MULTIPLE CHOICE QUESTIONS

1. Which of the following is not correct ?
(*a*) The graphic approach to an LPP is most suitable when there are only two decision variables.
(*b*) A possible solution on the graph corresponds to every point (x, y).
(*c*) The graphic approach to an LPP is applicable when the number of decision variables are more than the number of constraints.
(*d*) The common region that satisfies all the contraints is called the feasible (convex) region.

2. A feasible solution to an LPP
(*a*) must satisfy all of the problem's constraints simultaneously.
(*b*) must be a corner point of the feasible region.
(*c*) need not satisfy all of the constraints, only some of them.
(*d*) must optimize the value of the objective function.

3. Which of the following is not correct ?
(*a*) The graphic approach to the solution of LPP's cannot handle problems with more than three variables.
(*b*) A feasible solution to an LPP is one that satisfies at least one of the constraints of the problem.
(*c*) An optimum solution to an LPP is a feasible solution which optimizes the objective function.
(*d*) The feasible region is also termed as the solution space.

4. Which of the following is not correct ?
(*a*) Feasible solution of an LPP is independent of the objective function.
(*b*) The feasible region of an LPP must be a convex set.
(*c*) The feasible region for a constraint is restricted if its '$\geq$' or '$\leq$' sign is replaced by a '=' sign.
(*d*) It is not possible to obtain feasible solution of an LPP by graphical method.

5. An iso-profit line represents
(*a*) an infinite number of solutions all of which yield the same profit.
(*b*) an infinite number of optimum solutions.
(*c*) an infinite number of solutions all of which yield the same cost.
(*d*) a boundary of the feasible region.

6. If an iso-profit line yielding the optimum solution coincides with a constraint line, then
(*a*) the solution is unbounded.
(*b*) the solution is infeasible.
(*c*) the constraint which coincides is redundant.
(*d*) none of the above.

7. If two constraints do not intersect in the positive quadrant of the graph, then
(*a*) one of the constraint is redundant.
(*b*) the solution is infeasible.
(*c*) the solution is unbounded.
(*d*) none of these.

8. Which of the following is not correct ?
(*a*) An infeasible solution exists, when there is no feasible solution.
(*b*) Iso-profit lines on a graph of an LPP would always be parallel to each other.
(*c*) An iso-cost line cannot be parallel to the line of any constraint.
(*d*) Every LPP has a unique optimum solution.

9. Using graphic method, the optimum solution of the LPP of maximizing $z = 10x + 15y$ subject to $2x + y \leq 26$, $x + 2y \leq 28$, $y - x \leq 5$ and $x \geq 0$, $y \geq 0$ is obtained as
(*a*) $x = 8$ and $y = 10$.
(*b*) $x = 6$ and $y = 1$.
(*c*) $x = 6$ and $y = 10$.
(*d*) $x = 8$ and $y = 8$.

10. Given an LPP to maximize $z = -5x_2$ subject to $x_1 + x_2 \leq 1$, $0.5x_1 + 5x_2 \geq 0$, and $x_1 \geq 0$, $x_2 \geq 0$. Using graphical method, we have
(*a*) no feasible solution.
(*b*) unbounded solution.
(*c*) unique optimum solution.
(*d*) multiple optimum solutions.

11. Which of the following is not correct ?
- (*a*) An LPP with an unbounded feasible region would obviously have unbounded solution.
- (*b*) For an LPP, the feasible region may change if non-binding constraints are deleted.
- (*c*) A redundant constraint represents an abundant resource.
- (*d*) It is possible for the objective function value of an LPP to be the same at two distinct extreme points.

12. The general linear programming problem is in standard form, if
- (*a*) the constraints are strict equations.
- (*b*) the constraints are inequalities of '≤' type.
- (*c*) the constraints are inequalities of '≥' type.
- (*d*) the decision variables are unrestricted in sign.

13. Which of the following is not correct ?
- (*a*) Graphical method of linear programming is not useful when there are only two decision variables.
- (*b*) Solution of a maximization LPP when permitted to be infinitely large is called unbounded.
- (*c*) Optimum solution to an LPP always lies at least on the two vertices of the feasible region.
- (*d*) It is possible for the objective function value of an LPP to be the same at two distinct extreme points.

14. Which of the following statements is wrong ?
- (*a*) Slack variables are used to convert the inequalities of the type '≤' into equations.
- (*b*) Surplus variables are used to convert the inequalities of the type '≥' into equations.
- (*c*) An LPP with all its constraints are of the type '≥' is said to be in *standard form*.
- (*d*) An LPP with all its constraints are of the type '≤' is said to be in *canonical form*.

ANSWERS

1. (*c*)	**2.** (*a*)	**3.** (*b*)	**4.** (*d*)	**5.** (*a*)
6. (*d*)	**7.** (*b*)	**8.** (*c*)	**9.** (*a*)	**10.** (*a*)
11. (*b*)	**12.** (*a*)	**13.** (*c*)	**14.** (*c*).	

REVIEW QUESTIONS

1. What are the essential characteristics of a linear programming model? *[Madurai M.Com. (Nov.) 2002]*

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MULTIPLE CHOICE QUESTIONS

1. Given a system of m simultaneous linear equations in n unknowns ($m < n$), the number of basic variables will be

(a) m, (b) n,
(c) $n - m$, (d) $n + m$.

2. Which of the following is not correct ?

(a) The general LPP with m constraints in n unknowns ($m < n$) gives $\binom{n}{m}$ basic solutions.

(b) A basic solution that satisfies all the constraints and non- negative restrictions is called a basic feasible solution.

(c) A basic solution in which at least one basic variable vanishes is zero is called a non-degenerate basic solution.

(d) The basic feasible solution which maximizes or minimizes the objective function is called an optimum basic feasible solution.

3. Which of the following is not correct ?

(a) Simplex method is an iterative process which involves the substitution of variables for obtaining successively better solutions.

(b) Solution by Simplex method requires that an LPP should have at least one non-negative values in the right hand side of the constraints.

(c) For solving an LPP by Simplex method, it is essential that all variables involved are non-negative.

(d) Simplex method requires that all the constraints should be first converted into equations.

4. For maximization linear programming problem, the simplex method is terminated when all the net-evaluations are

(a) negative, (b) non-negative,
(c) zero, (d) non- positive.

5. A necessary and sufficient condition for a basic feasible solution to a minimization LPP to be an optimum is that (for all j) :

(a) $z_j - c_j \geq 0$, (b) $z_j - c_j \leq 0$,
(c) $z_j - c_j = 0$, (d) $z_j - c_j > 0$ or $z_j - c_j < 0$.

6. At any iteration of the usual Simplex method, if there is at least one basic variable in the basis at zero level and all $(z_j - c_j) \geq 0$, the current solution is

(a) Infeasible, (b) Unbounded,
(c) Non-degenerate, (d) Degenerate.

7. The role of artificial variables in simplex method is
   (a) to aid in finding initial basic feasible solution.
   (b) to start phases of simplex method.
   (c) to find shadow prices from the final simplex table.
   (d) none of the above.

8. For maximization LPP, the objective function coefficient for an artificial variable is
   (a) $+M$, (b) $-M$,
   (c) $+1$, (d) zero.

9. In a maximization LPP, if at least one artificial variable is in the basis, but not at zero level and the coefficient of M in each of the net evaluation $(z_j - c_j)$ is non-negative, then we have
   (a) a feasible solution, (b) no feasible solution
   (c) an unbounded solution, (d) an optimum solution.

10. In final (optimum) simplex table, if $z_j - c_j = 0$ for at least one non-basic variable, then there will be
   (a) an unbounded solution, (b) infeasible solution,
   (c) alternative solution, (d) cycling.

11. If a negative value appears in the solution values (x_B) coloumn of the simplex method, then
   (a) the basic solution is optimum, (b) the basic solution is infeasible,
   (c) the basic solution is unbounded, (d) all of the above.

12. If an optimum solution is degenerate, then
   (a) the solution is infeasible. (b) there are alternative optimum solutions.
   (c) the solution is of no use to the decision maker. (d) none of the above.

13. Which of the following is not correct ?
   (a) Degeneracy in an LPP may arise at the initial stage.
   (b) A degenerate solution can never be optimum.
   (c) Degeneracy may be a temporary phenomenon.
   (d) The Big-M method and the Two- Phase method do not require the same number of iterations for solving an LPP.

14. When we solve a system of simultaneous linear equations by using *Two-Phase Simplex Method*, the values of decision variables may be
   (a) positive. (b) negative,
   (c) zero. (d) positive and/or negative.

15. Which of the following is not correct ?
   (a) An LPP may have no optimum solution, a unique and optimum solution, multiple optimum solution, or an unbounded solution.
   (b) In the optimum solution to an LPP if a basic variable is zero, then multiple optimum solutions are indicated.
   (c) Multiple optimum solutions to an LPP would all have the same objective function values and would consume the same amount of the resources.
   (d) The inverse of a square matrix can be obtained by using *Simplex method*.

16. In the context of LPP, which of the following is not correct ?
   (a) When the constraints are of '≥' type, surplus variables are introduced to convert them into equations.
   (b) Artificial variables are no tangible relationship with the decision variables.
   (c) Surplus variables cannot appear in the basis of the optimum solution to an LPP.
   (d) An artificial variable can be dropped for further calculations once it becomes non-basic or gets removed at any stage.

ANSWERS

1. (a)	2. (c)	3. (b)	4. (b)	5. (b)
6. (d)	7. (a)	8. (b)	9. (b)	10. (c)
11. (b)	12. (c)	13. (b)	14. (d)	15. (b)
16. (c)				