



5. If  $A = \begin{bmatrix} 1 & -3 \\ -2 & 4 \end{bmatrix}$  and  $x = \begin{bmatrix} 5 \\ 3 \end{bmatrix}$  then  $x^T A^T =$

a.  $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$

c.  $\begin{bmatrix} -4 & 2 \end{bmatrix}$

b.  $\begin{bmatrix} 4 & 2 \end{bmatrix}$

d.  $\begin{bmatrix} 4 & -2 \end{bmatrix}$

6. If  $W = \text{col } A$ , then  $A$  for given

$$W = \left\{ \begin{bmatrix} 3a - 2b \\ a + 2b \\ -7b \end{bmatrix} : a, b \in \mathfrak{R} \right\} \text{ is}$$

a.  $\begin{bmatrix} 3 & -1 \\ 1 & 2 \\ 0 & -7 \end{bmatrix}$

c.  $\begin{bmatrix} -1 & 3 \\ 1 & 2 \\ -7 & 0 \end{bmatrix}$

b.  $\begin{bmatrix} 3 & -1 \\ 1 & 2 \\ -7 & 0 \end{bmatrix}$

d.  $\begin{bmatrix} -1 & 3 \\ 1 & 2 \\ 0 & -7 \end{bmatrix}$

7. If  $B = \{b_1, b_2\}$  for  $\mathfrak{R}^2$ , where  $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$  and  $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$  and  $[x]_B = \begin{bmatrix} 2 \\ -3 \end{bmatrix}$ , then  $x =$

a.  $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

c.  $\begin{bmatrix} -1 \\ 6 \end{bmatrix}$

b.  $\begin{bmatrix} 1 \\ -6 \end{bmatrix}$

d.  $\begin{bmatrix} 0 \\ 2 \end{bmatrix}$

8. The eigen value of  $A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$  is

a. 0

c. -7

b. 7

d. 5

9. The vectors  $\begin{pmatrix} -1 \\ 4 \\ -3 \end{pmatrix}$ ,  $\begin{pmatrix} 5 \\ 2 \\ 1 \end{pmatrix}$ ,  $\begin{pmatrix} 3 \\ -4 \\ -7 \end{pmatrix}$

a. are orthogonal

c. are parallel

b. are not orthogonal

d. None of the above

10. The standard matrix of  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^4$ ,  $T(e_1) = (1, 2, 0, 5)$  and  $T(e_2) = (3, -6, 1, 0)$  is

a.  $\begin{pmatrix} 1 & 2 & 0 & 5 \\ 3 & -6 & 1 & 0 \end{pmatrix}$

c.  $\begin{pmatrix} 1 & 3 & 0 & 5 \\ 3 & -6 & 1 & 0 \end{pmatrix}$

b.  $\begin{pmatrix} 1 & 3 \\ 2 & -6 \\ 0 & 1 \\ 5 & 0 \end{pmatrix}$

d. None of the above

11. If  $f(x) = x^2 - 1$ ,  $g(x) = \sin x$ ,  $h(x) = x^2$ , then  $f \circ g \circ h =$

a.  $\sin^2 x^2 - 1$

c.  $\sin^2 x^2$

b.  $\sin^2 x^4$

d.  $\sin^3 x^4$

12.  $\lim_{x \rightarrow 0} \frac{\sqrt{x^2 + 9} - 3}{x^2} =$

a. 0/0

c. 6

b. 1/6

d. 0

13. The function  $f(x) = \begin{cases} \frac{x^2 - x - 2}{x - 2}, & x \neq 2 \\ 3, & x = 2 \end{cases}$  is continuous at

a.  $x = 3$

c.  $x = 2$

b.  $x = 0$

d.  $x = 1$

14. The slope of the tangent line to the curve  $y = 9 - 2x^2$  at  $(2, 1)$  is

a. 2

c. 4

b. 1

d. -8

15. If  $f'(x) = 12x^2 + 6x - 4$  and  $f(0) = 2$ , then  $f(x)$  is

a.  $4x^3 + 3x^2 - 4x + 2$

c.  $12x^3 + 6x^2 - 4x + 2$

b.  $x^3 + 3x^2 - 4x + 2$

d.  $x^3 + 6x^2 - 4x + 2$

16. If the position  $(s, t)$  of a particle is given by the equation  $s = t^3 - 3t^2 + 2t$ , then the velocity after 2 second is

a.  $-2\text{ms}^{-1}$

c.  $2\text{ms}^{-1}$

b.  $3\text{ms}^{-1}$

d. 0

17. The area of the region bounded by the parabola  $y = x^2$  and  $y = 2x - x^2$  is
- 3
  - 1/3
  - 1/3
  - Not defined
18. If  $f(x, y) = x^3 + x^2y^2 - 2y^2$ , then  $f_x(1, 2)$  is
- 11
  - 3
  - 3
  - 11
19.  $\int_0^2 \int_1^2 (x - 3y^2) dy dx =$
- 12
  - 12
  - 0
  - 21
20. The power series expansion of  $e^t$  is
- $1 - t + \frac{t^2}{2!} + \dots$
  - $t - \frac{t^2}{2!} + \dots$
  - $1 + \frac{t^2}{2!} + \frac{t^4}{4!} + \dots$
  - $1 + t + \frac{t^2}{2!} + \dots$
21. Which of the following statement is true?
- A relation can have only one primary key
  - A relation can have only one foreign key
  - A relation can have only one super key
  - A relation can have only one candidate key
22. Which one of the following is the execution order of commands in SQL query?
- SELECT, FROM, WHERE
  - SELECT, WHERE, FROM
  - FROM, SELECT, WHERE
  - FROM, WHERE, SELECT
23. Which of the following normal form is based on the concept multi-valued dependency?
- 2NF
  - 3NF
  - 4NF
  - 5NF
24. After successful completion, a transaction is in \_\_\_\_\_ state.
- Active
  - Committed
  - Partially committed
  - Failed

25. Which of the following system development approach is appropriate if in which user requirements are certain and precise?
- a. Waterfall
  - b. Prototyping
  - c. Spiral
  - d. Agile
26. Which one of the following diagram is used for process modelling in structure development?
- a. Use-case diagram
  - b. Entity relationship diagram
  - c. Data flow diagram
  - d. Class diagram
27. Single location installation is also called
- a. Direct installation
  - b. Parallel installation
  - c. Phased installation
  - d. Pilot installation
28. A file organization in which the address for each row is determined using an algorithm is called
- a. Sequential file organization
  - b. Indexed file organization
  - c. Hashed file organization
  - d. None of the above
29. Which one of the following was an early packet-switched network and the first network to implement TCP/IP protocol suite?
- a. CSNET
  - b. ARPANET
  - c. ASAPNET
  - d. CNNET
30. Which of the following layer considers the functions that allows the data to move along different networks?
- a. Network access layer
  - b. Internet layer
  - c. Transport layer
  - d. Physical layer
31. Which of the following subnet-mask is used if we divide a class C address into 8 subnets?
- a. 255.255.255.0
  - b. 255.255.255.192
  - c. 255.255.255.224
  - d. 255.255.255.240
32. What is the header size of a UDP packet?
- a. 8 bytes
  - b. 8 bits
  - c. 16 bytes
  - d. 124 bytes

33. Which feature was already introduced before HTML5?

- a. Canvas/SVG  
 b. Video  
 c. Geolocation  
 d. Frames

34. DOM stands for

- a. Domain object model  
 b. Document object model  
 c. Discrete object model  
 d. Disk object model

35. Which of the following symbol describes class selector in CSS?

- a. #  
 b. >  
 c. ~  
 d. .

36. Number of incoming links (backlinks) is used for .....optimization.

- a. Technical  
 b. On-site  
 c. Off-site  
 d. All of the above

37. Which one of the following is transitive rule?

- a. 
$$\frac{p}{p \rightarrow q} \therefore q$$
  

$$p \rightarrow q$$
  
 b. 
$$\frac{q \rightarrow r}{\therefore p \rightarrow r}$$
  
 c. 
$$\frac{p \wedge q}{\therefore p}$$
  

$$p$$
  
 d. 
$$\frac{q}{\therefore p \wedge q}$$

38. Which one of the following is principle of inclusion and exclusion?

- a.  $|A_1 \cap A_2| = |A_1| + |A_2| - |A_1 \cup A_2|$   
 b.  $|A_1 \cap A_2| = |A_1| + |A_2| - |A_1 \cap A_2|$   
 c.  $|A_1 \cup A_2| = |A_1| + |A_2| - |A_1 \cup A_2|$   
 d.  $|A_1 \cup A_2| = |A_1| + |A_2| - |A_1 \cap A_2|$

39. The number of colors required to color a complete graph,  $K_n$ , is

- a.  $n - 1$   
 b.  $n$   
 c.  $n + 1$   
 d.  $n + 2$

40. Which one of the following statement is true?

- a. Value of maximal flow is always less than the value of minimal cut  
 b. Value of maximal flow is always greater than the value of minimal cut  
 c. Value of maximal flow is always greater than or equal to the value of minimal cut  
 d. Value of maximal flow is always less than or equal to the value of minimal cut

41. A digital signature is
- a. scanned signature
  - b. signature in binary form
  - c. encrypting information
  - d. handwritten signature
42. Which of the following register is loaded with the contents of the memory location pointed by PC?
- a. Program Counter
  - b. Memory address register
  - c. Memory data register
  - d. Instruction register
43. A hexadecimal number A20 is equal to the octal number
- a. 1040
  - b. 1020
  - c. 5040
  - d. A20
44. In MS Word, borders can be applied to
- a. Cells
  - b. Paragraph
  - c. Text
  - d. All of above
45. Which of the following is executed by preprocessor?
- a. `void main (int argc, char **argv)`
  - b. `#include <stdio.h>`
  - c. `return (0)`
  - d. None of the above
46. Output of the following code is
- ```
int main()
{
    int a,b,c;
    a=5; b=10; c=a+b;
    printf(“%i”,c);
    return(0);
}
```
- a. 0
  - b. 15
  - c. Undefined i
  - d. Other compiler error

47. In the following code “Hello World!” is printed

```
int main()
{
    int a=0;
    while (a++)
        printf(“Hello World!”);
    return(0);
}
```

- a. 1 time
- b. 0 times
- c. 2 times
- d. Infinite times

48. Which of the following ways are correct to comment out?

- a. `--printf(“%d”,i);`
- b. `// printf(“%d”,i);`
- c. `/*printf(“%d”,i);`
- d. `! printf(“%d”,i);`

49. Can a DFA recognize palindromes?

- a. Yes
- b. No
- c. Yes if given an input string from the alphabet of DFA
- d. Cannot be determined

50.  $A.A^*$  can be expressed in the form of

- a.  $A^+$
- b.  $A^-$
- c.  $A.A^+$
- d.  $A$

51. A CFG is ambiguous if

- a. It has more than one leftmost derivations for a string produced by the grammar
- b. It has more than one parse tree for a string produced by the grammar
- c. a and b both
- d. None of the above

52. A turing machine that can simulate other turing machines is called

- a. Nested turing machine
- b. Universal turing machine
- c. Multitape turing machine
- d. Turing machine with state as storage

53. Following are the ways to generate random numbers except
- Table of random numbers
  - Spinning a roulette wheel
  - Computer generated random numbers
  - Fibonacci series
54. \_\_\_\_\_ model follows the changes over time that results from the system activities.
- Static
  - Dynamic
  - Analytical
  - Numerical
55. Monte Carlo Simulation method got its name from
- Model formulation
  - Idea of random number assignment
  - Data collection method
  - Analysis method
56. Which of the following statistical method is commonly used to analyze simulation result?
- Analysis of variance
  - T-test
  - Regression analysis
  - All of the above
57. LR parser is a
- bottom up parser
  - top down parser
  - compiler
  - none of the above
58. Three address code involves
- At most three addresses
  - At least three addresses
  - No unary operators
  - None of the above
59. Consider a grammar
- $$S ::= bX \mid XYa$$
- $$X ::= bYY \mid \epsilon$$
- $$Y ::= cXYb$$
- What is First(S)?
- {b}
  - {a,b}
  - {b,c}
  - {a,b,c}
60. A “decorated parse tree” is the output of
- Lexical analyser
  - Syntax analyser
  - Semantic analyser
  - Code optimizer

61. A binary search tree whose left sub tree and right sub tree differ in height by at most 1 unit is called
- AVL tree
  - Red black tree
  - Lemma tree
  - None of the above
62. The postfix form of the expression  $(A + B) * (C * D - E) * F / G$  is
- $AB + CD * E - FG /**$
  - $AB + CD * E - F ** G /$
  - $AB + CD * E - * F * G /$
  - $AB + CDE * - * F * G /$
63. What's happen if base condition is not defined in recursion?
- Stack underflow
  - Stack Overflow
  - Both a and b
  - None of these
64. Suppose we are sorting an array of eight integers using quicksort, and we have just finished the first partitioning with the array looking like this: 2,5,1,7,9,12,11,10. Which statement is correct?
- The pivot could be either the 7 or the 9
  - The pivot could be the 7, but it is not the 9
  - The pivot is not the 7, but it could be the 9
  - Neither the 7 nor the 9 is the pivot
65. In which of the following method, we approximate the curve of solution by the tangent in each interval.
- Picard's method
  - Euler's method
  - Newton's method
  - Runge Kutta method
66. In general the ratio of truncation error to that of round off error is
- 2:1
  - 1:1
  - 1:2
  - 1:3
67. The convergence of which of the following method is sensitive to starting value?
- Newton-Raphson method
  - False position
  - Gauss seidel method
  - All of these

68. A partial differential equation requires
- Exactly one independent variable
  - More than one dependent variable
  - Two or more independent variables
  - Equal number of dependent and independent variables
69. The method which is based on the principle of checking the visibility point at each pixel position on the projection plane are called
- Object Space Method
  - Image Space Method
  - Both a and b
  - None of the above
70. Reflection of a point about x-axis, followed by a counter-clockwise rotation of 90°, is equivalent to reflection about the line?
- $X = -Y$
  - $Y = -X$
  - $X + Y = 1$
  - $X = Y$
71. In Bresenham's algorithm, while generating a circle, it is easy to generate?
- One octant first and other by successive rotation
  - One octant first and other by successive translation
  - One octant first and other by successive reflection
  - All octants
72. Which algorithm is a faster method for calculating pixel positions?
- Bresenham's line algorithm
  - Parallel line algorithm
  - Mid-point algorithm
  - DDA line algorithm
73. Operation carried out by a NOT gate are also termed as
- inverting
  - converting
  - reverting
  - reversing
74. Logic circuit with only one output and one or more inputs is said to be
- binary gate
  - logic gate
  - circuit gate
  - system gate

75. The output of NOR gate is
- High if all of its inputs are high
  - Low if all of its inputs are low
  - High if all of its inputs are low
  - High if only of its inputs is low
76. Which of the following adders can add three or more numbers at a time?
- Parallel adder
  - Carry-look-ahead adder
  - Carry-save-adder
  - Full adder
77. INTR is a .....
- software Interrupt
  - hardware Interrupt
  - inline Interrupt
  - none of the above
78. Which of the following instruction is not possible in 8085?
- POP 30 H
  - POP B
  - POP D
  - POP PSW
79. Which of the following statement is correct?
- address bus of microprocessor is bidirectional
  - address bus of microprocessor is omnidirectional
  - address bus of microprocessor is unidirectional
  - all of the above
80. 8085 consists of ..... total number of instruction
- 8
  - 16
  - 232
  - 246
81. The pipelining process is also called as .....
- superscalar operation
  - assembly line operation
  - Von Neumann cycle
  - none of the above
82. The addressing mode, where operand value is directly specified is ....
- Immediate
  - Direct
  - Definite
  - Relative
83. The transformation between the Parallel and serial ports is done with the help of
- flip flops
  - logic circuits
  - shift registers
  - none of the above

84. The sign followed by the string of digits is called as .....
- a. significant
  - b. determinant
  - c. exponent
  - d. mantissa
85. Which of the following sorting methods would be most suitable for sorting a list which is almost sorted?
- a. quick sort
  - b. bubble sort
  - c. insertion sort
  - d. merge sort
86. Heap is defined to be a .....
- a. binary tree
  - b. complete binary tree
  - c. avl tree
  - d. none of the above
87. Boolean satisfiability problem belongs to.....class.
- a. P
  - b. NP
  - c. NP complete
  - d. NP hard
88. Dynamic programming focuses on .....
- a. approximation
  - b. optimization
  - c. dynamism
  - d. estimation
89. The copy constructors can be used to \_\_\_\_\_
- a. Copy an object so that it can be passed to a class
  - b. Copy an object so that it can be passed to a function
  - c. Copy an object so that it can be passed to another primitive type variable
  - d. Copy an object for type casting
90. Class is \_\_\_\_\_ abstraction.
- a. Object
  - b. Logical
  - c. Real
  - d. Hypothetical
91. If class A is derived from another derived class B which is derived from class C, which class will have maximum level of abstraction?
- a. Class A
  - b. Class B
  - c. Class C
  - d. All have the same level of abstraction

92. Multiple catch blocks \_\_\_\_\_
- Are mandatory for each try block
  - Can be combined into a single catch block
  - Are not possible for a try block
  - Can never be associated with a single try block
93. In operating system, when does round robin scheduling become FCFS
- When the time for migration is infinite.
  - When the priority is same for all process.
  - When time quanta is same for all process.
  - When time quanta is large for all process.
94. If a system has 1 GB RAM with a page size of 8KB and operating system occupies 16 MB of RAM, how many page frames does the system have for user process.
- |           |           |
|-----------|-----------|
| a. 129024 | c. 131072 |
| b. 120924 | d. 119864 |
95. Threshing problem in operating system can be solved by using
- Increasing the degree of multiprogramming
  - Increasing the clock speed of processor
  - Decreasing the degree of multiprogramming
  - Both A and B.
96. Which of the following inter-process communication mechanism is most efficient in an operating system?
- |                  |                    |
|------------------|--------------------|
| a. Shared memory | c. Message Passing |
| b. Semaphore     | d. Mutex           |
97. An admissible heuristic  $h(n)$  means:
- $H(n)=0$
  - $H(n)$  is the exact cost to reach the goal
  - $H(n)$  never overestimate the cost to reach the goal
  - $H(n)=g(n)$

98. What is the assumption of Naïve Bayes Document classification model:
- a. A document can be classified using few keywords
  - b. Words in the documents are independent from their neighboring words.
  - c. Common words such as “the”, “a” and “an” should be avoided.
  - d. Dictionary should be very large.
99. In the expression “Grade(Brother(Jane))”, what does “Brother( )” represents:
- a. Function
  - b. Predicate
  - c. Binary relation
  - d. Unary relation
100. The morphological analysis in Natural Language Processing deals with
- a. Word level processing
  - b. Sentence Level processing
  - c. Character level processing
  - d. Sentiment Level Processing