

Instructions:

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

1. What is the drawback of LR parser?
A difficult to understand B No tool available to generate parser
C too much work to construct LR parser by hand D No drawback
2. How can we specify pattern of zero or more a's in lexical analysis ?
A a-a B [a-a]
C a+ D a*
3. What is true regarding following declaration?
int **p;
A It is pointer to pointer B It can store address of an integer variable
C It can store address of a pointer to an integer D Both A and C
4. What is the meaning of following statement?
int *ptr(a,b);
A ptr is a function returning an integer B ptr is a function returning a pointer to integer
C ptr is a pointer to function returning an integer D All of Above
5. The flow control in a program corresponds to which traversal of the activation tree?
A breadth first B active
C depth first D top down
6. Assuming All numbers are in 2's complement representation, which of the following numbers is divisible by 1111011?
A 11100111 B 11100100
C 11010111 D 11011011
7. An operating system contains 3 user processes. Each process requires 2 units of resource R. The minimum numbers of units of R such that no deadlocks will ever arise is
A 3 B 5
C 4 D 6
8. A counting semaphore was initialized to 10. Then 6P(wait) operations and 4V(signal) operations were completed on this semaphore. The resulting value of the semaphore is
A 0 B 8

- C 10

D 12

9. System calls are usually invoked by using
A polling
C An indirect jump
B A privileged instruction
D A software interrupt

10. If the time to service a page fault is on the average 10 milliseconds, while a memory access takes 1 microsecond. Then 99.99% hit ratio results in average memory access time of
A 1.9999 microseconds
C 1 milliseconds
B 9.999 microseconds
D 1.9999 milliseconds

11. A B⁺ tree of order 4 is built from the scratch by 10 successive insertions. What is the maximum number of node splitting operations that may take place
A 3
C 4
B 5
D 6

12. The following functional dependencies hold for relations R(A,B,C) and S(B,D,E). $B \rightarrow A$, $A \rightarrow C$. The Relation R contains 200 tuples and the Relation S contains 100 tuples. What is the maximum number of tuples possible in the natural joins of relation R with Relation S?
A 200
C 100
B 300
D 2000

13. In a database file structure, the search key field is 9 byte long, the block size is 512 bytes, a record pointer is 7 bytes and a block pointer is 6 bytes. The largest possible order of a non-leaf node in a B+ tree implementing file structure is
A 34
C 44
B 23
D 32

14. In Ethernet, when Manchester encoding is used, the bit rate is
A Half the baud rate
C Same as baud rate
B Twice the baud rate
D None

15. An organization has a class B network and wishes to form subnets of 64 departments. The subnet mask would be
A 255.255.0.0
C 255.255.128.0
B 255.255.64.0
D 255.255.252.0

16. Who determines the shift reduce parsing decision?
A current input symbol
C FOLLOW set
B state symbol on the top of the stack and current input symbol
D state

17. what regular expression lexical analyzer will we to find optional fractional part of decimal number ?
A optional_fraction \rightarrow (.digits) ?
C optional fraction \rightarrow (.digits)

B optional_fraction \rightarrow (.digits) +
D optional fraction \rightarrow (.digits) *

18. Which string is not generated by the following grammar ?
 $S \rightarrow aSa \mid aa$
A 3 a's
B 4 a's
C 8 a's
D 6 a's
19. The only interrupt that is edge triggered is
A TRAP
B RST 7.5
C INTR
D RST 5.5
20. The seek time of a disk is 30 ms. It rotates at the rate of 30 rotations per second. Each track has a capacity of 300 words. The access time is approximately
A 43 ms
B 48 ms
C 47 ms
D 40 ms
21. $T(n) = 2 T(n/2) + k.n$, where k is constant, then $T(n)$ is equal to
A $O(n^2)$
B $O(\log(n))$
C $O(n)$
D $O(n \log(n))$
22. 2's complement of hexadecimal number B70A is
A A07B
B 7BA0
C 485F
D 48F6
23. If we multiply ' 723 ' and ' 34 ' by representing them in floating point notation the value of mantissa of result will be
A 24.582
B 2.4582
C 24582
D 0.24582
24. What will be the decimal equivalent of 111011.10
A 48.625
B 59.625
C 48.652
D 59.652
25. The addressing mode used in the instruction PUSH B is
A Direct
B Register
C Immediate
D Register indirect
26. What identifies the common subexpression in the expression?
A Syntax tree
B Directed graph
C Directed Acyclic graph
D Parse tree
27. Out of the following grammars, which one is right associative grammar?
A $string \rightarrow string + string | 0 | 1 | 2 | 3$
B $stmt \rightarrow if (expr) stmt \text{ else } stmt$
C $right \rightarrow letter = right | letter$
D None of Above
 $letter \rightarrow a | b | . | z$
28. Once object oriented programming has been accomplished, unit testing is applied for each class. Class tests includes ?
A Partition testing
B Random testing
C Fault based testing
D All of above
29. Cyclomatic complexity metric provide information regarding number of

- A error in the program B cycle in the program
C independent logical path D statement in the program
30. An error is detected in some production code. The maintenance effort to fix the error is called
- A perfective B adaptive
C corrective D none of above
31. Swap Space in the disk is used for
- A Saving temporary html pages B Storing the super block
C Saving process data D Storing device drivers
32. The regular expression $0^*1(0^*10^*1)^*$ represents strings with
- A Even no. of 1's B Odd no. of 1's
C Odd no. of zeroes D None of these
33. Following is an Ambiguous Grammar
- A $S \rightarrow S + S \mid S * S \mid a$ B $S \rightarrow aSa \mid \Lambda$
C $S \rightarrow aS \mid \Lambda$ D None of these
34. The Coloring Problem is
- A NP Hard Problem B P Problem
C NP Complete Problem D None of these
35. The "Principle of Optimality" is used in
- A Branch & Bound B Backtracking
C Greedy Method D Dynamic Programming
36. Finite State Machine can recognize
- A Any Grammar B Only Regular Grammar
C Any Unambiguous Grammar D Only Context Free Grammar
37. Bottom Up Parsing have
- A Shift operation B Reduce Operation
C Both A and B D None of these
38. Which of the following algorithm design technique is used in the quick sort algorithm?
- A Dynamic programming B Backtracking
C Divide and conquer D Greedy method
39. Which of the following algorithms solves the all-pair shortest path problem?
- A Dijkstra's algorithm B Floyd's algorithm
C Prim's algorithm D Warshall's algorithm
40. Worst case Time Complexity of Merge Sort is
- A $O(n \log(n))$ B $O(n^2)$
C $O(n^2 \log(n))$ D $O(2 \log(n))$
41. The addressing mode used in the instruction ADI 34H is
- A Direct B Register

- C $n \log(n)$ D n^3
51. Once object oriented programming has been accomplished, unit testing is applied for each class. Class tests includes ?
- A Partition testing B Random testing
- C Fault based testing D All of above
52. Consider two modules A and B, both utility programs in the same organization developed by the same team of programmers, where a and b are the sizes, respectively. The cost to develop each module is C_a and C_b . The efforts are E_a and E_b . if $C_a > C_b$ then
- A $E_a < E_b$ B $E_a > E_b$
- C $E_a = E_b$ D both (A) and (C)
53. Which is true for tree?
- A acyclic graph B directed graph
- C has a root node with indegree 0 D All of the above
54. The time complexity of an algorithm $T(n)$, where n is the input size, is given by $T(n) = T(n - 1) + (1/n)$ if $n > 1$
The order of this algorithm is
- A $\log n$ B n
- C n^2 D n^n
55. There are 4 different algorithms A1, A2, A3, A4 to solve a given problem with the order $\log(n)$, $\log(\log(n))$, $n \log(n)$, $n / \log(n)$ respectively. Which is the best algorithm?
- A A2 B A1
- C A4 D A3
56. Which is the non-maskable interrupt ?
- A RST 7.5 B TRAP
- C RST 6.5 D INTR
57. Increment operation is incorporated with which instruction ?
- A IZS B CIR
- C ISZ D ICR
58. The value of root node in min-heap is
- A Largest of all B smallest of all
- C Any value D Can't say

59. End-to-End connectivity is provided from host-to-host in
 A Network Layer B Data link Layer
 C Transport Layer D Physical Layer
60. FDDI is a
 A Hybrid Network B Bus Network
 C Star Network D Ring Network
61. If following is preorder sequence of the tree, what is the value of root?
 15 5 7 9 23 17 35
 A 15 B 23
 C 5 D 35
62. Which of the following is true for recursion?
 A Uses stack B result in infinite loop if not handled properly
 C Reduces the code size D All of the above
63. The purpose of preamble in the ethernet is
 A Error checking B collision avoidance
 C clock synchronization D Broadcast
64. The Hamming distance between 001111 and 010011 is
 A 1 B 3
 C 2 D 4
65. Inorder threaded binary tree uses
 A Empty left link to point to inorder predecessor B Empty right link to point to inorder successor
 C Both A and B D None of the above
66. The largest %cost of software life cycle is in
 A Testing B feasibility
 C Maintenance D Design
67. if a software engineer has built a small web-based calculator application, we can say that the software size is
 A 300 LOC B 200 man-hours

- C 40 person-month D None of above

68. Time Complexity of Tower of Hanoi Problem (Recursive) with n disks is

A 2^n B n^2
C n^3 D 3^n

69. Breadth First Search method uses

A Stack B Queue
C Hash Table D Heap

70. RIP is based on

A Link State routing B Distance vector routing
C Dijkstra's algorithm D Path vector routing

71. X.25 standard Specifies a

A DTE/DCE Interface B Techniques for Start/Stop data
C Data Bit rate D Techniques for dial access

72. Stack is nothing but a set of

A reserved ROM address space B reserved RAM address space
C reserved IO address space D none of the above

73. Which of the following is useful for checking the balanced parentheses

A tree B queue
C list D stack

74. Binary heap is used to implement which data structure?

A dqueue B Circular queue
C priority queue D None of Above

75. δ^* of Finite Automata is

A Extended Transition Function B Non Recursive Function
C Transition Function D None of these

76. Recursive Languages are recognizable by

A NFA B FA
C Turing Machine D None of Above

77. The addresses of classes A, B and C are

- Page 9 of 11

- C $\frac{1 + \log y}{1 - \log y}$ D $\frac{1 - \log y}{1 + \log y}$
86. The area bounded by the parabola $2y = x^2$ and the line $x = y - 4$ is equal to
 A 5 B 9
 C $5/4$ D None
87. Changing the order of integration of $I = \int_0^8 \int_{x/4}^2 f(x, y) dy dx$ leads to the integral $I = \int_r^s \int_p^q f(x, y) dy dx$ the value of q is
 A $4y$ B $16y^2$
 C x D 8
88. If $y(x) = x + \sqrt{x + \sqrt{x + \dots \infty}}$ then $y(2) =$
 A 4 or 1 B 4 only
 C 1 only D ∞
89. The directional derivative of $u(x, y) = x^2 + y^2$ at the point (1,2) in the direction of $4i + 3j$ is
 A $4/5$ B 4
 C $2/5$ D 20
90. The curl of the gradient of the scalar field $v(x, y, z) = 2yx^2 + 3zy^2 + 4xz^2$ is
 A $4xy + 6yz + 8xz$ B 1
 C $4xyi + 6yzj + 8xzk$ D 0
91. If three coins are tossed simultaneously, the probability of getting at least one head is
 A $1/8$ B $3/8$
 C $5/8$ D $7/8$
92. The solution of $\frac{d^2y}{dx^2} + 25y = e^{3x}$ is
 A $y = C_1 \cos 5x + C_2 \sin 5x + \frac{e^{3x}}{34}$ B $y = C_1 e^{5x} + C_2 e^{-5x} + \frac{e^{3x}}{34}$
 C $y = C_1 e^{5x} + C_2 e^{-5x} - \frac{e^{3x}}{34}$ D $y = C_1 \cos 5x + C_2 \sin 5x - \frac{e^{3x}}{34}$
93. Let $P(E)$ denote the probability of an event E. If $P(A)=1$, $P(B)=0.5$ then the value of $P(A|B)$ and $P(B|A)$ respectively are
 A 0.25 and 0.5 B 0.5 and 0.25
 C 0.5 and 1 D 1 and 0.5
94. The solution of $6yy' - 25x = 0$ represents
 A Family of circles B Family of ellipses
 C Family of parabolas D Family of hyperbolas
95. The one dimensional heat conduction equation $\frac{\partial T}{\partial t} = \frac{\partial^2 T}{\partial x^2}$ is
 A Parabolic B hyperbolic
 C elliptic D mixed
96. The inverse Laplace transforms of the $\frac{s+5}{(s+1)(s+3)}$ is
 A $2e^{-t} - e^{-3t}$ B $2e^{-t} + e^{-3t}$
 C $e^{-t} - 2e^{-3t}$ D $e^{-t} + 2e^{-3t}$
97. If $f(z) = xy + iv(x, y)$ is an analytic function then $v(x, y)$

- A $\frac{(x+y)^2}{2} + \text{constant}$ B $\frac{x-y^2}{2} + \text{constant}$
 C $\frac{-x^2+y^2}{2} + \text{constant}$ D $\frac{(x-y)^2}{2} + \text{constant}$
98. If $C : |z| = 1$ then the value of $\oint_C \frac{1}{z^2+4} dz$
- A $\frac{i\pi}{2}$ B $\frac{-\pi}{2}$
 C $-\frac{i\pi}{2}$ D None
99. The iteration formula to find the square root of a positive real number b by using the Newton-Raphson method is
- A $x_{k+1} = \frac{3(x_k + b)}{2x_k}$ B $x_{k+1} = \frac{(x_k^2 + b)}{2x_k}$
 C $x_{k+1} = \frac{(x_k - 2x_{k-1})}{x_k^2 + b}$ D None
100. Simpson's rule for integration gives exact result when $f(x)$ is a polynomial function of degree less or equal to
- A 1 B 2
 C 3 D 4