\_\_.
- a)  $m+n+1$ .
  - b)  $mn$ .
  - c)  $m+n$ .
  - d)  $m+n-1$ .**
- 132) The time between the placement of an order and its delivery is called as \_\_\_\_\_.
- a) buffer time.
  - b) capital time.
  - c) EOQ.
  - d) lead time**
- 133) The total opportunity cost matrix is obtained by doing \_\_\_\_\_.
- a) row operation on row opportunity cost matrix.
  - b) by doing column operation on row opportunity cost matrix.**
  - c) by doing column operation on column opportunity cost matrix.
  - d) none of the above.
- 134) The transportation problem deals with the transportation of \_\_\_\_\_.
- a) a single product from a source to several destinations.**
  - b) a single product from several sources to several destinations.
  - c) a single product from several sources to a destination.
  - d) a multi-product from several sources to several destinations.
- 135) The transportation problem is balanced, if \_\_\_\_\_.
- a) total demand and total supply are equal and the number of sources equals the number of destinations.
  - b) none of the routes is prohibited.
  - c) total demand equals total supply irrespective of the number of sources and destinations.**
  - d) number of sources matches with number of destinations.
- 136) To resolve degeneracy at the initial solution, a very small quantity is allocated in \_\_\_\_\_ cell.
- a) occupied.
  - b) basic.
  - c) non-basic.
  - d) unoccupied.**

- 137) Transportation problem may have degenerate solution, if the number of \_\_\_\_\_.
- a) unoccupied (basic. cells is equal to  $m + n - 1$ ).
  - b) unoccupied cells is less than  $m + n - 1$ .
  - c) occupied cells is at least  $m + n - 1$ .
  - d) occupied cells is less than  $m + n - 1$ .**
- 138) Two-person zero-sum games is also called \_\_\_\_\_.
- a) zero-sum game.
  - b) two-person game.
  - c) value of the game.
  - d) matrix game.**
- 139) Using \_\_\_\_\_ method, we can never have an unbounded solution.
- a) simplex.
  - b) Big-M.
  - c) two-phase.
  - d) dual simplex.**
- 140) What type of distribution does a time follow in program evaluation review technique model?
- a) Poisson.
  - b) Normal.**
  - c) Binomial.
  - d) Beta.
- 141) When the total demand is equal to supply then the transportation problem is said to be \_\_\_\_\_.
- a) balanced.**
  - b) unbalanced.
  - c) maximization.
  - d) minimization.
- 142) When the total demand is not equal to supply then it is said to be \_\_\_\_\_.
- a) balanced.
  - b) unbalanced.**
  - c) maximization.
  - d) minimization.
- 143) When we solve a system of simultaneous linear equations by using two-phase method, the values of decision variables will be \_\_\_\_\_.
- a) positive.
  - b) negative.
  - c) zero.
  - d) positive and / or negative.**

- 144) Which of following are the ways for salesman who has to visit n cities?
- a)  $n!$ .
  - b)  $(n+a)!$ .
  - c)  $(n-a)!$ .**
  - d) n.
- 145) Which of the following inventory techniques are applicable for dependent demand items?
- a) EOQ.
  - b) ERL.
  - c) MRP.**
  - d) Back-ordering model.
- 146) Which of the following is not a part of holding (or carrying) costs?
- a) Rent for storage space.
  - b) Extra expenses for an overnight express mail.**
  - c) Spoilage costs.
  - d) Electricity and heat for the buildings.
- 147) Which of the following methods is used to verify the optimality of the current solution of the transportation problem?
- a) Least Cost Method.
  - b) Vogel's Approximation Method.
  - c) Modified Distribution Method.**
  - d) North-West Corner Rule.
- 148) Which of the following statement is correct?
- a) Re-order quantity in a "fixed "order-interval system equals EOQ.
  - b) Review period of the item is always kept higher than its lead time.
  - c) Re-order level of an item is always more than its minimum stock.**
  - d) Buffer stock is the total stock kept to meet the demand during lead time.
- 149) Which one of the following would not normally be a major input in the MRP system?
- a) Master production schedule.
  - b) Bill of materials.
  - c) Inventory record file.
  - d) System capacity.**
- 150) While solving a linear programming problem infeasibility may be removed by\_\_\_\_\_.
- a) adding another constraint.
  - b) adding another variable.
  - c) removing a constraint.**
  - d) removing a variable.

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