Roll No. .....

O. M. R. Serial No. | | | | | | | | |

Question Booklet Number
413382

B. C. A. (Fourth Semester) EXAMINATION, 2022-23

OPTIMIZATION TECHNIQUES

Paper Code						
B	C	A	4	0	0	4

Questions Booklet Series
B

Time : 1:30 Hours]

[*Maximum Marks : 75*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

(Remaining instructions on the last page)

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(शेष निर्देश अन्तिम पृष्ठ पर)

(Only for Rough Work)

1. A game is said to be fair if :

(A) both upper and lower values of the game are the same and zero

(B) upper and lower values of the game are not equal

(C) upper value is more than the lower value of the game

(D) None of the above

2. A two-person zero-sum game means that the :

(A) the sum of losses to one player is equal to the sum of gains to other

(B) the sum of losses to one player is not equal to the sum of gains to other

(C) no any player gains or losses

(D) None of the above

3. Game theory is the study of :

(A) selecting optimal strategies

(B) resolving conflict between players

(C) giving equal outcome to participants

(D) None of the above

4. CPM is the :

(A) Time oriented technique

(B) Event oriented technique

(C) Target oriented technique

(D) Activity oriented technique

5. Slack time in PERT analysis :

(A) can never be less than zero

(B) is minimum for critical events

(C) can never be less than zero

(D) can never be greater than zero

6. The particular task performance in CPM is known as :

(A) Event

(B) Activity

(C) Dummy

(D) Contract

7. An activity is critical if its ..... float is zero.

(A) total

(B) free

(C) independent

(D) interference

8. In a network diagram activity is denoted by :

(A) node

(B) arrow

(C) triangle

(D) None of the above

9. A transportation problem is said to be balanced if ..... .

(A) quantity demanded < quantity supplied

(B) quantity demanded > quantity supplied

(C) quantity demanded ≠ quantity supplied

(D) quantity demanded = quantity supplied

10. The term total elapsed time is used in :

(A) LPP

(B) Assignment problem

(C) Transportation Problem

(D) Sequencing Problem

11. If dual has optimal solution, then primal has ..... solution.

(A) Unbounded

(B) Optimal

(C) Infeasible

(D) None of the above

12. The minimum number of line covering all zeros in a reduced cost matrix of order n can be ..... .

(A) at least n

(B) at most n

(C) $n-1$

(D) $n+1$

13. In making assignment which of the following should be preferred :

(A) Only that row which have single zero

(B) Only that column which have single zero

(C) Only that row having more than one zero

(D) Only that column having more than one zero

14. A feasible solution of a balanced transportation problem is said to be a basic feasible solution if (m is the number of warehouses and n is the number of markets).

(A) at least $m + n - 1$ of the xij's are positive

(B) at least $m + n - 1$ of the xij's are negative

(C) at most $m + n - 1$ of the xij's are negative

(D) at most $m + n - 1$ of the xij's are positive

15. In the transportation problem if the current supply of the warehouses exceeds the current demand of the markets then :

(A) fictitious warehouse is introduced

(B) fictitious market is introduced

(C) decrease the supply of existing warehouse

(D) the demand of existing market

16. In a transportation problem, the method which finds difference between two least cost for each row and column is ..... .

(A) Minimum entry method
(B) Northwest corner method
(C) Northeast corner method
(D) VAM method

17. The best use of LPP is to find an optimal use of :

(A) money
(B) man power
(C) machine
(D) All of the above

18. An assignment problem is considered as a particular case of a transportation problem because :

(A) the number of rows equals columns
(B) all $x_{ij} = 0$ or 1
(C) Both (A) and (B)
(D) None of the above

19. The purpose of a dummy row or column in an assignment problem is to :

(A) Obtain balance between total activities andtotal resources
(B) Prevent a solution from becoming degenerate
(C) Provide a means of representing a dummy problem
(D) None of the above

20. If a primal LP problem has finite solution, then the dual LP problem should have :

(A) Finite solution
(B) Infeasible solution
(C) Unbounded solution
(D) None of the above

21. Network models have advantages in terms of project :

(A) planning
(B) scheduling
(C) controlling
(D) All of the above

22. The another term commonly used for activity slack time is :

(A) total float
(B) free float
(C) independent float
(D) All of the above

23. If there are n workers and n jobs, there would be :

(A) $n!$ solutions
(B) $(n-1)!$ solutions
(C) $(n!)^n$ solutions
(D) n solutions

24. A game is said to be fair if the value of the game is ..... .

(A) One
(B) Two
(C) Three
(D) Zero

25. Which of the following is a characteristic of a dual problem :

(A) Dual of a dual is primal

(B) If dual has a finite optimal solution, then the primal also has finite optimal solution

(C) If dual has no feasible solution, then the primal also has no feasible solution

(D) All of the above

26. When all the players of the game follow their optimal strategies, then the expected pay off of the game is called ..... .

(A) Gain of the game

(B) Loss of the game

(C) Value of the game

(D) None of the above

27. The outcome of a game is known as ..... .

(A) Profit

(B) Loss

(C) Payoff

(D) None of the above

28. ..... is the latest time by which an activity can be finished without delaying the completion of the project ?

(A) LST

(B) LFT

(C) EFT

(D) EST

29. The EST + activity duration = ...

(A) Earliest Finish Time

(B) Latest Start Time

(C) Latest Finish Time

(D) None of the above

30. Activities that cannot be started until one or more of the other activities are completed, are called ..... .

(A) Dummy activities

(B) Initial activities

(C) Successor activities

(D) Predecessor activities

31. ..... is an event oriented network diagram ?

(A) CPM

(B) PERT

(C) Histogram

(D) Ogive

32. ..... is activity oriented network diagram.

(A) CPM

(B) PERT

(C) Histogram

(D) Ogive

33. A LPP model does not contain :

(A) Decision

(B) Constraints

(C) Feasible solution

(D) Spread sheet

34. For a minimisation transportation problem, the objective is to minimise :

(A) Profit

(B) Cost

(C) Solution

(D) None of the above

35. Which of the followings is an assumption of Linear Programming Technique ?

(A) Divisibility

(B) Additivity

(C) Proportionality

(D) All of the above

36. Before formulating a formal L P model, it is better to :

(A) Verbally identify decision variables

(B) Express the objective function in words

(C) Express each constraint in words

(D) All of the above

37. ..... deals with the concepts such as critical path, float, events, etc.

(A) Game theory

(B) Decision theory

(C) Queuing theory

(D) Network analysis

38. Operations Research does not give perfect solution to a problem, but it helps to improve the ..... of the solution.

(A) Quality

(B) Clarity

(C) Look

(D) None of the above

39. In simplex method, we add ..... in the case of constraints with sign "=".

(A) Surplus variable

(B) Artificial variable

(C) Slack variable

(D) None of the above

40. A minimisation problem can be connected into maximisation problem by changing the signs of coefficients in the ..... .

(A) Constraints

(B) Objectives

(C) Both (A) and (B)

(D) None of the above

41. In ..... models, everything is defined and the results are certain.

(A) Probabilistic

(B) Deterministic

(C) Both (A) and (B)

(D) None of the above

42. Operations Research is a very powerful tool for ..... .

(A) Operations

(B) Research

(C) Decision making

(D) None of the above

43.

Job	Machine (M1)	Machine (M2)
A	2	5
B	9	7
C	8	12
D	10	3
E	4	9
F	11	1

Using the Johnson rule find the right sequence of the job :

(A) AECFBD

(B) ABCDEF

(C) DBFCEA

(D) ADBCEF

44. If the primal has unbounded solution, then the dual has :

(A) optimal solution

(B) no solution

(C) bound solution

(D) None of the above

45. The key column indicates :

(A) outgoing variable

(B) incoming variable

(C) independent variable

(D) dependent variable

46. In graphical solution of solving LPP to convert inequalities into equations, we :

(A) use slack variables

(B) use surplus variables

(C) use artificial variables

(D) simply assume them to equations

47. If a machine becomes old then the failure rate expected will be :

(A) constant

(B) increasing

(C) decreasing

(D) we cannot say

48. Which of the following is the correct assumption for replacement policy when money value does not change with time ?

(A) No capital cost

(B) No scrap value

(C) Constant scrap value

(D) zero maintenance cost

49. The time required by each job on each machine is :

(A) Processing time

(B) Idle time

(C) Elapsed time

(D) None of the above

50. The group replacement policy is suitable for identical low cost items which are likely to ..... .

(A) Fail over a period of time

(B) Fail suddenly

(C) Fail completely and suddenly

(D) None of the above

51. In Sequencing if the smallest time belong to machine-i then that job has to be placed ..... of the sequence.

(A) In the middle

(B) In the starting

(C) At end

(D) None of the above

52. The Penalty in VAM represents difference between ..... cost of respective row/column.

(A) Two largest

(B) Largest and smallest

(C) Smallest two

(D) None of the above

53. The method used for solving assignment problem is :

(A) MODI method

(B) Reduced matrix method

(C) Hungarian method

(D) None of the above

54. If an activity has zero slack, it implies that :

(A) it lies on the critical path

(B) it is a dummy activity

(C) the project is progressing well

(D) None of the above

55. MODI stands for :

(A) Modern distribution

(B) Mendel's distribution method

(C) Modified distribution method

(D) Model index method

56. If a job is having minimum processing time under both the machines, then the job is placed in :

(A) any one position

(B) available position

(C) available first position

(D) both first and last position

57. The curve used to interpret machine life cycle is :

(A) bath tub curve

(B) time curve

(C) product life cycle

(D) ogive curve

58. It is assumed that maintenance cost mostly depends on :

(A) Calendar age

(B) Running age

(C) Manufacturing date

(D) User's age

59. In case there is no saddle point in a game then the game is :

(A) Deterministic game

(B) Fair game

(C) Mixed strategy game

(D) Multiplayer game

60. Transportation problem is basically a :

(A) Maximization problem

(B) Minimization problem

(C) Iconic model

(D) Transshipment problem

61. The row which is introduced in the matrix to balance the rim requirement is :

(A) key row

(B) idle row

(C) slack row

(D) dummy row

62. ..... method is an alternative method of solving a Linear Programming Problem involving artificial variables .

(A) Simplex Method

(B) Big-M

(C) Dual simplex

(D) Graphical

63. 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 destination

64. In simplex method slack variables are assigned zero coefficients because :

(A) no contribution in objective function

(B) high contribution in objective function

(C) divisor contribution in objective function

(D) base contribution in objective function

65. Dual of a dual of dual is :

(A) Dual

(B) Primal

(C) Double dual

(D) Single dual

66. If primal problem is a maximization problem, then the dual will be :

(A) Maximisation problem

(B) Mixed problem

(C) Minimisation problem

(D) None of the above

67. When the probability of failure reduces gradually, the failure mode is said to be :

(A) Regressive

(B) Retrogressive

(C) Progressive

(D) Recursive

68. When the total allocations in a transportation model of $m * n$ size is not equals to $m + n - 1$. This situation is known as :

(A) unbalanced situation

(B) tie situation

(C) degeneracy

(D) none of the above

69. If $u_i + v_j$ are rows and column numbers respectively, then the implied cost is given by :

(A) $u_i + v_j$

(B) $u_i - v_j$

(C) $u_i * v_j$

(D) u_i / v_j

70. The assignment matrix is always a/an :

(A) Rectangular matrix

(B) Square matrix

(C) Identity matrix

(D) None of the above

71. Event indicates ..... of activity.

(A) starting

(B) ending

(C) Both (A) and (B)

(D) None of the above

72. To convert assignment problem into maximization problem :

(A) Deduct smallest element in the matrix from all other elements

(B) All elements of the matrix are deducted from the highest elements in the matrix.

(C) Deduct smallest element in any row from all other elements of the row.

(D) Deduct all elements of the row from highest element in that row.

73. The assignment will have alternate solutions :

(A) when total opportunity cost matrix has at least 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.

74. This is not allowed in sequencing of n jobs on two machines :

(A) Passing

(B) Repeating the job

(C) Loading

(D) One loaded on the machine it should be completed before removing from the machine.

75. The objective function of a linear programming problem is :

(A) a constraint

(B) function to be optimised

(C) a relation between the variables

(D) None of the above

76. The linear inequalities or equations or restrictions on the variables of a linear programming problem are called :

(A) a constraint

(B) Decision variables

(C) Objective function

(D) None of the above

77. The maximum value of $Z = 3x + 4y$ subjected to constraints $x + y \leq 4, x \geq 0$ and $y \geq 0$ is :

(A) 12

(B) 14

(C) 16

(D) None of the above

78. The optimal value of the objective function is attained at the points :

(A) on X-axis

(B) on Y-axis

(C) corner points of the feasible region

(D) None of the above

79. Which of the following is a type of Linear programming problem ?

(A) Manufacturing problem

(B) Diet problem

(C) Transportation problems

(D) All of the above

80. The formula for free float is ..... .

(A) Total float – slack of tail event

(B) Total float – LFT of head event

(C) Total float – EFT of head event

(D) Total float – slack of head event.

81. In LPP the condition to be satisfied is :

(A) Constraints have to be linear

(B) Objective function has to be linear

(C) None of the above

(D) Both (A) and (B)

82. Optimal solution of an assignment problem can be obtained only if :

(A) Each row and column has only one zero element

(B) Each row and column has at least one zero element

(C) The data is arrangement in a square matrix

(D) None of the above

83. In case of an unbalanced problem, shipping cost coefficients of ..... are assigned to each created dummy factory or warehouse.

(A) very high positive costs

(B) very high negative costs

(C) 10

(D) zero

84. When the total demand is not equal to supply then, it is said to be ..... .

(A) balanced

(B) unbalanced

(C) maximization

(D) minimization

85. In the transportation table, empty cells will be called ..... .

(A) occupied

(B) unoccupied

(C) basic

(D) non-basic

86. The coefficient of slack\surplus variables in the objective function are always assumed to be ..... .

(A) 0

(B) 1

(C) M

(D) –M

87. Which technique is used in finding a solution for optimizing a given objective, such as profit maximization or cost reduction under certain constraints ?

(A) Quailing Theory

(B) Waiting Line

(C) Both (A) and (B)

(D) Linear Programming

88. In Degenerate solution value of objective function ..... .

(A) increases infinitely

(B) basic variables are nonzero

(C) decreases infinitely

(D) one or more basic variables are zero

89. If an artificial variable is present in the basic variable column of optimal simplex table, then the solution is ..... .

(A) alternative

(B) bounded

(C) no solution

(D) infeasible

90. If all paths of a network are critical paths, then the project duration cannot be reduced further.

(A) True

(B) False

(C) Nothing can be said

(D) None of the above

91. The formula for calculating expected time in PERT is ..... .

(A) $(t_0 + 4t_m - t_p)/6$

(B) $(t_0 + 4t_m + t_p)/6$

(C) $(t_0 + 4t_m - 2t_p)/6$

(D) None of the above

92. What is the basis for PERT analysis ?

(A) An optimistic time

(B) A pessimistic period of time

(C) The date that is most likely

(D) All options mentioned above

93. The problem of replacement is felt when job performing units fail ..... .

(A) suddenly and gradually

(B) gradually

(C) suddenly

(D) neither gradually nor suddenly

94. If there exists a saddle point for a given problem it, implies that the players are using ..... strategies.

(A) Pure

(B) Mixed

(C) Optimal

(D) Pure and Mixed

95. What happens when maximin and minimax values of the game are same ?

(A) No solution exists

(B) Solution is mixed

(C) Saddle point exists

(D) None of the above

96. A mixed strategy can be solved by :

(A) algebraic method

(B) matrix method

(C) graphical method

(D) All of the above

97. The size of the payoff matrix of a game can be reduced by using the principle of :

(A) game inversion

(B) rotation reduction

(C) dominance

(D) game transpose

98. Games which involve more than two players are called ?

(A) conflicting game

(B) negotiable games

(C) N-person games

(D) All of the above

99. When the sum of gains of one player is equal to the sum of losses to another player in a game, this situation is known as ?

(A) biased game

(B) zero-sum game

(C) fair game

(D) All of the above

100. Linear programming method should be used to determine the value of the game when the size of the payoff matrix is :

(A) 2×2

(B) 3×4

(C) $m \times 2$

(D) $2 \times n$

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the correct answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q.1 (A) ● (C) (D)
Q.2 (A) (B) ● (D)
Q.3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.

6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.

7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.

8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.

9. There will be no negative marking.

10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.

11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.

12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is ny discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर— A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।

6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।

7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।

8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।

9. निगेटिव मार्किंग नहीं है।

10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।

11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।

12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।