348/2005

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. Flow control in TCP/IP is handled using :
   - (A) Urgent pointer
   - (B) Checksum
   - (C) Acknowledgement number
   - (D) Variable-size sliding window

2. Which among the following is a protocol of Wireless LAN?
   - (A) 802.2
   - (B) 802.3
   - (C) 802.5
   - (D) 802.11

3. The default payload of TCP segment established during connection setup in bytes is :
   - (A) 536
   - (B) 512
   - (C) 1024
   - (D) 1048

4. Which is the protocol among the following that is used for translating from physical address to Internet address?
   - (A) ICMP
   - (B) IGRP
   - (C) ARP
   - (D) RARP

5. Which property among the ones given below is not possessed by the HTTP protocol?
   - (A) Non-cached
   - (B) Lightweight
   - (C) Stateless
   - (D) Application level

6. The port number assigned to FTP protocol is :
   - (A) 23
   - (B) 22
   - (C) 69
   - (D) 21

7. The protocol used in TCP/IP for dynamic address assignment is :
   - (A) ARP
   - (B) RARP
   - (C) DHCP
   - (D) ICMP

8. Which of the following is true about a cross compiler?
   - (A) It is written in the machine code of one processor and produces code for another processor
   - (B) It is used for compiler porting
   - (C) It may be written in the same language as the one for which it is a compiler of
   - (D) All of these

C

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[P.T.O.]

9. Which of the following phases of a compiler is not in the backend?
   - (A) Syntax analysis
   - (B) Intermediate code generation
   - (C) Code generation
   - (D) Code optimization

10. FORTRAN does not support recursion because :
   - (A) It does not have pointer data type
   - (B) It is used for scientific and engineering applications
   - (C) It uses dynamic allocation
   - (D) It is not a format free language

11. For a given grammar, which among the following parsing tables are likely to have the most number of states?
   - (A) SLR
   - (B) LALR
   - (C) LR(0)
   - (D) LR(1)

12. A parsing algorithm used in top down parsing is :
   - (A) SLR
   - (B) LL
   - (C) LR
   - (D) LALR

13. Which among the following is not used for intermediate code generation?
   - (A) Quadruples
   - (B) Triples
   - (C) Syntax trees
   - (D) Parse trees

14. DAG is used in a compiler for :
   - (A) Intermediate code generation
   - (B) Code generation
   - (C) Code optimization
   - (D) Parsing

15. YACC is a program in UNIX used for :
   - (A) automatic scanner generation
   - (B) automatic parser generation
   - (C) automatic code generation
   - (D) none of these

16. Which of the following identifiers used in LEX contains the sequence of characters forming a token?
   - (A) yylval
   - (B) yyerror
   - (C) yytext
   - (D) yystack

17. Consider the following grammar :
   $S \rightarrow (S) \quad S \rightarrow x$
   Which of the following statements is (are) true?
   - (i) The grammar is ambiguous
   - (ii) The grammar is suitable for top-down parsing
   - (iii) The grammar is suitable for bottom-up parsing
   - (A) (iii) only
   - (B) (ii) only
   - (C) (i) only
   - (D) (ii) and (iii)

18. Which of the following operations is context free languages not closed under?
   - (A) Union
   - (B) Closure
   - (C) Intersection
   - (D) Substitution

19. A phenomenon in virtual memory schemes in which the processor spends most of the time swapping pages rather than executing instructions is :
   - (A) loading
   - (B) swapping
   - (C) trashing
   - (D) aging

20. Which among the following is not a reason for process termination?
   - (A) Normal termination
   - (B) Memory unavailable
   - (C) Protection error
   - (D) Invalid time

21. Which of the following is (are) true about virtual memory systems that use pages?
   - (i) The virtual address space can be larger than the amount of physical memory
   - (ii) Programs must be resident in main memory throughout their execution
   - (iii) Pages correspond to semantic characteristics of the program.
   - (A) (i) only
   - (B) (ii) only
   - (C) (i) and (ii)
   - (D) (i) and (iii)

22. Which among the following will not lead to a deadlock?
   - (A) Mutual exclusion
   - (B) Hold and wait
   - (C) Preemption
   - (D) Circular wait

23. Which level of security is implemented in Windows NT?
   - (A) A1
   - (B) C1
   - (C) B2
   - (D) C2

24. A method of executing two or more programs concurrently using the same computer describe :
   - (A) multi processing
   - (B) multiprogramming
   - (C) virtual processing
   - (D) time sharing

25. Windows is a —————— bit operating system.
   - (A) 8
   - (B) 16
   - (C) 32
   - (D) 64

26. The UNIX shell :
   - (A) does not come with the rest of the system
   - (B) forms the interface between the user and the kernal
   - (C) does not give any scope for programming
   - (D) does not allow calling one program from with in another

27. The invalid file in UNIX from among the ones given below is :

    (A) /bin/unix   (B) /etc/passwd

    (C) /etc/group   (D) /usr/bin/vi

28. The very first process created by the Kernal in UNIX is :

    (A) init   (B) getty

    (C) fork   (D) none among these

29. A software package that includes two or more applications, such as word processing and spreadsheets, providing for easy transfer of data between them is best defined as :

    (A) software server   (B) software set

    (C) integrated software package   (D) application set

30. Which of the following is a software selection criteria?

    (A) Appropriateness   (B) Efficiency

    (C) Compatibility   (D) All of the above

31. Which among the following set is the software that connects two disparate applications allowing them to communicate with each other and to exchange data?

    (A) Intranet middleware   (B) Software bridge

    (C) Software server   (D) Software agent

32. Which of the following is NOT a property of bitmap graphics?

    (A) Fast hardware exists to move blocks of pixels efficiently

    (B) Realistic lighting and shading can be done

    (C) All line segments can be displayed as straight

    (D) Polygons can be filled with solid colors and textures

33. Which of the following characteristics of a programming language is best specified using a context-free grammar?

    (A) Identifier length   (B) Maximum level of nesting

    (C) Operator precedence   (D) Type compatibility

34. Which of the following comes closest to being a perfectly secure encryption scheme?

    (A) The Caesar Cipher, a substitution cipher

    (B) DES (Data Encryption Standard), a symmetric-key algorithm

    (C) Enigma, a transposition cipher

    (D) One-time pad

35. Which of the following is a parameter passing method used in C?

    (A) Call by value   (B) Call by result

    (C) Call by value-result   (D) Call by name

36. Prolog programs are :

    (A) facts and knowledge bases   (B) horn clauses

    (C) a set of functions   (D) none of the above

37. Kerberos is :

    (A) an operating system

    (B) a networking file system protocol

    (C) an encrypted file system

    (D) a system that supports authentication in distributed systems

38. ACL stands for :

    (A) Automatic Control Language   (B) Access Control List

    (C) Associate Cache Level   (D) Amortized Circular Lists

39. A one-time password is :

    (A) one that changes every time it is used

    (B) one that is assigned once and not changed at all

    (C) one that can be used only at a particular time of the day

    (D) one that is assigned for all session that starts at a particular time

40. A hostile applet is :

    (A) A downloadable applet that can cause harm on a client's system

    (B) An applet that resides on a system infected with a virus

    (C) A downloadable applet that attaches itself to an existing applet

    (D) An applet generated by another applet

41. The Page Rank algorithm is used by :

    (A) www.google.com   (B) www.yahoo.com

    (C) www.altavista.com.   (D) www.go.com

42. The recursive function defined by $f(n) = 1$ if $n = 1$ and $f(n) = n + f(n-1)$ computes the value :

    (A) n^2 (B) $n!$

    (C) $n(n+1)/2$ (D) $2n$

43. Which of the following file formats have the largest compression ratio?

- (A) JPG
- (B) PCX
- (C) BMP
- (D) TIFF

44. The founder of Computer Graphics is :

- (A) Blaise Pascal
- (B) Ivan Sutherland
- (C) Dennis Ritchie
- (D) Gourard

45. The scientist credited with the evolution of the JAVA programming language is :

- (A) James Gosling
- (B) Scott McNealy
- (C) Andy Grove
- (D) Linus Torvalds

46. The scientist who developed the idea of the WWW is :

- (A) James Gosling
- (B) Tim Berns Lee
- (C) Andrew Tannenbaum
- (D) Linus Torvalds

47. Discovery of hidden patterns in a very large database is called :

- (A) Data Warehousing
- (B) Data Management
- (C) Online Transaction Processing
- (D) Data Mining

48. SQL is :

- (A) Data Definition Language
- (B) Data Manipulation Language
- (C) Both (A) and (B)
- (D) Neither (A) nor (B)

49. Which of the following terms is not related with ISDN?

- (A) NT1
- (B) ATM
- (C) BRI
- (D) PRI

50. Which of the following commands can be executed by a user for knowing the number of users logged in a UNIX system?

- (A) ps
- (B) telnet
- (C) who
- (D) login

51. $1 + 4 + 7 + \ldots + (3n - 2)$ is :

- (A) $3n(n+1)/2$
- (B) $n(3n-1)/2$
- (C) $n(2n-1)/2$
- (D) $n(3n+1)$

52. Which among the following functions is not reflexive?

- (A) The relation $\Leftarrow$ on the set Z of integers
- (B) Set inclusion $\subseteq$ on a collection C of sets
- (C) Relation $\perp$ (perpendicular) on the set of lines L in a plane
- (D) Relation $||$ (parallel) on a set of lines L in a plane

53. Which of the following type of relations partitions a set into a set of disjoint classes?

- (A) partial ordering
- (B) equivalence
- (C) reflexive
- (D) symmetric

54. How many times in nPr that of nCr ?

- (A) $r!$
- (B) $n!$
- (C) $(n-r)!$
- (D) $n \cdot r$

55. Deterministic and non-deterministic models of which among the following automata have non-equivalent powers?

- (A) FA
- (B) PDA
- (C) LBA
- (D) TM

56. Which among the following types of languages are accepted both by Finite automata and Pushdown automata?

- (A) Regular
- (B) Context free
- (C) Context sensitive
- (D) None of the above

57. Consider the following two languages over $\{a, b\}$.

$L1$-the set of strings beginning and ending with an a

$L2$-the set of strings with same number of a's and b's.

Which of the following is true about $L1$ and $L2$?

- (A) $L1$ and $L2$ are both regular
- (B) $L1$ is regular and $L2$ is context-free but not regular
- (C) Neither $L1$ nor $L2$ is regular, but both are context-free
- (D) $L1$ is context-free but not regular and $L2$ is not context-free

58. Classify into one of the alternatives the grammar denoted by the productions $S \to aB$, $S \to bA$, $A \to a$, $A \to aS$, $A \to bAA$, $B \to b$, $B \to bS$, $B \to aBB$, $AB \to BA$:

- (A) Regular grammar
- (B) Context free grammar
- (C) Context sensitive grammar
- (D) Unrestricted grammar

59. $\sim q \vee p$ is equivalent to :

    (A) $\sim p \to q$ (B) $q \to p$

    (C) $\sim p \to \sim q$ (D) $\neg q \to \sim p$

60. CRC is :

    (A) an error detection code

    (B) an error correction code

    (C) an error detection and correction code

    (D) none of these

61. Totempole output is characteristic of the logic IC family :

    (A) RTL   (B) CMOS

    (C) TTL   (D) IIL

62. A XOR B is equivalent to :

    (A) $(A+B)\cdot(\overline{B}+\overline{A})$ (B) $\overline{A}\,\overline{B}+BA$

    (C) $AB+\overline{B}\,\overline{A}$ (D) $(A+\overline{B})\cdot(\overline{B}+A)$

63. Which of the following is not correct?

    (A) $(x+y)' = x'\cdot y'$ (B) $(x'+y') = x\cdot y$

    (C) $(x'\cdot y') = x+y$ (D) $(x'+y') = x'\cdot y'$

64. Which among the following flip-flops is a modification to the R-S flip-flop that avoids its indeterminate state?

    (A) JK flip-flop   (B) D flip-flop

    (C) Q flip-flop   (D) T flip-flop

65. The decimal equivalent of the octal number 137 is :

    (A) 85   (B) 87

    (C) 95   (D) 97

66. The next larger integer corresponding to the positive integer whose representation in hexadecimal format is FF, represented in octal form is :

    (A) 1000   (B) 100

    (C) 177   (D) 200

67. Into which of the following categories of tokens can you classify the character stream "elseif"?

    (A) Keyword   (B) Identifier

    (C) Reserved word   (D) None of these

68. How many C tokens are present in the following assignment statement a+=b;

    (A) 2   (B) 3

    (C) 4   (D) 5

69. The operator in C among the following that is not overloaded is :

    (A) .   (B) /

    (C) +   (D) −

70. The incorrect statement a++b++ in C can be converted to a legal statement by changing which of the + characters to = ?

    (A) 1st alone   (B) 2nd alone

    (C) 1st or 2nd   (D) 1st or 2nd alone but not both

71. Which of the following is a valid operator of C++ but not of C?

    (A) New   (B) ++

    (C) −−   (D) →

72. An abstract class in C++ is :

    (A) a class with no data members

    (B) a class with no member functions

    (C) a class declared with virtual qualification

    (D) used to provide a standard interface for derived classes

73. In a publicly derived subclass, the protected members of a superclass are :

    (A) available with public visibility   (B) available with protected visibility

    (C) available with private visibility   (D) not available

74. Which among the following DMLs given below is a domain calculus language?

    (A) SQL   (B) QUEL

    (C) QBE   (D) SEQUEL

75. A relation in BCNF with no multivalued dependencies is in :

    (A) 1 NF   (B) 2 NF

    (C) 3 NF   (D) 4 NF

76. From a table STUDENT with the fields ROLL NO., NAME, MARK1, MARK2 and MARK3, which of the following SQL command lists student with the highest mark in mark1 field

    (A) SELECT ROLL NO., MARK1 FROM STUDENT ORDER BY MARK1

    (B) SELECT ROLL NO., MARK1 FROM STUDENT GROUP BY MARK1

    (C) SELECT ROLL NO., MARK1 FROM STUDENT WHERE MARK1 = SELECT MAX(MARK1) FROM STUDENT

    (D) None of the above

77. If $A \to BC$, $B \to E$ and $CD \to EF$ hold in a relation scheme $R(A, B, C, D, E, F)$, which of the following functional dependencies also hold?

    (A) $B \to D$ (B) $AD \to CD$

    (C) $D \to A$ (D) $B \to C$

78. In a relation scheme R with attributes A, B, C which of the following defines the augmentation property?

    (A) If $A \to B$ holds, then $AC \to BC$ where C is a subset of R

    (B) $A \to B$ and $B \to C$ implies $A \to C$

    (C) If $A \to B$ holds, then $B \to A$ also hold

    (D) $X \to YZ$ implies $X \to Y$ and $X \to Z$

79. Spurious tuples may occur due to

    (i) Bad normalization

    (ii) Theta joins

    (iii) Updating tables from join

    (A) (ii) or (iii)   (B) (ii) and (iii)

    (C) (i) and (iii)   (D) (i) or (iii)

80. Which of the following data structure is widely used in a network model RDBMS?

    (A) Arrays   (B) Graphs

    (C) Trees   (D) Stacks

81. Tables derived from the ER diagram are :

    (A) are totally unnormalized   (B) are always in 1 NF

    (C) can be further denormalized   (D) may have multivalued attribute

82. A non-linear data structure from among the set given below is :

    (A) queue   (B) stack

    (C) linked list   (D) tree

83. The equivalent prefix expression corresponding to the infix expression $(a + b) \cdot (c + d) - g + h$ is :

    (A) $+ - \cdot ab \cdot cd \cdot gh$ (B) $+ ab \cdot \cdot cd - g + h$

    (C) $+ - \cdot + abcd + gh$ (D) $+ - \cdot + ab + cdgh$

84. In a complete binary tree of depth n, the difference between the number of nodes at level n and level $n - 1$ is

    (A) $2^{(n-1)}$ (B) 2^n

    (C) $2^{(n-2)}$ (D) $2^n - 1$

85. A binary tree with 20 nodes can have ——————— null branches (A null branch is a branch pointed to by a null pointer, if represented by a linked list structure).

    (A) 20   (B) 21

    (C) 10   (D) 9

86. How many distinct binary trees are possible with n nodes?

    (A) $2^n - n$ (B) $n!$

    (C) $n! - n$ (D) 2^n

87. Which among the following is the average case complexity of the quick sort algorithm?

    (A) $O(\log n)$ (B) $O(n^2)$

    (C) $O(n \log n)$ (D) $O(\log n^2)$

88. A common property of the selection sort and quick sort algorithm is :

    (A) an in place sorting method   (B) best case is of $O(n)$ complexity

    (C) average is of $O(n \log n)$ complexity   (D) worst case of $O(n \log n)$ complexity

89. Which of the following algorithms has running time $O(n^2)$ in the worst case but $O(n \log n)$ on average?

    (A) Bubblesort   (B) Mergesort

    (C) Heapsort   (D) Quicksort

90. What is the worst case complexity of Quick-sort?

    (A) $O(\log n)$ (B) $O(n \log n)$

    (C) $O(n^2)$ (D) $O(n)$

91. Minimum cost spanning tree algorithm uses a technique of :

    (A) Greedy method   (B) Divide-and-conquer

    (C) Dynamic programming   (D) Randomized technique

92. A binary search tree with 8 nodes produced 1, 2, 3, 4, 5, 6, 7, 8 as the inorder reversal. What is the root node of the tree?

    (A) 1

    (B) 5

    (C) 8

    (D) cannot be determined

93. Which among the following is incorrect about the complexity of algorithms?

    (A) $O(n) < O(n \log n) < O(n^2)$

    (B) $O(\log n) < O(n \log n) < O(n^2)$

    (C) $O(\log n) < O(n) < O(n^2)$

    (D) $O(n) < O(\log n) < O(n^2)$

94. Which among the following devices interconnects networks and operate at the application layer?

    (A) Bridge

    (B) Hub

    (C) Router

    (D) Gateway

95. There is a diskless workstation on a TCP/IP LAN. Which will be the first protocol it will use?

    (A) FTP

    (B) ARP

    (C) HTTP

    (D) RARP

96. Modems communicating using the V.32 bis standard operate at :

    (A) 9600 bps

    (B) 14400 bps

    (C) 28800 bps

    (D) 56000 bps

97. RS-449 is a standard used for :

    (A) serial communication

    (B) parallel communication

    (C) network signalling

    (D) modem signalling

98. The polynomial used by CRC-16 standard for generating the checksum is :

    (A) $x^{16} + x^{12} + x^5 + 1$

    (B) $x^{15} + x^{12} + x^6 + 1$

    (C) $x^{16} + x^{15} + x^2 + 1$

    (D) $x^{12} + x^8 + x^5 + 1$

99. Which among the following is not part of the TCP header of a TCP/IP packet?

    (A) Sequence number

    (B) Acknowledgement number

    (C) Window size

    (D) Protocol

100. The IP address of a node on a LAN based on TCP/IP is 191.168.10.1. Into which class does this address belong?

    (A) Class A

    (B) Class B

    (C) Class C

    (D) Class D