Unit 5 : Week 5 - Quiz 5

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1. Machinery usage, labor volume, money spent, time used, warehouse space used, and material usage are resources that management need to control and program for. (Points : 1)

- True
- False

2. Computer programming forms the basis of linear programming because the word programming is an adjunct of computer programming.
(Points : 1)

- True
- False

3. The graphical method can be used to solve any linear programming problem.
(Points : 1)

- True
- False

4. In Linear Programming formulation, the requirement is to find the maximum value of an objective while simultaneously maximizing usage of the resource constraints.

(Points : 1)

- True
- False

5. The feasible region in graphical linear programming is the set of solution points that satisfies all of a linear programming problem's constraints simultaneously.

(Points : 1)

- True
- False

6. An objective function is necessary in a maximization problem but is not required in a minimization problem.
(Points : 1)

- True
- False

7. We have the possibility of multiple solutions any time that we have an isoprofit line that is parallel to a constraint. (Points : 1)

- True
- False

8. We have a condition called unboundedness when two or more constraints conflict with one another,

(Points : 1)

- True
- False

9. Sensitivity analysis enables us to look at the effects of changing the coefficients in the objective function, one at a time. (Points : 1)

- True
- False

10.

The existence of non-negativity objective function in a two-variable linear program implies that we are always working in the northeast quadrant of a graph.

(Points : 1)

- True
- False

11.

Which of the following is not a property of all linear programming problems?

A) the presence of restrictions

B) optimization of some objective

C) a computer program

D) alternate courses of action to choose from

E) usage of only linear equations and inequalities

(Points : 1)

- A
- B
- C
- D
- E

12.

A feasible solution to a linear programming problem

A) must be a corner point of the feasible region.

B) must satisfy all of the problem's constraints simultaneously.

C) need not satisfy all of the constraints, only the non-negativity constraints.

D) must give the maximum possible profit.

E) must give the minimum possible cost.

(Points : 1)

- A
- B
- C
- D
- E

13.

Infeasibility in a linear programming problem occurs when

A) there is an infinite solution.

B) a constraint is redundant.

C) more than one solution is optimal.

D) the feasible region is unbounded.

E) there is no solution that satisfies all the constraints given.

F) none of the above
(Points : 1)

- A
- B
- C
- D
- E
- F

14.

In a maximization problem, when one or more of the solution variables and the profit can be made infinitely large without violating any constraints, the linear program has

A) an infeasible solution.

B) an unbounded solution.

C) a redundant constraint.

D) alternate optimal solutions.

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

15.

In order for a linear programming problem to have a unique solution, the solution must exist

A) at the intersection of the non-negativity constraints.

B) at the intersection of a non-negativity constraint and a resource constraint.

C) at the intersection of the objective function and a constraint.

D) at the intersection of two or more constraints.

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

16.

When appropriate, the optimal solution to a maximization linear programming problem can be found by graphing the feasible region and

A) finding the profit at every corner point of the feasible region to see which one gives the highest value.

B) moving the isoprofit lines towards the origin in a parallel fashion until the last point in the feasible region is encountered.

C) locating the point that is highest on the graph.

D) None of the above

E) All of the above

(Points : 1)

- A
- B
- C
- D
- E

17.

The simultaneous equation method is

A) an alternative to the corner point method.

B) useful only in minimization methods.

C) an algebraic means for solving the intersection of two or more constraint equations.

D) useful only when more than two product variables exist in a product mix problem.

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

18.

Consider the following linear programming problem:

Maximize 10X + 12Y
Subject to: 4X + 2Y </= 380
2X + 3Y </= 360

The maximum possible value for the objective function is

A) 360.

B) 480.

C) 1520.

D) 1460.

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

19.

Consider the following constraints from a linear programming problem:

$2X + Y \leq 200$

$X + 2Y \leq 200$

$X, Y \geq 0$

If these are the only constraints, which of the following points (X,Y) cannot be the optimal solution?

A) (0, 0)

B) (0, 200)

C) (0,100)

D) (100, 0)

E) (66.67, 66.67)

(Points : 1)

- A
- B
- C
- D
- E

20.

Consider the following linear programming problem:

Maximize 5X + 6Y
Subject to: 4X + 2Y <= 420
X + 2Y <= 120
X and Y >= 0

Which of the following points (X,Y) is not a feasible corner point?

A) (0,80)

B) (115,0)

C) (120,0)

D) (110,10)

E) None of the above

F) All of the above

(Points : 1)

- A
- B
- C
- D
- E
- F

21.

Connie's manufacturing plant produces two models of a product — King (X) and Queen(Y). A linear programming model is used to determine the production schedule. The formulation is as follows:

Maximize 50X + 60Y
Subject to: 8X + 10Y <= 800 (labor hours)
4X + 5Y <= 500 (raw materials)
X + Y <= 120 (total units demanded)
X and Y >= 0

The optimal solution is X = 100, Y = 0.

How many units of the King model would be produced based on this solution?

A) 0

B) 100

C) 5000

D) 120

E) None of the above

F) Cannot be determine using the information given

(Points : 1)

- A
- B
- C
- D
- E
- F

22. Consider the following linear programming problem:

Maximize $20X + 30Y$
Subject to: $X + Y <= 80$
$6X + 12Y <= 600$
X and $Y >= 0$

This is a special case of a linear programming problem in which

A) there is no feasible solution.

B) there is a redundant constraint.

C) there are multiple optimal solutions.

D) this cannot be solved graphically.

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

23.

If one changes the contribution rates in the objective function of an LP,

A) the feasible region will change.

B) the slope of the isoprofit or isocost line will change.

C) the optimal solution to the LP is sure to no longer be optimal.

D) All of the above

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

24.

Sensitivity analyses are used to examine the effects of changes in

A) contribution rates for each variable.

B) technological coefficients.

C) available resources.

D) All of the above

E) None of the above

(Points : 1)

- A
- B
- C
- D
- E

25.

If the addition of a constraint to a linear programming problem does not change the solution, the constraint is said to be

A) unbounded.

B) non-negative.

C) infeasible.

D) redundant.

E) bounded.

(Points : 1)

- A
- B
- C
- D
- E

26.

One basic assumption of linear programming is proportionality. Explain its need.

(Points : 2)

Spellchecker

27. One basic assumption of linear programming is divisibility. Explain its need. (Points : 2)

Spellchecker

28. Define infeasibility with respect to an LP solution. (Points : 2)

Spellchecker

29. Given the case of alternate optimal solutions, as a special case in linear programming, compare this case (alternate optimal solutions) to the two other special cases of linear programming: infeasibility and unboundedness? (Points : 3)

Spellchecker

30.

After solving a minimization problem, Christina finds that the optimal value of the objective function is $300

Based on new information Christina received from a market report, she needs to add an additional constraint to her original linear program problem. How might adding the new constraint affect each of the following:

(a) the feasible region,(2 points)

(b) the optimal value of the objective function. (2 points)

(Points : 4)

Spellchecker

31. Consider the following Linear Programming problem:
Maximize 20X + 30Y
Subject to: X + Y <= 80
8X + 9Y <= 600
3X + 2Y >= 400 X and Y >= 0

The feasible solution to this problem is: (Points : 3)

Spellchecker

32. Formulate the LP Problem:

Tonya's furniture company is producing two types of bed frames, King and Queen. The King size frame requires 8 board feet of wood and 2 lbs of wicker. The Queen size frame requires 6 board feet of wood and 6 lbs of wicker. There are 2000 board feet of wood available for product and 1000 lbs of wicker. The King frame earns a profit margin of $30 a unit and the Queen frame earns a profit margin of $40 a unit. Formulate the problem as a linear program. (Points : 3)

Spellchecker

33.

Al's Dog Food Company wishes to introduce a new brand of dog biscuits (composed of chicken and liver-flavored biscuits) that meets certain nutritional requirements. The liver-flavored biscuits contain 1 unit of nutrient A and 2 units of nutrient B, while the chicken-flavored ones contain 1 unit of nutrient A and 4 units of nutrient B. According to federal requirements, there must be at least 40 units of nutrient A and 60 units of nutrient B in a package of the new biscuit mix. In addition, the company has decided that there can be no more than 15 liver-flavored biscuits in a package. If it costs 1 cent to make a liver-flavored biscuit and 2 cents to make a chicken-flavored one, what is the optimal product mix for a package of the biscuits in order to minimize the Al's cost?

(a) Formulate this as a linear programming problem.(4 points)

(b) Identify the corner points, identify which corner point is optimal, and find the optimal solution for this problem. (3 points)

(c) Are any constraints redundant? If so, which one or ones and why? (2 points)

(d) What is the total cost of a package of dog biscuits using the optimal mix? (1 points)

(Points : 10)

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