Online Assessment (Even Sem/Part-I/Part-II Examinations 2019 - 2020)

Course Name - Optimization Technique
Course Code - BCA404C

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- MBA
- M.SC.(BT)
- M.TECH(CSE)
- LLM
- M.A.(JMC)
- M.A.(ENG)
- M.SC.(MATH)
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Answer all the questions. Each question carry one mark.

9. 1.Consider the media selection problem with n possible things to invest in. Examples could be TV, radio, newspaper etc. There is a total budget restriction and limit on investment in each.The objective function has _____ terms.

   Mark only one oval.

   - n
   - n+1
   - n+2
   - n-1

10. 2.Consider the media selection problem with n possible things to invest in. Examples could be TV, radio, newspaper etc. There is a total budget restriction and limit on investment in each. The number of decision variables is _____

Mark only one oval.

- ◯ n-1
- ◯ n-2
- ◯ n
- ◯ n+1

11. 3.Consider the media selection problem with n possible things to invest in. Examples could be TV, radio, newspaper etc. There is a total budget restriction and limit on investment in each. The number of constraints is _____

Mark only one oval.

- ◯ n
- ◯ n+1
- ◯ n+2
- ◯ n+3

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. Thousand answer papers have to be totaled in four hours. There are 10 regular teachers, 5 staff and 4 retired teachers who can do the job. Regular teachers can total 20 papers in an hour; staff can do 15 per hour while retired teachers can do 18 per hour. The regular teachers total the papers correctly 98% of the times while this number is 94% and 96% for staff and retired teachers. We have to use the services of at least one staff. You can assume that any person can work for a fraction of an hour also. Formulate a relevant LP problem and answer the following question.Which of the following is a correct decision variable for this problem?

Mark only one oval.

- ◯ Number of answer papers given to teachers 1 to 10
- ◯ Total number of answer papers given to regular teachers
- ◯ Number of papers correctly totaled by regular teachers
- ◯ Number of papers incorrectly totaled by the regular teachers

15. 7. Thousand answer papers have to be totaled in four hours. There are 10 regular teachers, 5 staff and 4 retired teachers who can do the job. Regular teachers can total 20 papers in an hour; staff can do 15 per hour while retired teachers can do 18 per hour. The regular teachers total the papers correctly 98% of the times while this number is 94% and 96% for staff and retired teachers. We have to use the services of at least one staff. You can assume that any person can work for a fraction of an hour also. Formulate a relevant LP problem and answer the following question.A relevant objective function would be to

Mark only one oval.

- ◯ Maximize the papers totaled by all of them in four hours
- ◯ Minimize the papers totaled by staff and retired teachers
- ◯ Minimize the number of papers correctly totaled by all of them
- ◯ Minimize the number of papers incorrectly totaled by all of them

16. 8. A constraint that does not affect the feasible region is a

Mark only one oval.

- non-negativity constraint
- slack constraint
- redundant constraint
- standard constraint

17. 9. 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

18. 10. 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

19. 11. The purpose of the transportation approach for locational analysis is to minimize

Mark only one oval.

- total costs
- total shipping costs
- total variable costs
- total fixed costs

20. 12. 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

21. 13. 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

22. 14. The stepping-stone method

Mark only one oval.

- is an alternative to using the northwest corner rule
- often involves tracing closed paths with a triangular shape
- is used to evaluate the cost effectiveness of shipping goods via transportation routes not currently in the solution
- is used to identify the relevant costs in a transportation problem

23. 15. An improvement index indicates

Mark only one oval.

- whether a method other than the stepping stone should be used
- whether a method other that the northwest corner rule should be used
- whether the transportation cost in the upper left-hand corner of a cell is optimal
- how much total cost would increase or decrease if a single unit was reallocated to that cell

24. 16. How many feasible solutions does a 5 x 5 assignment problem have?

Mark only one oval.

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

25. 17. How many variables does the formulation of 5 x 5 assignment problem have?

Mark only one oval.

- 20
- 25
- 30
- 35

26. 18. Which of the following is not a step in Hungarian algorithm?

Mark only one oval.

- Subtract row minimum from every row
- Subtract column minimum from every column
- Draw lines through ticked rows and unticked columns
- Tick unassigned rows

27. 19.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

28. 20.

A TP has 2 supply points and 3 destination points. The dummy is added to ___ and the quantity is _____

5	6	3	40
7	5	8	40
30	25	35	

Mark only one oval.

- Row, 10
- Column, 10
- Row, 20
- Column, 20

29. 21. An activity is said to be critical activity if

Mark only one oval.

- its free float is zero
- its total float is zero
- its independent float is zero
- its time duration is zero

30. 22. The purpose of the transportation approach for locational analysis is to minimize

Mark only one oval.

- total costs
- total shipping costs
- total variable costs
- total fixed costs

31. 23. The full form of CPM is

Mark only one oval.

- Crash project management
- Critical path management
- Critical path method
- None of these

32. 24. 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

33. 25. 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

34. 26.

Consider the LP
Maximize $7X_1 + X_2$
subject to $X_1 + X_2 \leq 3$
$X_1 + X_2 \geq 2$
$X_1, X_2 \geq 0.$
Solve this primal. Use ideas from complimentary slackness and indicate which of the following is TRUE

Mark only one oval.

- The dual will have an objective function not greater than 20 at the optimum
- The dual is unbounded or infeasible
- Y1 and Y2 are basic at the optimum for the dual
- Y2 = 0 at the optimum for the dual
- None of these

35. 27.

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
- 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
- None of these

36. 28.

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 optimum, the coefficient of variable X_3 in the objective function is _____

Mark only one oval.

- 2
- 5
- -5
- -2

37. 29. If a primal constraint is an equation, the corresponding dual variable is

Mark only one oval.

- bounded
- unbounded
- unrestricted
- none of these.

38. 30. The primal has m constraints and n variables. The dual has ___ constraints and ___variables

Mark only one oval.

- m,m
- n,n
- m,n
- n,m