

Roll. No.

O.M.R. Serial No.

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Question Booklet Number

400024

BCA (SEM.-IV) (NON-NEP) EXAMINATION, 2024

COMPUTER APPLICATION

(Optimization Techniques)

[BCA-404 (N)]

Paper Code

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Question Booklet

Series

D

Time : 1 : 30 Hours

Max. 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.
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 :

(Remaining instructions on 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, उसे तुरन्त बदल लें।
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 छँटना है। उत्तर को OMR उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

(शेष निर्देश अन्तिम पृष्ठ पर)

1. The best use of linear programming technique is to find the optimal use of _____.
 (A) money
 (B) manpower
 (C) machine
 (D) all of the above
2. _____ is used to reduce the game.
 (A) Transportation Problem
 (B) Assignment Problem
 (C) Dual Simplex Method
 (D) Graphical Method
3. _____ is a mathematical technique used to solve the problem of allocating limited resource among the competing activities.
 (A) Linear Programming Problem
 (B) Assignment Problem
 (C) Replacement Problem
 (D) Non linear Programming Problem
4. The area bounded by all the given constraints is called _____.
 (A) feasible region
 (B) basic solution
 (C) non-feasible region
 (D) optimum basic feasible solution
5. 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) $m+n-1$
6. Customer behavior in which the customer moves from one queue to another in a multiple channel situation is :
 (A) Balking
 (B) Reneging
 (C) Jockeying
 (D) Alternating
7. Which of the following characteristics apply to the queuing system ?
 (A) customer population
 (B) arrival process
 (C) Both (A) and (B)
 (D) Neither (A) nor (B)
8. Which of the following is not a key operating characteristic for a queuing system ?
 (A) Utilization factor
 (B) Percent idle time
 (C) Average time spent waiting in the system and queue
 (D) None of the above

9. To proceed with the Modified Distribution method algorithm for solving a transportation problem, the number of dummy allocations need to be added are _____.
- (A) n
 (B) $n-1$
 (C) $2n-1$
 (D) $n-2$
10. Select the correct statement :
- (A) ECQ 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
11. If the order quantity (size of order) is increased, _____.
- (A) holding costs decrease and ordering costs increase
 (B) holding costs increase and ordering costs decrease
 (C) the total costs increase and then decrease
 (D) storage cost as well as stock-out cost increase
12. The activity cost corresponding to the crash time is called the _____.
- (A) Critical time
 (B) Normal time
 (C) Cost slope
 (D) Crash cost
13. In an Linear Programming Problem functions to be maximized or minimized are called _____.
- (A) Constraints
 (B) Objective function
 (C) Basic solution
 (D) Feasible solution
14. 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
15. The non-basic variables are called _____.
- (A) Shadow cost
 (B) Opportunity cost
 (C) Slack variable
 (D) Surplus variable

16. 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
17. The difference between total and free float is _____.
 (A) total
 (B) free
 (C) independent
 (D) interference
18. The assignment problem is always a _____ matrix.
 (A) circle
 (B) square
 (C) rectangle
 (D) triangle
19. The slack variables indicate _____.
 (A) excess resource available.
 (B) shortage of resource
 (C) nil resource
 (D) idle resource
20. The right hand side constant of a constraint in a primal problem appears in the corresponding dual as _____.
 (A) a coefficient in the objective function
 (B) a right hand side constant of a function
 (C) an input output coefficient
 (D) a left hand side constraint coefficient variable
21. Replace an item when _____.
 (A) average cost upto date is equal to the current maintenance cost
 (B) average cost upto date is greater than the current maintenance cost
 (C) average cost upto date is less than the current maintenance cost
 (D) next year running cost is more than average cost of nth year
22. In time cost trade off function analysis _____.
 (A) cost decreases linearly as time increases
 (B) cost increases linearly as time decreases
 (C) cost at normal time is zero
 (D) cost increases linearly as time increases
23. The minimum number of lines covering all zeros in a reduced cost matrix of order n can be _____.
 (A) at the most n
 (B) at the least n
 (C) $n-1$
 (D) $n+1$

24. The qualitative approach to decision analysis relies on _____.
 (A) Judgement
 (B) Intuition
 (C) Experience
 (D) All of the above
25. Operations Research, which is a very powerful tool for _____.
 (A) Decision – Making
 (B) Operations
 (C) Research
 (D) None of the above
26. _____ may be defined as a method of determining an optimum programme interdependent activities in view of available resources.
 (A) Linear Programming
 (B) Goal Programming
 (C) Decision-Making
 (D) None of the above
27. When a doctor attends to an emergency case leaving his regular service is called:
 (A) Reneging
 (B) Balking
 (C) Pre-emptive queue discipline
 (D) Non-Pre-Emptive queue discipline
28. This department is responsible for the development of queuing theory:
 (A) Railway station
 (B) Municipal office
 (C) Telephone department
 (D) Health department
29. Arrival-->Service-->Service-->Service-->Out-->The given sequence represents:
 (A) Single-channel Single-phase system
 (B) Multi-channel Single-phase system
 (C) Single-channel Multi-phase system
 (D) Multi-channel Multi-phase system
30. The distribution of arrivals in a queuing system can be considered as a:
 (A) Death Process
 (B) Pure Birth Process
 (C) Pure Live Process
 (D) Sick Process
31. The unit of traffic intensity is :
 (A) Poisson
 (B) Markow
 (C) Erlang
 (D) Kendall
32. _____ is concerned with the determination of the most economic replacement policy.
 (A) Probabilistic programming
 (B) Linear programming
 (C) Search theory
 (D) Replacement theory

33. If Dual has a solution, then the primal will
- (A) Not have a solution
 - (B) Have only basic feasible solution,
 - (C) Have a solution
 - (D) None of these
34. If the primal has an unbounded solution, then the dual has :
- (A) Optimal solution
 - (B) No feasible solution
 - (C) Bound solution
 - (D) None of these
35. To transfer the key row in simplex table we have to :
- (A) Add the elements of the key row to the key number
 - (B) Subtract the elements of a key row from topmost no key row
 - (C) Divide the elements of the key row by the key number
 - (D) None of these
36. Primal of a Primal is :
- (A) Primal
 - (B) Dual
 - (C) Primal-Dual
 - (D) Duo primal
37. The person who coined the name Operations Research is:
- (A) Bellman
 - (B) Newman
 - (C) McClosky and Trefrhen
 - (D) None of these
38. Operations Research is the art of giving:
- (A) Good answers for war problems
 - (B) Bad answers to war problems
 - (C) Bad answers to problems where otherwise worse answers are given
 - (D) Good answers to problems where otherwise bad answers are given
39. One of the properties of the O.R. model is :
- (A) The model should be complicated
 - (B) Model is structured to suit O.R. techniques
 - (C) The model should be structured to suit all the problems we come across
 - (D) The model should be easy to derive
40. The cost coefficient of the artificial surplus variable is :
- (A) 0
 - (B) 1
 - (C) M
 - (D) > than 1

41. Which of the following methods is used to verify the optimality of the current solution of the transportation problem ?
- (A) Least cost method
 - (B) Vogel's Approximation method
 - (C) Row minima method
 - (D) Modified Distribution method
42. Economic order quantity results in _____.
- (A) equalisation of carrying cost and procurement cost
 - (B) favourable procurement price
 - (C) reduced chances of stock outs
 - (D) minimization of set up cost
43. The problem of replacement is felt when job performing units fail ____.
- (A) suddenly and gradually
 - (B) gradually
 - (C) suddenly
 - (D) neither gradually nor suddenly
44. The time between the placement of an order and its delivery is called as ____.
- (A) buffer time
 - (B) lead time
 - (C) Economic Order Quantity
 - (D) capital time
45. All of the following are assumptions of the EOQ model except ____.
- (A) the usage rate is reasonably constant
 - (B) replenishment is not instantaneous
 - (C) only one product is involved
 - (D) there are no quantity discount prices
46. The dual of the dual is ____.
- (A) dual-primal
 - (B) primal-dual
 - (C) dual
 - (D) primal
47. When the total demand is not equal to supply then it is said to be ____.
- (A) balanced
 - (B) unbalanced
 - (C) maximization
 - (D) minimization
48. The group replacement policy is suitable for identical low cost items which are likely to ____.
- (A) fail suddenly
 - (B) fail completely and suddenly
 - (C) fail over a period of time
 - (D) be progressive and retrogressive
49. Which of the following is not a part of holding (or carrying) costs?
- (A) Rent for storage space
 - (B) Extra expenses for an overnight express mail.
 - (C) Spoilage costs
 - (D) Electricity and heat for the buildings

50. Priority queue discipline may be classified as :
- (A) finite or infinite
 - (B) limited and unlimited
 - (C) pre-emptive or non-pre-emptive
 - (D) All of the above
51. Which symbol describes the interarrival time distribution ?
- (A) D
 - (B) M
 - (C) G
 - (D) All of the above
52. The calling population is assumed to be infinite when :
- (A) arrivals are independent of each other
 - (B) the capacity of the system is infinite
 - (C) service rate is faster than the arrival rate
 - (D) All of the above
53. A calling population is considered to be infinite when
- (A) all customers arrive at once
 - (B) arrivals are independent of each other
 - (C) arrivals are dependent upon each other
 - (D) All of the above
54. The cost of providing service in a queuing system decreases with :
- (A) decreased average waiting time in the queue
 - (B) decreased arrival rate
 - (C) increased arrival rate
 - (D) None of the above
55. Service mechanism in a queuing system is characterized by :
- (A) server's behavior
 - (B) customer's behavior
 - (C) customers in the system
 - (D) All of the above
56. In M/M/S: N/FIFO the following does not apply :
- (A) Poisson arrival
 - (B) Limited service
 - (C) Exponential service
 - (D) Single server
57. The system of loading and unloading of goods usually follows:
- (A) LIFO
 - (B) FIFO
 - (C) SIRO
 - (D) SBP
58. The characteristics of a queuing model are independent of :
- (A) Number of service stations
 - (B) Limit of the length of the queue
 - (C) Service pattern
 - (D) Queue discipline

59. Key element is also known as _____.
- (A) slack
 - (B) surplus
 - (C) artificial
 - (D) pivot
60. 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) $m+n-1$
61. The allocation cells in the transportation table will be called _____ cell.
- (A) occupied
 - (B) unoccupied
 - (C) no
 - (D) finite
62. The assignment algorithm was developed by _____ method.
- (A) HUNGARIAN
 - (B) VOGELS
 - (C) MODI
 - (D) TRAVELLING SALESMAN
63. An assignment problem is a particular case of _____.
- (A) transportation problem
 - (B) assignment problem
 - (C) travelling salesman problem
 - (D) replacement problem
64. The coefficient of slack\surplus variables in the objective function are always assumed to be _____.
- (A) 0
 - (B) 1
 - (C) M
 - (D) -M
65. Using _____ method, we can never have an unbounded solution.
- (A) Simplex
 - (B) Dual simplex
 - (C) Big M
 - (D) Modi
66. A queuing system is said to be a _____ when its operating characteristics are independent upon time.
- (A) pure birth model
 - (B) pure death model
 - (C) transient state
 - (D) steady state

67. For a 2.5% increase in order quantity (under fundamental EOQ problem) the total relevant cost would _____.
 (A) increase by 2.5%
 (B) decrease by 2.5%
 (C) increase by 0.25%
 (D) decrease by 0.25%
68. In the basic EOQ model, if the lead time increases from 2 to 4 days, the EOQ will _____.
 (A) double increase
 (B) remain constant
 (C) but not double
 (D) decrease by a factor of two
69. Graphical method is also known as _____.
 (A) Simplex Method
 (B) Dual Simplex Method
 (C) Big-M Method
 (D) Search-Approach Method
70. If the given Linear Programming Problem is in its standard form then primal-dual pair is _____.
 (A) symmetric
 (B) unsymmetric
 (C) square
 (D) triangle
71. When the total demand is equal to supply then the transportation problem is said to be _____.
 (A) balanced
 (B) unbalanced
 (C) maximization
 (D) minimization
72. The server utilization factor is also known as _____.
 (A) Erlang distribution
 (B) Poisson distribution
 (C) Exponential distribution
 (D) Traffic intensity
73. The model in which only arrivals are counted and no departure takes place are called _____.
 (A) pure birth model
 (B) pure death model
 (C) birth death model
 (D) death birth model
74. An _____ represent the start or completion of some activity and as such it consumes no time.
 (A) activity
 (B) event
 (C) slack
 (D) path
75. 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

76. What is linear programming?
- (A) Constrained optimization technique
 - (B) Technique for economic allocation of limited resources
 - (C) Mathematical technique
 - (D) All of the above
77. Constraint in a linear programming model restricts :
- (A) value of objective function
 - (B) value of a decision variable
 - (C) use of the available resources
 - (D) All of the above
78. The distinguishing feature of a linear programming model is _____.
- (A) relationship among all variables is linear
 - (B) it has a single objective function & constraints
 - (C) value of decision variables is non-negative
 - (D) All of the above
79. While solving a Linear Programming model graphically, the area bounded by the constraints is called :
- (A) Feasible region
 - (B) Infeasible region
 - (C) Unbounded solution
 - (D) Non-bounded solution
80. Each optimization problem must have certain parameters called :
- (A) Linear variables
 - (B) Non-linear variables
 - (C) Design variables
 - (D) Dummy variables
81. When the optimization problem cost functions are differentiable, the problem is referred to as :
- (A) rough
 - (B) non-smooth
 - (C) smooth
 - (D) non-rough
82. The feasible region for the inequality constraints with respect to equality constraints :
- (A) increases
 - (B) decreases
 - (C) does not change
 - (D) None of these
83. If two constraints do not intersect in the positive quadrant of the graph then:
- (A) the solution is unbounded
 - (B) the problem is infeasible
 - (C) one of the constraints is redundant
 - (D) None of these

84. Given arrival rate = 15/hr, service rate = 20/hr, the value of traffic intensity is _____.
- (A) $3/4$
(B) $4/3$
(C) $3/5$
(D) $4/5$
85. Hungarian Method is used to solve
- (A) A transportation problem
(B) A travelling salesman problem
(C) A LP problem
(D) Both (A) and (B)
86. The time required by each job on each machine is called-time.
- (A) elapsed
(B) idle
(C) processing
(D) average
87. The time between the starting of the first job and completion of the last job in sequencing problems is called :
- (A) Total time
(B) Assignment time
(C) Elapsed time
(D) Idle time
88. At EOQ :
- (A) Annual purchase cost = Annual ordering cost
(B) Annual ordering cost = Annual carrying cost
(C) Annual carrying cost = Annual shortage cost
(D) Annual shortage cost = Annual purchase cost
89. Which of the following increases with the quantity ordered per order?
- (A) Carrying cost
(B) Ordering cost
(C) Purchase cost
(D) Demand
90. Operations Research (OR) , which is a very powerful tool for :
- (A) Research
(B) Decision – Making
(C) Operations
(D) None of the above
91. Which of the following formula cannot be used to calculate re-order level :
- (A) Minimum level + consumption during lead time
(B) Maximum consumption $\times$ maximum re-order period
(C) Maximum consumption $\times$ lead time + safety stock
(D) Minimum consumption $\times$ minimum re-order period
92. Operations Research attempts to find the best and _____ solution to a problem.
- (A) Perfect
(B) Degenerate
(C) Optimum
(D) None of the above

93. Group replacement policy is most suitable for :
- (A) Trucks
 - (B) Infant machines
 - (C) Street light bulbs
 - (D) New cars
94. The following is not discussed in group replacement policy :
- (A) Failure probability
 - (B) Cost of individual replacement
 - (C) Loss due to failure
 - (D) Present worth factor series
95. Decreasing failure rate is usually observed in ____ stage of the machine.
- (A) infant
 - (B) youth
 - (C) old age
 - (D) any time in its life
96. The production manager will not recommend group replacement policy in case of :
- (A) When large number of identical items is to be replaced
 - (B) Low cost items are to be replaced, where record keeping is a problem
 - (C) For items that fail completely
 - (D) Repairable items
97. The degeneracy in the transportation problem indicates that :
- (A) dummy allocation(s) needs to be added
 - (B) the problem has no feasible solution
 - (C) the multiple optimal solutions exist
 - (D) (A) and (B) but not (C)
98. In a transportation problem, we must make the number of _____ and _____ equal.
- (A) destinations; sources
 - (B) units supplied; units demanded
 - (C) columns; rows
 - (D) positive cost coefficients; negative cost coefficients
99. One disadvantage of using the North-West Corner Rule to find initial the solution to the transportation problem is that :
- (A) it is complicated to use
 - (B) it does not take into account the cost of transportation
 - (C) it leads to a degenerate initial solution
 - (D) All of the above
100. The possible decisions at any stage are known as:
- (A) States
 - (B) Steps
 - (C) Parts
 - (D) None of the above

ROUGH WORK

Example :

Question :

Q.1 (A) ● (C) (D)

Q.2 (A) (B) ● (D)

Q.3 (A) ● (C) (D)

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 & 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 any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ०एम०आर० 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. ओ०एम०आर० 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 में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, 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 प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरिज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।