Roll No. .....

Question Booklet Number

O. M. R. Serial No.

B. Com. (Honors) (Fourth Semester)

EXAMINATION, July, 2022

OPERATION RESEARCH

Paper Code				
BCOMH	4	0	0	3

Questions Booklet Series
A

Time : 1:30 Hours] [*Maximum Marks : 100*

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 any 75 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 75 questions are attempted by student, then the first attempted 75 questions will be considered for evaluation. 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.

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 किन्हीं 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 75 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 75 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। 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।

(Remaining instructions on the last page) (शेष निर्देश अन्तिम पृष्ठ पर)

1. Operations Research approach is _____.

(A) Scientific

(B) Intuitive

(C) Collect essential data

(D) Multidisciplinary

2. A feasible solution to a linear programming problem _____.

(A) must satisfy all the constraints of the problem simultaneously

(B) need not satisfy all of the constraints, only some of them

(C) must be a corner point of the feasible region

(D) must optimize the value of the objective function

3. If any value in XB column of final simplex table is negative, then the solution is _____.

(A) infeasible

(B) feasible

(C) bounded

(D) no solution

4. For any primal problem and its dual _____.

(A) optimal value of objective function is same

(B) dual will have an optimal solution iff primal does too

(C) primal will have an optimal solution iff dual does too

(D) both primal and dual cannot be infeasible

5. The difference between total float and head event slack is _____.

(A) free float

(B) independent float

(C) interference float

(D) linear float

6. An optimal assignment requires that the maximum number of lines which can be drawn through squares with zero opportunity cost should be equal to the number of _____.

(A) rows or columns

(B) rows and columns

(C) rows + columns – 1

(D) rows – columns

7. To proceed with the Modified Distribution method algorithm for solving an transportation problem, the number of dummy allocations need to be added are _____.

(A) n

(B) $n - 1$

(C) $2n - 1$

(D) $n - 2$

8. Select the correct statement :

(A) EOQ is that quantity at which price paid by the buyer is minimum.

(B) If annual demand doubles with all other parameters remaining constant, the Economic Order Quantity is doubled.

(C) Total ordering cost equals holding cost.

(D) Stock out cost is never permitted.

9. Service mechanism in a queuing system is characterized by _____.

(A) customers behavior

(B) servers behavior

(C) customers in the system

(D) server in the system

10. The objective of network analysis is to _____.

(A) minimize total project duration

(B) minimize toal project cost

(C) minimize production delays, interruption and conflicts

(D) maximize total project duration

11. In an Linear Programming Problem functions to be maximized or minimized are called :

(A) constraints

(B) objective function

(C) basic solution

(D) feasible solution

12. If the primal problem has n constraints and m variables, then the number of constraints in the dual problem is _____.

(A) mn

(B) $m + n$

(C) $m - n$

(D) m / n

13. The non-basic variables are called _____.

(A) shadow cost

(B) opportunity cost

(C) slack variable

(D) surplus variable

14. Key element is also known as _____.

(A) slack

(B) surplus

(C) artificial

(D) pivot

15. The solution to a transportation problem with *m*-sources and *n*-destinations is feasible if the numbers of allocations are _____.

(A) $m + n$

(B) mn

(C) $m - n$

(D) $m + n - 1$

16. The allocation cells in the transportation table will be called _____ cell.

(A) occupied

(B) unoccupied

(C) no

(D) finite

17. To resolve degeneracy at the initial solution, a very small quantity is allocated in _____ cell.

(A) occupied

(B) unoccupied

(C) no

(D) finite

18. The assignment algorithm was developed by _____ method.

(A) Hungarian

(B) Vogel's

(C) Modi

(D) Traveling Salesman

19. An assignment problem is a particular case of _____.

(A) transportation problem

(B) assignment problem

(C) travelling salesman problem

(D) replacement problem

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

(A) 0

(B) 1

(C) M

(D) – M

21. Using _____ method, we can never have an unbounded solution.

(A) Simplex

(B) Dual simplex

(C) Big-M

(D) Modi

22. The customers of high priority are given service over the low priority customers is _____.

(A) Pre-emptive

(B) FIFO

(C) LIFO

(D) SIRO

23. A queuing system is said to be a _____ when its operating characteristic are independent upon time.

(A) pure birth model

(B) pure death model

(C) transient state

(D) steady state

24. An activity which does not consume neither any resource nor time is known as _____.

(A) predecessor activity

(B) successor activity

(C) dummy activity

(D) activity

25. The difference between total and free float is _____.

(A) total

(B) free

(C) independent

(D) interference

26. The number of time estimates involved in Program Evaluation Review Technique problem is _____.

(A) 1

(B) 2

(C) 3

(D) 4

27. The assignment problem is always a _____ matrix.

(A) circle

(B) square

(C) rectangle

(D) triangle

28. The slack variables indicate _____.

(A) excess resource available.

(B) shortage of resource

(C) nil resource

(D) idle resource

29. If the net evaluation corresponding to any non-basic variable is zero, it is an indication of the existence of an _____.

(A) initial basic feasible solution

(B) optimum basic feasible solution

(C) optimum solution

(D) alternate optimum solution

30. Mathematical model of linear programming problem is important because _____.

(A) it helps in converting the verbal description and numerical data into mathematical expression.

(B) decision makers prefer to work with formal models.

(C) it captures the relevant relationship among decision factors.

(D) it enables the use of algebraic technique.

31. When the total demand is equal to supply, then the transportation problem is said to be _____.

(A) balanced

(B) unbalanced

(C) maximization

(D) minimization

32. For finding an optimum solution in transportation problem _____ method is used.

(A) Simplex

(B) Big-M

(C) Modi

(D) Hungarian

33. Any solution to a Linear Programming Problem which also satisfies the non-negative notifications of the problem has _____.

(A) solution

(B) basic solution

(C) basic feasible solution

(D) feasible solution

34. A Linear Programming Problem have _____ optimal solution.

(A) 1

(B) 2

(C) more than 1

(D) more than 2

35. If an artificial variable is present in the basic variable column of optimal simplex table, then the problem has _____ solution.

(A) alternative

(B) no

(C) bounded

(D) infeasible

36. The dummy source or destination in a transportation problem is added to _____.

(A) satisfy rim conditions

(B) prevent solution from becoming degenerate

(C) ensure that total cost does not exceed a limit

(D) the solution not be degenerate

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

(A) suddenly and gradually

(B) gradually

(C) suddenly

(D) neither gradually nor suddenly

38. A feasible solution of an Linear Programming Problem that optimizes the objective function is called _____.

(A) basic feasible solution

(B) optimum solution

(C) feasible solution

(D) solution

39. All the basis for a transportation problem is _____.

(A) square

(B) rectangle

(C) diagonal

(D) triangle

40. In the transportation table, empty cells will be called _____.

(A) occupied

(B) unoccupied

(C) no

(D) finite

41. _____ is a completely degenerate form of a transportation problem.

(A) Transportation Problem

(B) Assignment Problem

(C) Travelling Salesman Problem

(D) Replacement Problem

42. The linear function to be maximized or minimized is called _____ function.

(A) injective

(B) surjective

(C) bijective

(D) optimal

43. The coefficient of an artificial variable in the objective function of penalty method are always assumed to be :

(A) 0

(B) 1

(C) M

(D) –M

44. The process that performs the services to the customer is known as :

(A) queue

(B) service channel

(C) customers

(D) server

45. A queuing system is said to be a _____ when its operating characteristic are dependent upon time.

(A) pure birth model

(B) pure death model

(C) transient state

(D) steady state

46. Slack is also known as _____.

(A) float

(B) event

(C) activity

(D) path

47. What type of distribution does a time follow in program evaluation review technique model ?

(A) Poisson

(B) Exponential

(C) Normal

(D) Chi-square

48. A activity in a network diagram is said to be _____ if the delay in its start will further delay the project completion time.

(A) critical

(B) critical path

(C) crash

(D) non-critical

49. The total opportunity cost matrix is obtained by doing _____.

(A) row operation on row opportunity cost matrix

(B) column operation on row opportunity cost matrix

(C) column operation on column opportunity cost matrix

(D) None of the above

50. The Simplex method is also called the _____.

(A) Dual simplex method

(B) Modi method

(C) Simplex technique

(D) Big-M method

51. A degenerate solution is one that :

(A) gives an optimum solution to the Linear Programming Problem

(B) gives zero value to one or more of the basic variables

(C) yields more than one-way to achieve the objective

(D) makes use of all the available resources

52. Graphical method of linear programming is useful when the number of decision variable are :

(A) 1

(B) 2

(C) 3

(D) 4

53. In the optimal simplex table, $Z_j - C_j = 0$ value indicates _____.

(A) alternative solution

(B) bounded solution

(C) infeasible solution

(D) unbounded solution

54. If primal linear programming problem has a finite solution, then dual linear programming problem should _____.

(A) have optimal solution

(B) satisfy the Rim condition

(C) have degenerate solution

(D) have non-degenerate solution

55. While solving an assignment problem, an activity is assigned to a resource through a square with zero opportunity cost because the objective is to _____.

(A) minimize total cost of assignment

(B) reduce the cost of assignment to zero

(C) reduce the cost of that particular assignment to zero

(D) reduce total cost of assignment

56. The longest path in the network diagram is called _____.

(A) head path

(B) subpath

(C) critical path

(D) subcritical path

57. The shortest time in the PERT is called _____ time.

(A) expected

(B) pessimistic

(C) optimistic

(D) most likely

58. Which of these specifies the objective or goal of solving the LPP ?

(A) Objective function

(B) Decision variables

(C) Constraints

(D) Opportunity cost

59. In linear programming, unbounded solution means solution :

(A) infeasible

(B) infinite

(C) unique

(D) degenerate

60. The intersection value of key column and key row is called :

(A) vital element

(B) important element

(C) basic element

(D) key element

61. The variable added to the LHS of a less than or equal to constraint to convert it into equality is called _____ variable.

(A) surplus

(B) artificial

(C) slack

(D) additional

62. To find initial feasible solution of a transportation problem the method which starts allocation from the lowest cost is called _____ method.

(A) Vogel's approximation

(B) nwcr

(C) lcm

(D) Modi

63. Which of the following considers difference between two least costs for each row and column while finding initial basic feasible solution in transportation ?

(A) yarn

(B) nwcr

(C) Modi

(D) lcm

64. The time during which a machine remains waiting or vacant in sequencing problem is called _____ time.

(A) processing

(B) waiting

(C) free

(D) idle

65. In linear programming represents mathematical equation of the limitations imposed by the problem :

(A) objective function

(B) decision variables

(C) constraints

(D) opportunity cost

66. The outgoing variable row in the simplex algorithm is called :

(A) outgoing row

(B) key row

(C) interchanging row

(D) basic row

67. In simplex; a maximization problem is optimsi when all Della J, i.e. $C_j - Z_j$ values are :

(A) either zero or positive

(B) either zero or negative

(C) only positive

(D) only negative

68. The participants in s game are called :

(A) invitees

(B) players

(C) contestants

(D) clients

69. The outcome of the interaction of selected strategies of opponents in a game is called :

(A) income

(B) profit

(C) payoff

(D) gains

70. A situation in a game, where in the payoff matrix, maximum of row is equal to minimax of column is called :

(A) centre point

(B) saddle point

(C) main point

(D) equal point

71. Operations Research techniques are in nature :

(A) qualitative

(B) quantitative

(C) judgmental

(D) subjective

72. Operations Research (OR), which is a very powerful tool for _____.

(A) Research

(B) Decision-making

(C) Operations

(D) None of the above

73. The term 'Operations Research' was coined in the year _____.

(A) 1950

(B) 1940

(C) 1978

(D) 1960

74. This innovative science of Operations Research was discovered during _____.

(A) Civil War

(B) World War I

(C) World War II

(D) Industrial Revolution

75. Operations Research was known as an ability to win a war without really going into a _____.

(A) Battlefield

(B) Fighting

(C) War

(D) Both (A) and (B)

76. Operations Research cannot give perfect _____ to problems.

(A) Answers

(B) Solutions

(C) Both (A) and (B)

(D) Decisions

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

(A) Deterministic

(B) Probabilistic

(C) Both (A) and (B)

(D) None of the above

78. Which models are obtained by enlarging or reducing the size of the item ?

(A) Iconic Models

(B) Analogue Models

(C) Symbolic Models

(D) None of the above

79. _____ are the representation of reality.

(A) Models

(B) Phases

(C) Both (A) and (B)

(D) None of the above

80. _____ are called mathematical models.

(A) Iconic Models

(B) Analogue Models

(C) Symbolic Models

(D) None of the above

81. The objective functions and constraints are linear relationship between _____.

(A) Variables

(B) Constraints

(C) Functions

(D) All of the above

82. All the parameters in the linear programming model are assumed to be _____.

(A) Variables

(B) Constraints

(C) Functions

(D) None of the above

83. Graphical method can be applied to solve a LPP when there are only _____ variable.

(A) One

(B) More than one

(C) Two

(D) Three

84. Any column or row of a simplex table is called a _____.

(A) Vector

(B) Key column

(C) Key row

(D) None of the above

85. As for maximization in assignment problem, the objective is to maximize the _____.

(A) Profit

(B) Optimization

(C) Cost

(D) None of the above

86. If there are more than one optimum solution for the decision variable the solution is _____.

(A) Infeasible

(B) Unbounded

(C) Alternative

(D) None of the above

87. For analyzing the problem, decision makers should normally study :

(A) Its qualitative aspects

(B) Its quantitative aspects

(C) Both (A) and (B)

(D) Neither (A) nor (B)

88. The word 'Linear' means that the relationships are represented by _____.

(A) Diagonal lines

(B) Curved lines

(C) Straight lines

(D) Slanting lines

89. The word 'programming' means taking decisions _____.

(A) Systematically

(B) Rapidly

(C) Slowly

(D) Instantly

90. If the total supply is less than the total demand, a dummy source (row) is included in the cost matrix with _____.

(A) Dummy Demand

(B) Dummy Supply

(C) Zero Cost

(D) Both (A) and (B)

91. Once the initial basic feasible solution has been computed, what is the next step in the problem ?

(A) VAM

(B) Modified distribution method

(C) Optimality test

(D) None of the above

92. Optimal solution is a feasible solution (not necessarily basic) which minimizes the _____.

(A) Time taken

(B) Partial cost

(C) Total cost

(D) None of the above

93. If demand is lesser than supply, then dummy demand node is added to make it a _____.

(A) Simple problem

(B) Balanced problem

(C) Transportation problem

(D) None of the above

94. Any feasible solution to a transportation problem containing *m* origins and *n* destinations is said to be _____.

(A) Independent

(B) Degenerate

(C) Non-degenerate

(D) Both (A) and (B)

95. An optimum solution is considered the _____ among feasible solutions.

(A) Worst

(B) Best

(C) Ineffective

(D) None of the above

96. All the constraints are expressed as equations and the right hand side of each constraint and all variables are non-negative is called _____.

(A) Canonical variable

(B) Canonical form

(C) Canonical solution

(D) Both (A) and (B)

97. What are the main questions before a production manager ?

(A) Which commodity/commodities to produce

(B) In what quantities

(C) By which process or processes

(D) All of the above

98. An optimization model :

(A) Mathematically provides the best decision

(B) Provides decision within its limited context

(C) Helps in evaluating various alternatives constantly

(D) All of the above

99. Who developed Linear Programming for the purpose of scheduling the complicated procurement activities of the United States Air Force ?

(A) George B. Dantzig

(B) James B. Dantzig

(C) George B. Dante

(D) George V. Dantzig

100. Which theory concerns making sound decisions under conditions of certainty, risk and uncertainty ?

(A) Game Theory

(B) Network Analysis

(C) Decision Theory

(D) None of the above

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate 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 एक सबसे सही अथवा सबसे उपयुक्त 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।