Serial No. of Booklet :

Code No. : 1287

B. C. A. (Second Semester) Examination, 2022-23

AFFIX PRESCRIBED RUBBER STAMP

Paper Third

DATA STRUCTURE USING 'C'

Course Code—BCA–203T (Major)

In Figures (अंकों में) :

Roll No.

In Words (शब्दों में) :

Date : .....

Time : 2 Hrs.

Signature of Invigilator

कक्ष निरीक्षक के हस्ताक्षर

Max. Marks : 75

Important Instructions :

1. The candidate will write his/her Roll Number only at the places provided for, i. e., on the cover page and on the OMR answer sheet at the end and nowhere else.

2. Immediately on receipt of the question booklet, the candidate should check up the booklet and ensure that it contains all the pages and that no question is missing. If the candidate finds any discrepancy in the question booklet, he/she should report the invigilator within 10 minutes of the issue of this booklet and a fresh question booklet without any discrepancy is obtained.

3. No second question booklet shall be given to a candidate under any circumstances after 10 minutes. The candidate should be careful in handling the question booklet and in filling the OMR answer sheet given separately with this booklet.

महत्त्वपूर्ण निर्देश :

1. अभ्यर्थी अपने अनुक्रमांक केवल उन्हीं स्थानों पर लिखेंगे जो इसके लिए दिये गये हैं, अर्थात् प्रश्न पुस्तिका के मुख्य पृष्ठ तथा साथ दिये गये ओ. एम. आर. उत्तर पत्र पर, तथा अन्यत्र कहीं नहीं लिखेंगे।

2. प्रश्न पुस्तिका मिलते ही अभ्यर्थी को जाँच करके सुनिश्चित कर लेना चाहिए कि पुस्तिका में पूरे पृष्ठ हैं और कोई प्रश्न छूटा तो नहीं है। यदि कोई विसंगति है तो प्रश्न पुस्तिका मिलने के 10 मिनट के भीतर ही कक्ष परिवेक्षक को सूचित करना चाहिए और बिना त्रुटि की दूसरी प्रश्न पुस्तिका प्राप्त कर लेना चाहिए।

3. किसी भी परिस्थिति में 10 मिनट बाद अभ्यर्थी को दूसरी प्रश्न पुस्तिका नहीं मिलेगी अभ्यर्थी को प्रश्न पुस्तिका को उपयोग में लाने और ओ. एम आर. उत्तर पत्र को भरने में सावधानी बरतनी चाहिए।

S

(Contd. on the last page / अन्य निर्देश अन्तिम पृ. पर)

1. An array is a _____ data structure.

(A) linear type

(B) queue type

(C) circular type

(D) None of the above

2. C language uses the _____ to convert the code into machine language.

(A) Compiler

(B) Interpreter

(C) Both compiler and interpreter

(D) None of the above

3. Which one of the following is an application of Queue Data Structure ?

(A) When a resource is shared among multiple consumers.

(B) When data is transferred asynchronously (data not neeessarily received at same rate as sent) between two processes.

(C) Load Balancing

(D) All of the above

4. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity ?

(A) Insertion Sort

(B) Quick Sort

(C) Heap Sort

(D) Merge Sort

5. If (top == – 1), then stack is _____.

(A) full

(B) out of bound

(C) empty

(D) All of the above

6. If (top == max–1), then stack is _____.

(A) empty

(B) recursive

(C) full

(D) None of the above

7. Which function is used to count the number of characters in a string ?

(A) len()

(B) strlen()

(C) chlen()

(D) count()

8. You can declare a string variable by using the _____ keyword in the C program.

(A) str

(B) string

(C) char

(D) char having some size in the array

9. Every C program always required _____.

(A) A function

(B) An input

(C) An output

(D) None of the above

10. In the worst case, the number of comparisons needed to search a singly linked list of length n for a given element is _____.

(A) log 2n

(B) n/2

(C) log 2n–1

(D) n

11. Which of the following is not a logical operator ?

(A) &&

(B) !

(C) ||

(D) +

12. Which of the following operators can be applied on structure variables ?

(A) Equality comparison (= =)

(B) Assignment (=)

(C) Both of the above

(D) None of the above

13. Which one of the following is not a reserved keyword for C ?

(A) auto

(B) main

(C) default

(D) register

14. Which is the only function all C programs must contain ?

(A) start()

(B) system()

(C) main()

(D) printf()

15. Which of the following is not a correct variable type ?

(A) float

(B) real

(C) int

(D) double

16. Which of the following operator takes only integer operands ?

(A) +

(B) *

(C) /

(D) %

17. In C programming language, which of the following type of operators have the highest precedence ?

(A) Relational operators

(B) Equality operators

(C) Logical operators

(D) Arithmetic operators

18. What will be the value of top, if there is a size of stack STACK_SIZE is 5 ?

(A) 5

(B) 6

(C) 4

(D) None of the above

19. Any node is the path from the root to the node is called :

(A) Successor node

(B) Ancestor node

(C) Both (A) and (B)

(D) None of the above

20. FILE reserved word is _____.

(A) structure tag declared in stdio.h

(B) one of the basic datatypes in c

(C) pointer to the structure defined in stdio.h

(D) a type name defined in stdio.h

21. Which type of files can't be opened using fopen() ?

(A) .txt

(B) .bin

(C) .c

(D) None of the above

22. Which of the following data structure store the homogeneous data elements ?

(A) Arrays

(B) Records

(C) Pointers

(D) Lists

23. Which of the following data structure is linear type ?

(A) Array

(B) Tree

(C) Graphs

(D) Hierarchy

24. Which is primitive datatype ?

(A) stack

(B) array

(C) int & float

(D) All of the above

25. POP operation is used in _____.

(A) array

(B) tree

(C) file

(D) stack

26. POP operation is used for _____.

(A) insertion

(B) updation

(C) deletion

(D) None of the above

27. How can we describe an array in the best possible way ?

(A) The array shows a hierarchical structure.

(B) Arrays are immutable.

(C) Container that stores the elements of similar types.

(D) The array is not a data structure.

28. Which of the following highly uses the concept of an array ?

(A) Binary Search tree

(B) Caching

(C) Spatial locality

(D) Scheduling of processes

29. Which one of the following is the size of int arr[9] assuming that int is of 4 bytes ?

(A) 9

(B) 36

(C) 35

(D) None of the above

30. Which one of the following is the process of inserting an element in the stack ?

(A) Insert

(B) Add

(C) Push

(D) None of the above

31. Which is valid C expression ?

(A) int my_num = 100,000;

(B) int my_num 100000;

(C) int my num= 1000;

(D) int $my_num 10000;

32. Pointer is a _____.

(A) keyword

(B) operator

(C) control statement

(D) reference type variable

33. PUSH operation is used for _____.

(A) updation

(B) insertion

(C) deletion

(D) None of the above

34. When the user tries to delete the element from the empty stack, then the condition is said to be a _____.

(A) Underflow

(B) Garbage collection

(C) Overflow

(D) None of the above

35. C is a which level language ?

(A) Low Level

(B) High Level

(C) Low + High

(D) None of the above

36. Low level language is :

(A) human readable like language.

(B) language with big program size.

(C) language with small program size.

(D) difficult to understand and readability is questionable.

37. High level language is a :

(A) human readable like language.

(B) language with small program size.

(C) language with big program size.

(D) language which is difficult to understand and not human readable.

38. Which one of the following is not the application of the stack data structure ?

(A) String reversal

(B) Recursion

(C) Backtracking

(D) Asynchronous data transfer

39. C language was invented in which laboratories ?

(A) Uniliver Labs

(B) IBM Labs

(C) Bell Labs

(D) Verizon Labs

40. Which data structure is mainly used for implementing the recursive algorithm ?

(A) Queue

(B) Stack

(C) Binary tree

(D) Linked list

41. An array is a _____.

(A) Dynamic in nature

(B) Static in nature

(C) Both (A) and (B)

(D) All of the above

42. Which data structure is required to convert the infix to prefix notation ?

(A) Stack

(B) Linked list

(C) Binary tree

(D) Queue

43. Which of the following is the infix expression ?

(A) A + B*C

(B) + A*BC

(C) ABC+*

(D) None of the above

44. Which of the following is the prefix form of A+B*C ?

(A) A+ (BC*)

(B) + AB*C

(C) ABC +*

(D) + A*BC

45. Which of the following is not the correct statement for a stack data structure ?

(A) Arrays can be used to implement the stack.

(B) Stack follows FIFO.

(C) Elements are stored in a sequential manner.

(D) Top of the stack contains the last inserted element.

46. Find an integer constant :

(A) 3.145

(B) 34

(C) "125"

(D) None of the above

47. Find a Floating Point constant :

(A) 12.3E5

(B) 12e34

(C) 125.34857

(D) All of the above

48. A variable of a particular type can hold only a constant of the same type.

(A) TRUE

(B) FALSE

49. Number of keywords present in C language are _____.

(A) 32

(B) 34

(C) 62

(D) 64

50. '*' is used for _____.

(A) pointer

(B) comments

(C) null variable

(D) None of the above

51. If the elements '1', '2', '3' and '4' are added in a stack, so what would be the order for the removal ?

(A) 1234

(B) 2134

(C) 4321

(D) None of the above

52. Types of Integers are :

(A) short

(B) int

(C) long

(D) All of the above

53. What is the outcome of the prefix expression +, –, *, 3, 2, /, 8, 4, 1 ?

(A) 12

(B) 11

(C) 5

(D) 4

54. The minimum number of stacks required to implement a stack is _____.

(A) 1

(B) 3

(C) 2

(D) 5

55. Which one of the following node is considered the top of the stack if the stack is implemented using the linked list ?

(A) First node

(B) Second node

(C) Last node

(D) None of the above

56. Which among the following is a Global Variable ?

(A) auto

(B) register

(C) static

(D) extern

57. What is an array in C language ?

(A) A group of elements of same datatype.

(B) An array contains more than one element.

(C) Array elements are stored in memory in continuous or contiguous locations.

(D) All of the above

58. What are the types of arrays ?

(A) int, long, float, double

(B) struct, enum

(C) char

(D) All of the above

59. An array index starts with :

(A) – 1

(B) 0

(C) 1

(D) 2

60. What is another name for the circular queue among the following options ?

(A) Square buffer

(B) Rectangle buffer

(C) Ring buffer

(D) None of the above

61. A list of elements in which enqueue operation takes place from one end, and dequeue operation takes place from one end is _____.

(A) Binary tree

(B) Stack

(C) Queue

(D) Linked list

62. Which of the following principle does queue use ?

(A) LIFO principle

(B) FIFO principle

(C) Linear tree

(D) Ordered array

63. Operator % in C language is called :

(A) Percentage Operator

(B) Quotient Operator

(C) Modulus

(D) Division

64. Which one of the following is not the type of the queue ?

(A) Linear queue

(B) Circular queue

(C) Double-ended queue

(D) Single-ended queue

65. Which one of the following is the overflow condition if linear queue is implemented using an array with a size MAX_SIZE ?

(A) rear = front

(B) rear = front + 1

(C) rear = MAX_SIZE – 1

(D) rear = MAX_SIZE

66. The time complexity of enqueue operation in Queue is _____.

(A) O(1)

(B) O(n)

(C) O(logn)

(D) O(nlogn)

67. In the linked list implementation of queue, where will the new element be inserted ?

(A) At the middle position of the linked list

(B) At the head position of the linked list

(C) At the tail position of the linked list

(D) None of the above

68. Railway line is an example of _____.

(A) array

(B) line

(C) pointer

(D) queue

69. How many queues are required to implement a Stack ?

(A) 3

(B) 2

(C) 1

(D) 4

70. Which one of the following is not the application of the queue data structure ?

(A) Resource shared between various systems

(B) Data is transferred asynchronously

(C) Load balancing

(D) Balancing of symbols

71. In tree data structure individual terminals are called _____.

(A) keyword

(B) data types

(C) pointers

(D) node

72. What are the datatype of variables that can be returned by a C function ?

(A) int, float, double, char

(B) struct, enum

(C) Pointers to variables, arrays, functions, struct variables, enum variables etc.

(D) All of the above

73. The necessary condition to be checked before deletion from the queue is _____.

(A) Overflow

(B) Underflow

(C) Rear value

(D) Front value

74. Which data structure is the best for implementing a priority queue ?

(A) Stack

(B) Linked list

(C) Array

(D) Heap

75. What is the C keyword that must be used to achieve expected result using recursion ?

(A) printf

(B) scanf

(C) void

(D) return

76. Which of the following principles is used if two elements in the priority queue have the same priority ?

(A) LIFO

(B) FIFO

(C) Linear tree

(D) None of the above

77. Which of the following statements is not true regarding the priority queue ?

(A) Processes with different priority can be easily handled.

(B) Easy to implement.

(C) Deletion is easier.

(D) None of the above

78. A linear data structure in which insertion and deletion operations can be performed from both the ends is _____.

(A) Queue

(B) Deque

(C) Priority queue

(D) Circular queue

79. What is the format specifier used to print a String or Character array in C printf() or scanf() function ?

(A) %c

(B) %C

(C) %s

(D) %w

80. Which of the following statements is not true about the doubly linked list ?

(A) We can traverse in both the directions.

(B) It requires extra space.

(C) Implementation of doubly linked list is easier than the singly linked list.

(D) It stores the addresses of the next and the previous node.

81. %s is used for _____.

(A) integers

(B) string

(C) float

(D) None of the above

82. Choose a right C statement :

(A) Loops or repetition block executes a group of statements repeatedly.

(B) Loop is usually executed as long as a condition is met.

(C) Loops usually take advantage of loop counter.

(D) All of the above

83. malloc() is _____.

(A) keyword

(B) user defined function

(C) operator

(D) standard library function

84. What is the maximum number of children that a node can have in a binary tree ?

(A) 3

(B) 1

(C) 4

(D) 2

85. What is the way to suddenly come out of or quit any loop in C language ?

(A) continue; statement

(B) break; statement

(C) leave; statement

(D) quit; statement

86. What is a structure in C language ?

(A) A structure is a collection of elements that can be of same datatype.

(B) A structure is a collection of elements that can be of different datatype.

(C) Elements of a structure are called members.

(D) All of the above

87. What is the size of a C structure ?

(A) C structure is always 128 bytes.

(B) Size of C structure is the total bytes of all elements of structure.

(C) Size of C structure is the size of largest element.

(D) None of the above

88. Which one of the following techniques is not used in the Binary tree ?

(A) Randomized traversal

(B) Preorder traversal

(C) Postorder traversal

(D) Inorder traversal

89. Choose a valid format specifier :

(A) %d prints integer constants

(B) %u prints unsigned integer constants

(C) %ld prints signed long and %lu prints unsigned long constants

(D) All of the above

90. Which of the following options is not true about the Binary Search tree ?

(A) The value of the left child should be less than the root node.

(B) The value of the right child should be greater than the root node.

(C) The left and right subtrees should also be a binary search tree.

(D) None of the above

91. How can we define a AVL tree ?

(A) A tree which is binary search tree and height balanced tree.

(B) A tree which is a binary search tree but unbalanced tree.

(C) A tree with utmost two children.

(D) A tree with utmost three children.

92. What is the keyword used to declare a C file pointer ?

(A) file

(B) FILE

(C) FILEFP

(D) filefp

93. Why do we prefer Red black tree over AVL tree ?

(A) Red black trees are not strictly balanced.

(B) Red black tree requires lesser rotations than AVL tree.

(C) AVL tree needs more space to store the balance factor.

(D) Both (B) and (C)

94. What is the need for closing a file in C language ?

(A) fclose(fp) closes a file to release the memory used in opening a file.

(B) Closing a file clears buffer contents from RAM or memory.

(C) Unclosed files occupy memory and PC hangs when on low memory.

(D) All of the above

95. Which of the following satisfies the property of the Red Black tree ?

(A) A tree which is a binary search tree but not strtctly balanced tree.

(B) A node must be either Red or Black in color and root node must be black.

(C) A tree with maximum three children.

(D) Both (A) and (B)

96. What are the C functions used to read or write a file in Binary Mode ?

(A) fprintf(), fscanf()

(B) fread(), fwrite()

(C) readf(), writef()

(D) printf(), scanf()

97. Which library function is used to delete reserved memory space ?

(A) free()

(B) malloc()

(C) delete

(D) remove()

98. Which library function is used for reading characters from file in C ?

(A) printf();

(B) getch();

(C) sqrt();

(D) fgetc();

99. Which one of the following is an application of Stack Data Structure ?

(A) Managing function calls

(B) The stock span problem

(C) Arithmetic expression evaluation

(D) All of the above

100. Which data structure uses less memory space C ?

(A) structure

(B) array

(C) pointe

(D) union

4. The candidate has to answer all 100 questions given in question booklet. Ovals are given against the alternative answer to each question. The candidate is expected to fill the oval against the particular question. Each question is of .75 mark.

5. There is no separate answer-book and the candidate has no mark answer on the OMR answer sheet given with this booklet separately. **Only this sheet will be evaluated.** In this answer sheet, the candidate is required :

   (a) To blacken the alternative (A), (B), (C) or (D) which he/she considers to be correct answer to the question.

   (b) To leave blanks all the ovals representing that question which he/she does not attempt.

6. The OMR answer sheet is generated by computer, therefore, in no case it should be multilated or damaged or dog-eared as such sheet will not be evaluated by the computer.

7. As the maximum time allowed for the examination is 2:00 hours. the candidate is advised to spend initial 1:30 hours for the question paper and the remaining 30 minutes for carefully filling in the OMR answer sheet.

8. The candidate shall not bring any loose paper, whether printed, written or blank, mobile phone, calculator etc. inside the examination hall except the Admit Card.

9. End pages of question booklet shall be used for rough work.

Note : Please check the answer number of each question in the question booklet before filling ovals in the OMR answer sheet. Instruction for filling the OMR answer sheet is given on the back of this sheet. Read it carefully and do accordingly. **Use black/blue ball pen only** for filling the OMR answer sheet. Pencil or fountain pen must not be used for this purpose

4. अभ्यर्थी को प्रश्न पुस्तिका में दिये गये सभी 100 प्रश्नों के उत्तर देने हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तरों के सामने ओवेल (गोला) बना हुआ है। अभ्यर्थी द्वारा उपयुक्त ओवेल को पूर्णतया काला कर देना है, जिसको वह प्रश्न का सही उत्तर समझता है। प्रत्येक प्रश्न .75 अंक का है।

5. कोई अलग से उत्तर पुस्तिका नहीं है और अभ्यर्थी को प्रश्न पुस्तिका के साथ अलग दिए गए ओ. एम. आर. उत्तर पत्र पर ही प्रश्नों के उत्तर भरने हैं। **केवल इस उत्तर पत्र का मूल्यांकन होगा।** इस उत्तर पत्र में अभ्यर्थी को निम्न बातें भरनी हैं :

   (अ) प्रश्न के वैकल्पिक उत्तर (A), (B), (C) या (D) जिसे वह प्रश्न का सही उत्तर समझता है, उससे सम्बन्धित ओवेल को काला करें।

   (ब) जिस प्रश्न का उत्तर अभ्यर्थी को नहीं पता है उसके सामने बने सभी ओवेलों को खाली छोड़ दें।

6. ओ. एम. आर. उत्तर पत्र कम्प्यूटर जनित है। अतः किसी भी दशा में इसे विकृत, क्षतिग्रस्त या इसके कोने मुड़े हुए नहीं होने चाहिए।

7. चूँकि परीक्षा की अधिकतम निर्धारित अवधि 2:00 घण्टा है, इसलिए अभ्यर्थी को सलाह दी जाती है कि वह पहले 1 घण्टा 30 मिनट प्रश्नों को हल करने में तथा शेष 30 मिनट ओ. एम. आर. उत्तर पत्र भरने में लगाये।

8. अभ्यर्थी प्रवेश पत्र के अतिरिक्त कोई भी छपा हुआ, लिखा हुआ या कोरा फालतू कागज, मोबाइल फोन, कैलकुलेटर इत्यादि अपने साथ परीक्षा भवन के भीतर नहीं लायेगा।

9. रफ कार्य प्रश्न पुस्तिका के आखिरी पन्नों पर किया जा सकता है।

   टिप्पणी : ओ. एम. आर. उत्तर पत्र में प्रश्नों की उत्तर संख्या भरने से पहले प्रश्न पुस्तिका में हल किये गए सभी प्रश्नों की उत्तर संख्याओं की अच्छी प्रकार जाँच कर लें। ओ. एम. आर. उत्तर पत्र भरने का तरीका उसके पृष्ठ पर दिया गया है। इसे सावधानीपूर्वक पढ़ें और उसके अनुसार भरें। ओ. एम. आर. उत्तर पत्र को भरने के लिए केवल काले/नीले बॉल पेन का प्रयोग करें। पेन्सिल या स्याही वाली पेन का प्रयोग नहीं करना है।