Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –Optimization Techniques
Course Code - GEBS401

* You can submit the form ONLY ONCE.
* Fill the following information for further process.

* Required

1. Email *

2. Name of the Student *

3. Enter Full Student Code *

4. Enter Roll No *

5. Enter Registration No *

6. Enter Course Code *

7. Enter Course Name *

8. *

Mark only one oval.

- Diploma in Pharmacy
- Bachelor of Pharmacy
- B.TECH.(CSE)
- B.TECH.(ECE)
- BCA
- B.SC.(CS)
- B.SC.(BT)
- B.SC.(ANCS)
- B.SC.(HN)
- B.Sc.(MM)
- B.A.(MW)
- BBA
- B.COM
- B.A.(JMC)
- BBA(HM)
- BBA(LLB)
- B.OPTOMETRY
- B.SC.(MB)
- B.SC.(MLT)
- B.SC.(MRIT)
- B.SC.(PA)
- LLB
- B.SC(IT)-AI
- B.SC.(MSJ)
- Bachelor of Physiotherapy
- B.SC.(AM)
- Dip.CSE
- Dip.ECE
- DIP.EE
- DIP.CE

- DIP.ME
- PGDHM
- MBA
- M.SC.(BT)
- M.TECH(CSE)
- LLM
- M.A.(JMC)
- M.A.(ENG)
- M.SC.(MATH)
- M.SC.(MB)
- MCA
- M.SC.(MSJ)
- M.SC.(AM)
- M.SC.CS)
- M.SC.(ANCS)
- M.SC.(MM)
- B.A.(Eng)

Answer all the questions. Each question carry one mark.

9. 1. A shop can make two types of sweets (A and B). They use two resources – flour and sugar. To make one packet of A, they need 2 kg of flour and 5 kg of sugar. To make one packet of B, they need 3 kg of flour and 3 kg of sugar. They have 25 kg of flour and 28 kg of sugar. These sweets are sold at Rs 800 and 900 per packet respectively. Find the best product mix.An appropriate objective function for this problem is to

Mark only one oval.

- Maximize total revenue
- Minimize total cost
- Maximize the total units of products produced.
- None of these

10. 2. A shop can make two types of sweets (A and B). They use two resources – flour and sugar. To make one packet of A, they need 2 kg of flour and 5 kg of sugar. To make one packet of B, they need 3 kg of flour and 3 kg of sugar. They have 25 kg of flour and 28 kg of sugar. These sweets are sold at Rs 800 and 900 per packet respectively. Find the best product mix.The number of decision variables is

____

Mark only one oval.

- 1
- 2
- 3
- 4

11. 3. A shop can make two types of sweets (A and B). They use two resources – flour and sugar. To make one packet of A, they need 2 kg of flour and 5 kg of sugar. To make one packet of B, they need 3 kg of flour and 3 kg of sugar. They have 25 kg of flour and 28 kg of sugar. These sweets are sold at Rs 800 and 900 per packet respectively. Find the best product mix.The number of constraints is

____

Mark only one oval.

- 2
- 3
- 4
- 5

12. 4. A company makes two products (A and B) and both require processing on 2 machines. Product A takes 10 and 15 minutes on the two machines per unit and product B takes 22 and 18 minutes per unit on the two machines. Both the machines are available for 2640 minutes per week. The products are sold for Rs 200 and Rs 175 respectively per unit. Formulate a LP to maximize revenue? The market can take a maximum of 150 units of product.An appropriate objective function for this problem is to

Mark only one oval.

- Maximize total revenue
- Minimize total cost
- Maximize the total units of products produced.
- None of these

13. 5. A company makes two products (A and B) and both require processing on 2 machines. Product A takes 10 and 15 minutes on the two machines per unit and product B takes 22 and 18 minutes per unit on the two machines. Both the machines are available for 2640 minutes per week. The products are sold for Rs 200 and Rs 175 respectively per unit. Formulate a LP to maximize revenue? The market can take a maximum of 150 units of product .The number of decision variables is ____________

Mark only one oval.

- 1
- 2
- 3
- 4

14. 6. A company makes two products (A and B) and both require processing on 2 machines. Product A takes 10 and 15 minutes on the two machines per unit and product B takes 22 and 18 minutes per unit on the two machines. Both the machines are available for 2640 minutes per week. The products are sold for Rs 200 and Rs 175 respectively per unit. Formulate a LP to maximize revenue? The market can take a maximum of 150 units of product .The number of constraints is ________________

Mark only one oval.

- 1
- 2
- 4
- 5

15. 7. An investor has Rs 20 lakhs with her and considers three schemes to invest the money for one year.The expected returns are 10%, 12% and 15% for the three schemes per year. The third scheme accepts only up to 10 lakhs. The investor wants to invest more money in scheme 1 than in scheme 2.The investor assesses the risk associated with the three schemes as 0 units, 10 units and 20 units per lakh invested and does not want her risk to exceed 500 units.Which of the following is the correct decision variable?

Mark only one oval.

- Amount of money invested in each scheme
- Amount of revenue obtained from each scheme
- Amount of risk through investment in each scheme
- Total amount that can be obtained from the investments

16. 8. An investor has Rs 20 lakhs with her and considers three schemes to invest the money for one year.The expected returns are 10%, 12% and 15% for the three schemes per year. The third scheme accepts only up to 10 lakhs. The investor wants to invest more money in scheme 1 than in scheme 2.The investor assesses the risk associated with the three schemes as 0 units, 10 units and 20 units per lakh invested and does not want her risk to exceed 500 units.How many decision variables are in your formulation?

Mark only one oval.

- 1
- 2
- 3
- 4

17. 9. An investor has Rs 20 lakhs with her and considers three schemes to invest the money for one year.The expected returns are 10%, 12% and 15% for the three schemes per year. The third scheme accepts only up to 10 lakhs. The investor wants to invest more money in scheme 1 than in scheme 2.The investor assesses the risk associated with the three schemes as 0 units, 10 units and 20 units per lakh invested and does not want her risk to exceed 500 units.How many constraints are in your formulation?

Mark only one oval.

- 2
- 3
- 4
- 5

18. 10. An investor has Rs 20 lakhs with her and considers three schemes to invest the money for one year.The expected returns are 10%, 12% and 15% for the three schemes per year. The third scheme accepts only up to 10 lakhs. The investor wants to invest more money in scheme 1 than in scheme 2.The investor assesses the risk associated with the three schemes as 0 units, 10 units and 20 units per lakh invested and does not want her risk to exceed 500 units.How many greater than or equal to constraints are in your formulation. (To answer this question you should write your constraints such that the right hand side value is non negative)

Mark only one oval.

- 1
- 2
- 3
- 4

19. 11. Two tasks have to be completed and require 10 hours and 12 hours of work if one person does the tasks. If n people do task 1, the time to complete the task becomes 10/n and so on. Similarly if n people do task 2, the time becomes 12/n and so on. We have 5 people and they have to be assigned to the two tasks. We cannot assign more than three to task 1. Find the earliest time that both tasks are completed if they start at the same time. (Use ideas from the bicycle problem to write your objective function. At some point you may have to define a variable to represent the reciprocal of another variable). Formulate an LP problem and answer the following:The final objective function is

Mark only one oval.

- Maximization problem with one term in the objective function
- Minimization problem with one term in the objective function
- Maximization problem with two terms in the objective function
- Minimization problem with two terms in the objective function

20. 12. Two tasks have to be completed and require 10 hours and 12 hours of work if one person does the tasks. If n people do task 1, the time to complete the task becomes 10/n and so on. Similarly if n people do task 2, the time becomes 12/n and so on. We have 5 people and they have to be assigned to the two tasks. We cannot assign more than three to task 1. Find the earliest time that both tasks are completed if they start at the same time. (Use ideas from the bicycle problem to write your objective function. At some point you may have to define a variable to represent the reciprocal of another variable). Formulate an LP problem and answer the following:The total number of constraints in the final formulation is

Mark only one oval.

- 1
- 2
- 3
- 4

21. 13. TV sets are to be transported from three factories to three retail stores. The available quantities are 300, 400 and 500 respectively in the three factories and the requirements are 250, 350 and 500 in the three stores. They are first transported from the factories to warehouses and then sent to the retail stores. There are two warehouses and their capacities are 600 and 700 units. The unit costs of transportation from the factories to warehouses and from the warehouses to retail stores are known. Formulate an LP and answer the following questions:The number of terms in the objective function is

Mark only one oval.

- 6
- 8
- 12
- 18

22. 14. TV sets are to be transported from three factories to three retail stores. The available quantities are 300, 400 and 500 respectively in the three factories and the requirements are 250, 350 and 500 in the three stores. They are first transported from the factories to warehouses and then sent to the retail stores. There are two warehouses and their capacities are 600 and 700 units. The unit costs of transportation from the factories to warehouses and from the warehouses to retail stores are known. Formulate an LP and answer the following questions:The number of decision variables in the formulation is

Mark only one oval.

- 8
- 10
- 12
- 18

23. 15. TV sets are to be transported from three factories to three retail stores. The available quantities are 300, 400 and 500 respectively in the three factories and the requirements are 250, 350 and 500 in the three stores. They are first transported from the factories to warehouses and then sent to the retail stores. There are two warehouses and their capacities are 600 and 700 units. The unit costs of transportation from the factories to warehouses and from the warehouses to retail stores are known. Formulate an LP and answer the following questions:The number of constraints in the formulation is

Mark only one oval.

- 6
- 8
- 10
- 12

24. 16. Consider a transportation problem with 3 supply points and 4 demand points. The number of variables in the formulation is

Mark only one oval.

- 3
- 4
- 7
- 12

25. 17. Consider a transportation problem with 3 supply points and 4 demand points. The number of constraints in the formulation is

Mark only one oval.

- 3
- 6
- 7
- 10

26. 18. In a m x n balanced transportation problem the number of allocations in a non-degenerate basic feasible solution is

Mark only one oval.

- m
- n
- mn
- m+n-1

27. 19. The initial solution to a transportation problem can be generated in any manner, so long as

Mark only one oval.

- it minimizes cost
- it ignores cost
- all supply and demand are satisfied
- degeneracy does not exist

28. 20. In transportation model analysis the stepping-stone method is used to

Mark only one oval.

- obtain an initial optimum solution
- obtain an initial feasible solution
- evaluate empty cells for potential solution improvements
- evaluate empty cells for possible degeneracy

29. 21. A transportation problem has a feasible solution when

Mark only one oval.

- all of the improvement indexes are positive
- all the squares are used
- the solution yields the lowest possible cost
- all demand and supply constraints are satisfied

30. 22. When dealing with assignment problems in which we are assigning people to activities based on the cost, what is the Hungarian Algorithm used for?

Mark only one oval.

- To minimize cost
- To maximize cost
- To assign all of the activities to just one person
- To find more people that we can assign activities to

31. 23. How many feasible solutions does a 5 x 5 assignment problem have?

Mark only one oval.

- 5!
- 4!
- 6!
- 3!

32. 24. How many variables does the dual of 5 x 5 assignment problem have?

Mark only one oval.

- 9
- 10
- 11
- 12

33. 25. In a fair game the value of the game is

Mark only one oval.

- Positive
- 0
- Negative
- Can't say anything

34. 26. The point of intersection of pure strategies in a game is called

Mark only one oval.

- Value of the game
- Saddle point
- Mixed strategy
- Optimal strategy

35. 27. In game theory, a situation in which one firm can gain only what another firm loses is called a

Mark only one oval.

- nonzero-sum game.
- prisoners' dilemma.
- zero-sum game.
- cartel temptation.

36. 28. Which of the following is a zero-sum game?

Mark only one oval.

- Prisoners' dilemma
- Chess
- A cartel member's decision regarding whether or not to cheat
- All of these

37. 29. A plan of action that considers the reactions of rivals is an example of

Mark only one oval.

- accounting liability.
- strategic behavior.
- accommodating behavior.
- a. risk management.

38. 30. How many constraints does the dual of the 5 x 5 assignment problem have?

Mark only one oval.

- 15
- 20
- 25
- 30

39. 31. The measure that shows the change in the optimal objective function value for a unit increase in a constraint RHS value is the

Mark only one oval.

- allowable increase
- allowable decrease
- reduced cost
- shadow price

40. 32. The measure that compares the marginal contribution of a variable with the marginal worth of the resources it consumes is the

Mark only one oval.

- reduced cost
- allowable increase
- shadow price
- allowable decrease

41. 33. For a constraint, the Allowable Increase column in the Sensitivity Report shows

Mark only one oval.

- the allowable increase in the objective value
- the allowable increase in the shadow price
- the allowable increase in the RHS value of the constraint for which the current optimal corner point remains optimal
- None of these

42. 34. The pricing out procedure allows us to

Mark only one oval.

- analyze the impact of changes in the selling price of existing product.
- analyze simultaneous changes in parametric values.
- analyze the impact of the introduction of a new variable.
- analyze the impact of changes in the cost of resources.

43. 35. If the objective function co efficient of a variable changes within its allowable range

Mark only one oval.

- the current variable values remain the same but the objective value changes
- the current variable values and the objective value change
- the current variable values and the objective value remain the same.
- None of these.

44. 36. Consider the following statements:(a) Revised simplex method requires lesser computations than simplex method.(b) Revised simplex method automatically generates the inverse of the current basis matrix.(c) Less number of entries are needed in each table of revised simplex method than usual simplex method. Which of these statements are correct?

Mark only one oval.

- Only (a) and (b)
- only (a) and (c)
- only (b) and (c)
- all statements are correct

45. 37. Every feasible solution to the dual (minimization problem) has an objective function greater than or equal to that of every feasible solution to the primal. This theorem is

Mark only one oval.

- Weak duality theorem
- Optimality criterion theorem
- Main duality theorem
- Complimentary slackness theorem

46. 38. If the primal (maximization) is unbounded the corresponding dual is _______

Mark only one oval.

- bounded
- unbounded
- infeasible
- none of these

47. 39. If the primal (maximization) has an objective function value of 100 at the optimum, which of the following is true?

Mark only one oval.

- Dual has an objective function value greater than 100 at optimum
- Dual has an objective function value lesser than 100 at optimum
- Dual has an objective function value equal to 100 at optimum
- Dual's objective function value at optimum does not depend on the objective function value of the primal

48. 40.

Consider the LP problem:
Maximize $5X_1 + 12X_2$
subject to $2X_1 + 5X_2 \leq 13$
$7X_1 + 11X_2 \leq 31$
$X_1, X_2 \geq 0$. Solve this problem using Simplex algorithm and answer the following:
At the optimum, which of the following is NOT TRUE

Mark only one oval.

- The value of the objective function is 408/13
- Variables X1 and X2 are in the basis
- The dual has variables Y1 and Y3 in the basis
- The shadow price of the first primal resource is non zero.

49. 41.

Consider the LP problem:
Maximize $5X_1 + 12X_2$
subject to $2X_1 + 5X_2 \leq 13$
$7X_1 + 11X_2 \leq 31$
$X_1, X_2 \geq 0$. Solve this problem using Simplex algorithm and answer the following:
The objective function value after first iteration is ____

Mark only one oval.

- 28.8
- 30.0
- 31.2
- 32.2

50. 42.

Consider the LP
Maximize $2X_1 + 3X_2 + 4X_3 + X_4$
subject to $X_1 + 2X_2 + 5X_3 + X_4 \leq 12$.
$Xj \geq 0$. Solve the dual and find the optimum solution to the primal.
If 100 units of the resource are available, the value of the objective function at optimum is _______

Mark only one oval.

- 120
- 180
- 200
- 240

51. 43.

Consider the LP
Maximize $2X_1 + 3X_2 + 4X_3 + X_4$
subject to $X_1 + 2X_2 + 5X_3 + X_4 \leq 12$.
$Xj \geq 0$. Solve the dual and find the optimum solution to the primal.
Only 11 units of the resource is available. The value of the objective function at optimum is ___________

Mark only one oval.

- 18
- 20
- 22
- 24

52. 44.

Consider the LP
Maximize $2X_1 + 3X_2 + 4X_3 + X_4$
subject to $X_1 + 2X_2 + 5X_3 + X_4 \leq 12$.
$Xj \geq 0$. Solve the dual and find the optimum solution to the primal.
Which of the statements is TRUE?

Mark only one oval.

- A single constrained LP can have more than one variable taking non zero value at the optimum
- The variable with the largest coefficient in the objective function is the only variable with a non-zero value in the optimum solution.
- The variable with the smallest coefficient in the constraint is the only variable with a non-zero value in the optimum solution.
- The variable with the largest ratio of the objective function coefficient to constraint coefficient is the only variable with a non-zero value in the optimum solution.

53. 45.

Write the LP dual to the problem.
Minimize $2X_1 + 3X_2$
subject to
$X_1 + X_2 \geq 4$
$2X_1 + 4X_2 \geq 10$
$X_1, X_2 \geq 0$.
The shadow price of the first resource is____________

Mark only one oval.

- 1
- 2
- 3
- 4

54. 46.

Consider the LP
Maximize $9X_1 + 3X_2$
subject to $4X_1 + X_2 \leq 12$
$2X_1 + 4X_2 \leq 22$
$X_1, X_2 \geq 0$.
Solve the primal using the graphical method. Is a dual solution $Y_1 = 15/7$, $Y_2 = 3/14$ optimum?

Mark only one oval.

- It is not optimum to the dual because it is not feasible to the dual
- The dual solution is feasible but not optimum because the objective function value is different from that of the primal
- It is optimum using the optimality criterion theorem
- Weak duality theorem is violated.

55. 47.

Solve the LP problem using Simplex algorithm
Minimize $2X_1 + 3X_2$
subject to
$X_1 + X_2 \geq 4$
$X_1 \leq 1$
$X_1, X_2 \geq 0$ using the simplex algorithm.
The value of X_2 at the optimum is _____

Mark only one oval.

- 1
- 2
- 3
- 4

56. 48.

Solve the LP problem using Simplex algorithm
Minimize $2X_1 + 3X_2$
subject to
$X_1 + X_2 \geq 4$
$X_1 \leq 1$
$X_1, X_2 \geq 0$ using the simplex algorithm.
The value of the objective function at the optimum is _____

Mark only one oval.

- 7
- 9
- 10
- 11

57. 49.

Solve the LP problem using Simplex algorithm
Minimize $9X_1 + 3X_2$
subject to
$4X_1 + X_2 \geq 12$
$7X_1 + 4X_2 \leq 16$
$X_1, X_2 \geq 0$ using the simplex algorithm.
Which of the following is the correct answer

Mark only one oval.

- The optimum solution is (0, 4)
- The problem is unbounded
- The problem is infeasible with simplex showing artificial variable a1 = 20/7 at optimum
- The problem is infeasible with simplex showing artificial variable a1 = 3 at

58. 50.

Solve the LP problem
Maximize $9X_1 + 3X_2 + 5X_3$
subject to
$4X_1 + X_2 + X_3 \leq 12$
$2X_1 + 4X_2 + 3X_3 \leq 22$
$5X_1 + 2X_2 + 4X_3 \leq 34$
$X_1, X_2, X_3 \geq 0$ using the simplex algorithm and answer the following questions.
The number of iterations taken by simplex (after the initial table) to reach the optimum is _____

Mark only one oval.

- 1
- 2
- 3
- 4

59. 51.

Solve the LP problem
Maximize $4X_1 + 3X_2 + 5X_3$
subject to
$X_1 + X_2 + X_3 \leq 10$
$2X_1 + X_2 + 3X_3 \leq 20$
$3X_1 + 2X_2 + 4X_3 \leq 30$
$X_1, X_2, X_3 \geq 0$ using the simplex algorithm and answer the following questions. If you have a tie to decide a leaving variable, break the tie arbitrarily.
How many $C_j - Z_j$ values are zero at the optimum?

Mark only one oval.

- 1
- 2
- 3
- 4

60. 52.

Solve the LP problem
Maximize $4X_1 + 3X_2 + 5X_3$
subject to
$X_1 + X_2 + X_3 \leq 10$
$2X_1 + X_2 + 3X_3 \leq 20$
$3X_1 + 2X_2 + 4X_3 \leq 30$
$X_1, X_2, X_3 \geq 0$ using the simplex algorithm and answer the following questions. If you have a tie to decide a leaving variable, break the tie arbitrarily.
How many iterations, after the initial table did you take to reach the optimum

Mark only one oval.

- 1
- 2
- 3
- 4

61. 53.

Solve the LP problem
Maximize $4X_1 + 3X_2 + 5X_3$
subject to
$X_1 + X_2 + X_3 \leq 10$
$2X_1 + X_2 + 3X_3 \leq 20$
$3X_1 + 2X_2 + 4X_3 \leq 30$
$X_1, X_2, X_3 \geq 0$ using the simplex algorithm and answer the following questions. If you have a tie to decide a leaving variable, break the tie arbitrarily.
How many variables are there in the initial Simplex table

Mark only one oval.

- 3
- 4
- 5
- 6

62. 54.

Solve the LP problem
Maximize $4X_1 + 3X_2 + 5X_3$
subject to
$X_1 + X_2 + X_3 \leq 10$
$2X_1 + X_2 + 3X_3 \leq 20$
$3X_1 + 2X_2 + 4X_3 \leq 30$
$X_1, X_2, X_3 \geq 0$ using the simplex algorithm and answer the following questions. If you have a tie to decide a leaving variable, break the tie arbitrarily.
What is the value of the objective function at the optimum

Mark only one oval.

- 20
- 30
- 40
- 50

63. 55.

Solve the LP problem
Maximize $3X_1 + 8X_2$
subject to
$3X_1 + 5X_2 \leq 16$
$5X_1 + 3X_2 \leq 12$
$X_1, X_2 \geq 0$
Using the simplex algorithm.
The value of objective function at optimum is _______

Mark only one oval.

- 25.2
- 25.4
- 25.6
- 25.8

64. 56.

Solve the LP problem
Maximize $3X_1 + 8X_2$
subject to
$3X_1 + 5X_2 \leq 16$
$5X_1 + 3X_2 \leq 12$
$X_1, X_2 \geq 0$
Using the simplex algorithm.
The optimum solution has X_2 = _____

Mark only one oval.

- 3.1
- 3.2
- 3.3
- 3.4

65. 57.

Consider the LP problem:
Maximize $7X_1 + 6X_2$
subject to
$X_1 + X_2 \leq 4$
$2X_1 + X_2 \leq 6$
$X_1, X_2 \geq 0$.
Solve using the algebraic form of the simplex algorithm and answer the following:
At the end of the first iteration, the objective function coefficient for X_2 is ____

Mark only one oval.

- 2.5
- 3.0
- 3.5
- 4.0

66. 58.

Consider the LP problem
Minimize $3X_1 + 8X_2$
subject to
$3X_1 + 5X_2 \geq 16$
$5X_1 + 3X_2 \geq 12$
$X_1, X_2 \geq 0.$
The number of artificial variables required to initialize the simplex table is ___

Mark only one oval.

- 1
- 2
- 3
- 4

67. 59.

Consider the LP problem
Minimize $3X_1 + 8X_2 + 3X_3 + 7X_4$
subject to $3X_1 + 5X_2 + X_3 \geq 16;$
$5X_1 + 3X_2 - X_4 \geq 12,$
$X_1, X_2, X_3, X_4 \geq 0.$
The number of artificial variables required to initialize the simplex table is ___

Mark only one oval.

- 1
- 2
- 3
- 4

68. 60.

Consider the LP problem:
Maximize $7X_1 + 6X_2$
subject to $X_1 + X_2 \leq 4$
$2X_1 + X_2 \leq 6$
$X_1, X_2 \geq 0$.
Solve by algebraic method and answer the following:
If we solve for X_1 and X_3 as basic and the other variables as non-basic, the value of X_2 is ___________

Mark only one oval.

- 0
- 1
- 2
- 4