

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

TEST BOOKLET
AP (CC) COMP. APP.—2018

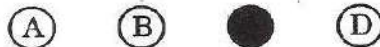
Time Allowed : 2 Hours]

[Maximum Marks : 100

All questions carry equal marks.

INSTRUCTIONS

1. Immediately after the commencement of the examination, you should check that test booklet does not have any unprinted or torn or missing pages or items, etc. If so, get it replaced by a complete test booklet.
2. Write your Roll Number only in the box provided alongside.
Do not write anything else on the Test Booklet.
3. This Test Booklet contains 100 items (questions). Each item comprises four responses (answers). Choose only one response for each item which you consider the best.
4. After the candidate has read each item in the Test Booklet and decided which of the given responses is correct or the best, he has to mark the circle containing the letter of the selected response by blackening it completely with Black or Blue ball pen. In the following example, response "C" is so marked :



5. Do the encoding carefully as given in the illustrations. While encoding your particulars or marking the answers on answer sheet, you should blacken the circle corresponding to the choice in full and no part of the circle should be left unfilled. After the response has been marked in the ANSWER SHEET, no erasing/fluid is allowed.
6. You have to mark all your responses ONLY on the ANSWER SHEET separately given according to 'INSTRUCTIONS FOR CANDIDATES' already supplied to you. Responses marked on the Test Booklet or in any paper other than the answer sheet shall not be examined.
7. All items carry equal marks. Attempt all items. Your total marks will depend only on the number of correct responses marked by you in the Answer Sheet. There will be negative marking and 1/4 (0.25) of the marks will be deducted as penalty for wrong answer.
8. Before you proceed to mark responses in the Answer Sheet fill in the particulars in the front portion of the Answer Sheet as per the instructions sent to you.
9. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
10. After you have completed the test, hand over the Answer Sheet only, to the Invigilator.

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1. The reverse polish notation equivalent to the infix expression $((A + B) \times C + D)/(E + F + G)$ is :
(A) $AB + C \times D + EF + G +$ (B) $AB + CD \times + EFG +$
(C) $AB + C \times D + EF + G + /$ (D) $AB + CD \times + E + FG + /$
2. A sorted algorithm is called stable if :
(A) It takes $O(n \log n)$ time
(B) It takes $O(n)$ time
(C) It maintains relative order of occurrence of non-distinct elements
(D) All of the above
3. Consider a B+-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node ?
(A) 4 (B) 2
(C) 3 (D) 5
4. Given an empty stack, after performing push (a), push (a), push (b), pop, pop, push (b), push (c), pop, pop, pop, push (d), push (a), pop. What is the value of the top of the stack ?
(A) d (B) c
(C) b (D) a

5. Bellman Ford algorithm for single source shortest path is based on :
- (A) Divide & Conquer Approach (B) Branch & Bound Approach
(C) Greedy Approach (D) Dynamic Programming Approach
6. If the address of A[1] [1] and A[2] [1] are 1000 and 1010 respectively and each element occupies 2 bytes, then the array has been stored in.....order.
- (A) Column Major (B) Row Major
(C) Matrix Major (D) None of these
7. Given two sorted list of size 'm' and 'n' respectively. The number of comparisons needed in the worst case by the merge sort algorithm is :
- (A) $m + n - 1$ (B) $\min(m, n)$
(C) $\text{avg}(m, n)$ (D) $m * \log n$
8. Let X be a problem that belongs to the class NP. Then which one of the following is NOT TRUE ?
- (A) X may be undecidable
(B) If X is NP-Hard, then it is NP-Complete
(C) If X can be deterministically in polynomial time, then $P = NP$
(D) There is no polynomial time algorithm for X

9. Match all algorithms in Group 1 with their complexities in Group 2.

Group 1	Group 2
P. Huffman Code	1. $O(\log n)$
Q. AVL Tree	2. $O(n \log n)$
R. Bucket Sort	3. $O(n^3)$
S. Optimal Binary Search Tree	4. $O(n)$

Codes :

- (A) P-1, Q-2, R-4, S-3 (B) P-2, Q-3, R-4, S-1
(C) P-2, Q-1, R-4, S-3 (D) P-2, Q-1, R-3, S-4
10. Consider the matrices P, Q and R with dimensions 2×3 , 3×4 and 4×5 respectively. What is the minimum number of multiplications required to multiply the three matrices ?
- (A) 90 (B) 64
(C) 120 (D) 60
11. Which of the following is the longest common subsequence between the strings "PMGNCAFDG" and "NGPACFMD" ?
- (A) PMD (B) GAD
(C) CFD (D) None of these
12. In which one of the following layer of OSI reference model PPP (Point to Point Protocol) is used ?
- (A) Physical (B) Data Link
(C) Transport (D) Session

13. Which of the following is a type of analog to digital conversion technique in data communication ?
- (A) Phase Modulation (PM) (B) Delta Modulation (DM)
(C) Amplitude Modulation (AM) (D) Frequency Modulation (FM)
14. Which of the following is used as private IP address ?
- (A) 192.168.0.1 (B) 10.10.10.10
(C) 172.24.1.1 (D) All of these
15. If 5 bits are used for sequence number, then what is the sender window size in selective repeat scheme ?
- (A) 16 (B) 15
(C) 32 (D) 31
16. In link state routing algorithm after construction of link state packets, new routes are computed using :
- (A) Bellman Ford algorithm (B) Ford Fulkerson algorithm
(C) Dijkstra algorithm (D) All of these
17. If a class B networks on the Internet has a subnet mask of 255.255.248.0, what is the maximum number of hosts per subnet ?
- (A) 2046 (B) 1024
(C) 1022 (D) 2048

18. Which of the following information does *not* contain in TCP header format ?
- (A) Urgent Pointer (B) Type of Service
(C) Window Size (D) Optional Data
19. Which of the following radio frequency spectrum bands is used in cellular telephony networks ?
- (A) High Frequency (HF) (B) Very High Frequency (VHF)
(C) Ultra High Frequency (UHF) (D) Super High Frequency (SHF)
20. Which of the following is a monoalphabetic cipher technique ?
- (A) Lucifer Cipher (B) Play Fair Cipher
(C) Contradictory Cipher (D) Caesar Cipher
21. How many 3×8 decoders are needed to construct 6×64 decoders ?
- (A) 8 (B) 9
(C) 10 (D) 16
22. How many different Boolean functions of degree 4 are there ?
- (A) 2^4 (B) 2^8
(C) 2^{12} (D) 2^{16}
23. What is the result of Boolean expression $(AB + AC + A)(BC + CD + C + B)$?
- (A) $AB + AC$ (B) $AB + BC$
(C) ABC (D) $AC + BC$

24. A serial in/parallel out, 4-bit shift register initially contains all 1s. The data nibble 0111 is waiting to enter. After four clock pulses, the register contains
- (A) 0000 (B) 0111
(C) 1000 (D) 1111
25. Which one of the following is *not* a logical instruction in 8085 micro-processor ?
- (A) RAR (B) STC
(C) CMC (D) INR
26. Which register is used for temporary storing the address during CALL instruction in 8085 microprocessor ?
- (A) WZ (B) PC
(C) SP (D) None of these
27. The process adjusting the code and data in the program to reflect the assigned addresses is called.....
- (A) Assembly (B) Relocation
(C) Absolute Addressing (D) Linking
28. Which one of the following is non-vectored interrupt ?
- (A) TRAP (B) INTR
(C) RST 7.5 (D) RST 6.5

29. A memory management algorithm, realizing virtual memory, partially swap out a process. This is similar to which kind of CPU scheduling.
- (A) Short-term scheduling (B) Medium-term scheduling
 (C) Long-term scheduling (D) None of these
30. In Linux, PID of the kernel process is.....
- (A) 0 (B) 1
 (C) 2 (D) Undefined
31. If there are 32 segments, each of size 1 kB, then the logical address should have.....
- (A) 10 bits (B) 15 bits
 (C) 5 bits (D) None of these
32. A critical section is a program segment.....
- (A) Which should run in a certain specified amount of time
 (B) Which avoids deadlock
 (C) Which must be enclosed by a pair of semaphore operations, P and V
 (D) Where shared resources are accessed
33. At A process executes the code
- ```

Fork ();
Fork ();
Fork ();

```
- The total number of child processes created is.....
- (A) 3                                              (B) 4  
 (C) 7                                              (D) 8



34. Consider a system with TLB access time of 10 ns and main memory access time of 100 ns. Calculate the effective memory access time if TLB hit ratio is 90%.
- (A) 125 ns (B) 100 ns  
(C) 110 ns (D) 120 ns
35. Assuming that the disk head is located initially at 20, find the number of disk moves required with SSTF if the disk queue of I/O block requests are 90, 35, 12, 110, 63, 67 :
- (A) 106 (B) 297  
(C) 110 (D) 123
36. Which of the following is the most appropriate format for graphics that are to be embedded within an Internet document ?
- (A) JPEG (B) GIF  
(C) BMP (D) HTML
37. Which of the following is *not* a pair tag in HTML ?
- (A) `<b>` (B) `<img>`  
(C) `<p>` (D) `<a>`
38. Which of the following statements is/are *true* ?
- I. Shortest remaining time first scheduling may cause starvation.  
II. Preemptive scheduling may cause starvation.  
III. Round robin is better than FCFS in terms of response time.
- (A) I only (B) I and III only  
(C) II and III only (D) I, II and III

39. Which one of the following Linux commands is used to record a user login session in a file ?

(A) Script

(B) Session

(C) Record

(D) None of these

40. What is the complexity of safe sequence using Banker's algorithm where  $m$  is the number of resources and  $n$  is the number of processes ?

(A)  $mn$

(B)  $n^2$

(C)  $mn^2$

(D)  $m^2n$

41. Given the following statements :

S1 : Every context-sensitive language L is recursive.

S2 : There exists a recursive language that is not context-sensitive.

Which statement is *correct* ?

(A) Only S1 is correct

(B) Only S2 is correct

(C) Both S1 and S2 are not correct

(D) Both S1 and S2 are correct

42. The family of context free language is.....under intersection and.....under compliment.

(A) closed, not closed

(B) not closed, not closed

(C) closed, closed

(D) not closed, closed

43. A bottom-up parser while parsing an input string from left to right makes use of.....

- (A) Rightmost derivation
- (B) Leftmost derivation
- (C) Rightmost derivation traced out in reverse
- (D) Bottom-up derivation traced in reverse

44. Which two of the following four regular expressions are equivalent ?

I.  $(00)^* (\epsilon + 0)$

II.  $(00)^*$

III.  $0^*$

IV.  $0(00)^*$

(A) I and II

(B) I and III

(C) II and III

(D) III and IV

45. Which of the following languages over  $\{a, b, c\}$  is accepted by a deterministic push down automata ?

(A)  $\{WCW^R \mid W \in \{a, b\}^*\}$

(B)  $\{WW^R \mid W \in \{a, b, c\}^*\}$

(C)  $\{a^n b^n c^n \mid n \geq 0\}$

(D)  $\{W \mid W \text{ is a palindrome over } \{a, b, c\}^*\}$



46. Which of the following statements is *false* ?

- (A) Halting problem of Turing machines is undecidable
- (B) Given two arbitrary context-free grammars  $G_1, G_2$  and it is undecidable when  $L(G_1) = L(G_2)$
- (C) Given two regular grammars  $G_1, G_2$  and it is undecidable when  $L(G_1) = L(G_2)$
- (D) Determining whether a context-free grammar is ambiguous is undecidable

47. Given the following expression grammar :

$$E \rightarrow E * F \mid F + E \mid F, F \rightarrow F - F \mid id$$

Which of the following is *true* ?

- (A)  $*$  has higher precedence than  $+$
- (B)  $+$  and  $-$  have same precedence
- (C)  $+$  has higher precedence than  $*$
- (D)  $-$  has higher precedence than  $*$

48. Assume that the LALR parser for a grammar  $G_1$  has  $n_1$  states and the CLR parser for  $G_2$  has  $n_2$  states. The relationship between  $n_1$  and  $n_2$  is :

- (A)  $n_1 < n_2$
- (B)  $n_1 > n_2$
- (C)  $n_1 \leq n_2$
- (D)  $n_2 \leq n_1$

49. The identification of common sub-expression and replacement of run-time computations by compile time computation is :
- (A) Common folding (B) Constant folding  
(C) Local optimization (D) Global optimization
50. In an absolute loading scheme which loader function is accomplished by assembler ?
- (A) Linker (B) Loader  
(C) Allocation (D) Re-allocation
51. The number of equivalence relations on a set {1, 2, 3} is :
- (A) 3 (B) 5  
(C) 7 (D) 8
52. The power set of empty set has exactly.....subset.
- (A) Two (B) Zero  
(C) One (D) None of these
53. The process of managing simultaneous operations on the database without having them interfere with one another is known as :
- (A) Concurrency Control (B) Recoverability  
(C) Serializability (D) Transaction Management

54. In an SQL query involving NOT, OR and AND without parenthesis, what is the order of evaluation ?
- (A) NOT followed by AND followed by OR
  - (B) NOT followed by OR followed by AND
  - (C) AND followed by OR followed by NOT
  - (D) OR followed by AND followed by NOT
55. Consider a "Customer" database table having a column "e\_name" filled with all the names of Customer. The SQL command that finds all Customer name that starts with letters 'A' or 'S'.
- (A) Select \* from Customer where e\_name = 'A%' OR 'S%'
  - (B) Select \* from Customer where e\_name = 'A\$' OR 'S\$'
  - (C) Select \* from Customer where e\_name like 'A%' OR 'S%'
  - (D) Select \* from Customer where e\_name like 'A\$' OR 'S\$'
56. Which one of the following is a key factor for preferring B+ tree to binary search tree for indexing database relations ?
- (A) Database relations have a large number of records
  - (B) Data transfer from disks is in blocks
  - (C) Database relations are sorted on the primary key
  - (D) B+ trees requires less memory than binary search tree



57. Match the following :

|                     |                     |
|---------------------|---------------------|
| I. OLAP             | A. Back propagation |
| II. OLTP            | B. Classification   |
| III. Decision Tree  | C. RDBMS            |
| IV. Neural Networks | D. Data Warehouse   |

- |     | I | II | III | IV |
|-----|---|----|-----|----|
| (A) | C | D  | A   | B  |
| (B) | D | C  | B   | A  |
| (C) | C | D  | B   | A  |
| (D) | D | C  | A   | B  |

58. Which of the following techniques is an alternative to log based recovery ?

- |                   |                  |
|-------------------|------------------|
| (A) Shadow paging | (B) Check points |
| (C) Locks         | (D) All of these |

59. Let  $R = (A, B, C, D, E, F)$  be a relation scheme with the following dependencies  $C \rightarrow F, E \rightarrow A, EC \rightarrow D, A \rightarrow B$ . Which of the following is a key for  $R$  ?

- |        |        |
|--------|--------|
| (A) CD | (B) AC |
| (C) EC | (D) AE |

60. Which of the following processes includes data cleaning, data integration, data selection, data transformation, data mining, pattern evolution and knowledge presentation ?

- |                 |                 |
|-----------------|-----------------|
| (A) KTL Process | (B) MTX Process |
| (C) ETL Process | (D) KDD Process |

61. What do you mean by Data scrubbing in data warehousing ?
- (A) A process to reject data from the data warehouse and to create the necessary indexes
  - (B) A process to upgrade the quality of data before it is moved into a data warehouse
  - (C) A process to upgrade the quality of data after it is moved into a data warehouse
  - (D) A process to load the data in the data warehouse and to create the necessary indexes
62. Which of the following is *worst* type of module coupling ?
- (A) Content coupling
  - (B) Control coupling
  - (C) Common coupling
  - (D) External coupling
63. Which one of the following is *not* a step of requirement engineering ?
- (A) Requirement Elicitation
  - (B) Requirement Analysis
  - (C) Requirement Design
  - (D) Requirement Documentation
64. In functional point analysis, the number of complexity adjustment factor is :
- (A) 14
  - (B) 10
  - (C) 16
  - (D) 12

65. 63000 LOC gaming software is developed, with the effort of 4 person-year. What is the productivity of person-month ?
- (A) 15.7 KLOC (B) 1.6 KLOC  
(C) 1.3 KLOC (D) 2.4 KLOC
66. Testing of software with actual data in actual environment is called :
- (A) Alpha testing (B) Beta testing  
(C) Gamma testing (D) Regression testing
67. (2, 4) is a point on a circle that has centre at the origin. Which of the following points are also on circle ?
- (A) (2, - 4) (B) (4, - 2)  
(C) (- 4, 2) (D) All of these
68. ....is a line drawing algorithm based only on integer calculation.
- (A) Caman's line drawing algorithm  
(B) Digital Differential Analyzer (DDA) line drawing algorithm  
(C) Bresenham's line drawing algorithm  
(D) All of the above
69. In Cohen-Sutherland line clipping algorithm, the region code 1000 represents the.....
- (A) Top Clipping window (B) Left Clipping window  
(C) Right Clipping window (D) Bottom Clipping window



70. The point at which a set of projected parallel lines appear to converge is called as :

- (A) Point of illusion (B) Point of diffusion  
(C) Convergence point (D) Vanishing point

71. In JAVA, the class at the top of exception class hierarchy is :

- (A) Throwable (B) Object  
(C) Exception (D) None of these

72. Which of the following operations can be performed on the file "source.txt" using the code below in C language ?

```
FILE *fp;
fp = fopen("source.txt", "r+");
```

- (A) Reading Only (B) Writing Only  
(C) Reading and Writing (D) Appending Only

73. Which method registers a thread in a thread scheduler in JAVA ?

- (A) Start( ) (B) Run( )  
(C) Register( ) (D) Enter( )

74. What is the output of the following C language code ?

```
main ()
{
 int a;
 a=(20, 30, 10);
 printf("%d", a);
}
```

- (A) 10 (B) 30  
(C) 60 (D) Compile time error

75. In C++, the compiler identifies a virtual function to be pure.....
- (A) By the presence of the keyword pure
  - (B) By its location in the program
  - (C) If it is equal to 0
  - (D) None of the above

76. What will be the output of the following program in C Language ?

```
main()
{
 int x,y = 10;
 x = y * NULL;
 printf("\%d\",x);
}
```

- (A) 0
  - (B) 10
  - (C) Error
  - (D) Garbage value
77. If a binary operator is overloaded as a member function, how many parameters will the member function require ?
- (A) Two-to pass the first and second operand
  - (B) Binary operators can't be overloaded as global functions, only as member functions of a class
  - (C) None-Both operands are passed via the object
  - (D) One-to pass the second operand. The first operand is the object itself

78. Which of the following operations *cannot* be performed on pointers in C ?
- (A) Subtraction of a pointer to another pointer
  - (B) Addition of two pointers
  - (C) Increment the value of a pointer
  - (D) Decrements the value of a pointer
79. Which of the following *cannot* be declared as static in C++ ?
- (A) Class
  - (B) Functions
  - (C) Member variables
  - (D) None of these
80. Which of the following declares an abstract method in an abstract Java class ?
- (A) public abstract method ( )
  - (B) public void abstract method ( )
  - (C) public void method ( )
  - (D) public abstract void method ( )
81. Who was the first woman President of Indian National Congress ?
- (A) Aruna Asaf Ali
  - (B) Indira Gandhi
  - (C) Annie Besant
  - (D) Sarojini Naidu
82. When was Namami Ganga Yojana launched ?
- (A) July 2013
  - (B) July 2014
  - (C) July 2016
  - (D) June 2015



83. Where is the forest area known as Silent Valley, located ?
- (A) Assam (B) Kerala  
(C) Himachal Pradesh (D) Mizoram
84. The oldest mountain range of India is :
- (A) Aravalli (B) Himalaya  
(C) Satpura (D) Sahyadri
85. Who is the author of "Kashmir : The Vajpayee Years" ?
- (A) Farooq Abdullah (B) K.V. Kamath  
(C) A.S. Dulat (D) Shashi Tharoor
86. Which among the following is the major irrigation project in Himachal Pradesh ?
- (A) Changar Project (Bilaspur) (B) Balh Valley Project  
(C) Shahnehar Project (D) Phinna Singh Project
87. Hangrang tehsil is in which district ?
- (A) Lahaul-spiti (B) Kinnaur  
(C) Chamba (D) Shimla
88. The Lufthansa is the airlines of :
- (A) USA (B) Britain  
(C) Germany (D) France

89. "The City of God" book was written by :
- (A) Plato (B) Chanakya  
(C) Saint Augustine (D) Adam Smith
90. When was "Silver Card Yojana" launched in Himachal Pradesh ?
- (A) 2015 (B) 2014  
(C) 2017 (D) 2016
91. When was Dayanand Saraswati born ?
- (A) 1824 (B) 1836  
(C) 1830 (D) 1811
92. When was Communist Party of India (Marxist) formed ?
- (A) 1966 (B) 1967  
(C) 1961 (D) 1964
93. The Speaker of the Lok Sabha may resign his office by writing to the :
- (A) President of India (B) Prime Minister  
(C) Chief Justice (D) Deputy Speaker of Lok Sabha
94. The Panchayati Raj is included in the :
- (A) State List (B) Union List  
(C) Concurrent List (D) Residuary Powers

95. Where was the capital of Bhajji state ?
- (A) Naldehra (B) Halog  
(C) Sunni (D) Koti
96. Who was the founder of Mahlog state ?
- (A) Ajit Chand (B) Uttam Chand  
(C) Bir Chand or (Hari Chand) (D) Raghunath Chand
97. Balson (Ghodana) princely state is now part of district :
- (A) Shimla (B) Solan  
(C) Sirmour (D) Kinnaur
98. Who founded Kuthar princely state ?
- (A) Surat Chand (B) Durga Singh  
(C) Bhup Chand (D) Gopal Chand
99. Where is Lytton memorial located ?
- (A) Dharamshala (B) Nahan  
(C) Shimla (D) Solan
100. Pajhota area in Sirmour district is now the part of Tehsil :
- (A) Renuka (B) Shillai  
(C) Nohradhar (D) Rajgarh