

# M.Sc. CSIT Entrance MODEL QUESTIONS COLLECTION 2019

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## **Questions Structure**

### **Set A - Computer**

**Four questions from each subject and one mark for each question**

1. Introduction to Information Technology
2. C Programming
3. Discrete Structure
4. Data Structures and Algorithms
5. Digital Logic
6. Microprocessor
7. Computer Architecture
8. Operating Systems
9. Object Oriented Programming Language
10. Numerical Methods
11. Database Management Systems
12. Computer Graphics
13. Automata Theory
14. System Analysis and Design
15. Simulation and Modeling
16. Artificial Intelligence
17. Computer Networks
18. Design and Analysis of Algorithms
19. Compiler Design and Construction
20. Web Technology

### **Set B - Mathematics**

**Ten questions from each subject and one mark for each question**

1. Linear Algebra
2. Calculus and Analytical Geometry

**Tribhuvan University**  
**Institute of Science and Technology**  
**Central Department of Computer Science and Information Technology**  
**M.Sc. CSIT Entrance Examination, January 22, 2016**

**Full Marks: 100****Time: 2 Hrs****Pass Marks: 35**

**Attempt all questions. Please Tick/Encircle the correct answer. Any omission or correction to the answers is not allowed.**

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1. Regular expression are .....
  - a. Type 0 language
  - b. Type 1 language
  - c. Type 2 language
  - d.  Type 3 language
  
2. Which of following is true .....
  - a. Tape of Turing Machine is finite when language is regular
  - b.  Tape of Turing Machine is infinite regardless of language
  - c. Tape of Turing Machine is infinite when the language is not regular
  - d. Turing Machine is same as Linear Bound Automata.
  
3. A PDA is deterministic if .....
  - a. For any  $q \in Q, a \in \Sigma \cup \{\epsilon\}, x \in \Gamma$ , the set  $\delta(q, a, x)$  has at most one element.
  - b. For any  $q \in Q, x \in \Gamma$ , if  $\delta(q, \epsilon, x) \neq \emptyset$ , then  $\delta(q, a, x) = \emptyset$  for every  $a \in \Sigma$ .
  - c.  both a and b holds true
  - d. it has one final state F
  
4. The grammar  $S \rightarrow aSa \mid bSb \mid a \mid b$  generates ..... over {a, b}
  - a. All palindromes starting with a and ending with a.
  - b.  All odd length palindromes.
  - c. All strings starting with a and ending with b
  - d. All even length palindromes.

5. Natural Language Processing is can be divided into .....
- semantics and pragmatics
  - generation and understanding
  - recognition and synthesis
  - context and expectations
6. In Baye's theorem, what is the meant by  $P(H_i|E)$ ?
- The probability that hypotheses  $H_i$  is true given evidence  $E$
  - The probability that hypotheses  $H_i$  is false given evidence  $E$
  - The probability that hypotheses  $H_i$  is true given false evidence  $E$
  - The probability that hypotheses  $H_i$  is true given unexpected evidence  $E$
7. .... represents a transfer of physical location of an object in conceptual dependencies.
- ATRANS
  - PROPEL
  - PTRANS
  - MTRANS
8. A search method that examines the values associated with the immediate successor nodes and goes to the node if the successor has the better value than itself is .....
- minimax Search
  - A\* Search
  - Depth First Search
  - hill-climbing Search
9. In CRT, which of following is correct .....
- electron gun focuses the beam of electrons on the screen
  - inside front surface is coated with phosphors
  - control electrode is used to turn the electron beam on and off
  - All of above
10. Coordinates of viewport are known as .....
- World coordinates
  - Polar coordinates

- c. ✓ Screen coordinates  
d. Cartesian coordinates
11. .... data structure is used to identify the vertices for each polygon edge.  
a. ✓ Edge table  
b. Vertex table  
c. Polygon table  
d. Surface table
12. The transformation in which the dimension of an object are changed relative to a specified fixed point is called .....  
a. Rotation  
b. ✓ Scaling  
c. Reflection  
d. Translation
13. Consider the following entries in a Cascading Style Sheet (CSS) file;  
P {color: blue; background-color: white; border-color: red; border-left: solid}  
BODY {color: black; border-color: green}  
What is the color of text in a paragraph of an HTML document that uses the above style sheet?  
a. green  
b. ✓ blue  
c. black  
d. red
14. XML documents are validated against .....  
a. XSD  
b. DTD  
c. ✓ Both a & b  
d. XSLT
15. Repeater Control consist of .....  
a. <HeaderTemplate>, <Item Template> and <FooterTemplate>  
b. <HeaderTemplate> or <ItemTemplate> or <FooterTemplate>  
c. ✓ <HeaderTemplate> or <Item Template>

d. <FooterTemplate>

16. What will be the output of the following script?

```
<html>
<head><title>JavaScript</title></head>
<body>
<script language="JavaScript">
var a=70 80
var b=(a==80 ? "pass" :"fail");
document.write(b)
</script>
</body>
</html>
```

a. fail

b. null

c. 80

d. pass

17. If  $A_\alpha = \begin{bmatrix} \cos \alpha & \sin \alpha \\ -\sin \alpha & \cos \alpha \end{bmatrix}$  then  $A_\alpha \times A_\beta$  is .....

a.  $A_{\alpha+\beta}$

b.  $A_{\alpha-\beta}$

c.  $A_{\alpha\beta}$

d. None of these

18. The necessary and sufficient condition that a square matrix A has an inverse is that .....

a.  $|A|=0$

b.  $|A|\neq 0$

c.  $A=1$

d. None of these

19.  $|A - \lambda I| = 0$  is called as .....

a. Characteristic equation

b. Characteristic Vector

c. Characteristic Matrix

d. None of these

20. For what values of  $k$  will then vector  $(1, k, 5)$  in  $\mathbb{R}^3$  is a linear combination of  $(1, -3, 2)$  and  $(2, -2, 1)$ ?

- a. -5
- b. 6
- c. -8
- d. 10

it should be 2, -1, 1

$$\text{vector}(..) = a(..) + b(..)$$

21. The dimension of the vector space of all  $2 \times 2$  matrix over  $\mathbb{R}$  is .....

- a. 1
- b. 3
- c. 2
- d. 4

22. Every finite dimensional non zero vector space has .....

- a. Linearly independent vectors
- b. linearly dependent vectors
- c. orthogonal basis
- d. none of these

vector = 0 is linearly dependent

23. Let  $V$  and  $W$  be vector space over  $K$ .  $T: V \rightarrow W$  be a linear map. Then  $T$  is surjective if and only if .....

- a.  $\text{Ker } T = 0_V$
- b.  $\text{Ker } T = 0_W$
- c.  $\text{Im } T = W$
- d.  $\text{Im } T = V$

24. A set of orthonormal basis is .....

- a. Linearly dependent
- b. Linearly independent
- c. Neither Linearly dependent nor Linearly independent
- d. None of these

25. The collection of all eigen vectors  $v \in V$  such that  $T(v) = \lambda v$  is called .....

- a. Eigen values

b. Eigen vectors

c. ✓ Eigen space

d. None of these

26. If  $A = \begin{bmatrix} 1 & 3 \\ 2 & 0 \end{bmatrix}$  and  $X = \begin{pmatrix} -1 \\ -2 \end{pmatrix}$  what is  $L_A(X)$ ?

a.  $\begin{pmatrix} -7 \\ -2 \end{pmatrix}$

b.  $\begin{pmatrix} 1 \\ 6 \end{pmatrix}$

c.  $\begin{pmatrix} 5 \\ 7 \end{pmatrix}$

d.  $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$

27. The eccentricity of the ellipse  $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2}, a > b > 0$  is .....

a.  $b^2=a^2(1-e^2)$

b. ✓  $b^2=a^2(e^2-1)$

c.  $a^2=b^2(1-e^2)$

d.  $b^2=a^2(1-e^2)$

eccentricity  $e = \sqrt{1 - b^2/a^2}$

28. The value of the integral  $\int_0^{\pi} \sin^2 x dx$  is .....

a.  $\frac{\pi}{4}$

b.  $\frac{\pi^2}{4}$

c.  $\pi$

d. 0

29. The general solution of  $(D^2 + 1)y = \sin x$  is .....

a.  $y = a \cos x + b \sin x - \frac{x}{2} \cos x$

b.  $y = a \cos x + b \sin x + \frac{1}{2} \cos x$

c.  $y = a \cos x - b \sin x - \frac{x}{2} \cos x$

d. None

30. The solution of  $\tan x \frac{dy}{dx} + y = \sec x$  is .....

a.  $y \sin x = x + C$

b.  $y \sin^x x = x + C$

c.  $y \cos x = x + C$

d. None

31. The value of  $\lim_{n \rightarrow \infty} \frac{(n^2 + 1)}{(n+1)(n+2)}$  is .....

a. 0

b.  $\frac{1}{2}$

c. 1

d. 2

32. Every absolutely convergent series is .....

a. Divergent

b. Neither Convergent nor Divergent

c. Convergent

d. None

33. What is the value of improper integral  $\int_1^\infty \frac{dx}{(1+x)^{\frac{3}{2}}}$ ?

a.  $\frac{1}{3}$

b.  $\frac{1}{\sqrt{3}}$

c.  $\frac{2}{\sqrt{3}}$

d. 4

34. The value of the integral  $\int_0^2 \int_0^1 xy dx dy$  is .....

- a. 1
- b. 2
- c. 3
- d. 4

35. If  $u = f(x, y)$  then its total differential is .....

- a.  $du = f_x dx + f_y dy$
- b.  $du = f_y dx + f_x dy$
- c.  $\checkmark du = f_x dx + f_y dy$
- d. None

36.  $\vec{i}^2 = \vec{j}^2 = \vec{k}^2$  is equals .....

- a. 0
- b. -1
- c. 1
- d. 2

37. Which of following is valid variable declaration?

- a. int a, b; c;
- b. int a; b; c;
- c. ~~int~~ a, b, c;
- d. int a, b, c,

38. How many times "Tribhuvan University" is get printed?

```
#include<stdio.h>
int main()
{
    int x;
    for (x=-1; x<10; x++)
    {
        if(x<5)
```

```

        continue;

    else
        break;
    printf("Tribhuvan University");
}

return 0;
}

a. 0 times
✓ b. 10 times
c. 11 times
d. Infinite times

```

39. Which of the following is the correct order of evaluation for the below expression?

$$z = x + y * z / 4 \% 2 - 1$$

- ✓ a. \* / % + - =
- b. = \* / % + -
- c. / \* % - + =
- d. \* % / - + =

40. How will you free the allocated memory ..... ....

- a. remove(var-name);
- ✓ b. free(var-name);
- c. delete(var-name);
- d. dalloc(var-name);

41. Which of following is the application layer protocol?

- a. HTTP
- b. FTP
- c. SMTP
- ✓ d. All of the above

42. Which is the following layer of TCP/IP s concerned with addressing and routing messages?

- a. Application Layer
- b. Transport Layer

- c ✓ Internet Layer
- d. Network Access Layer
43. What is the default subnet mask for a class C network?
- 127.0.0.1
  - 255.0.0.0
  - 255.255.0.0
  - ✓ 255.255.255.0
44. What device separates a single network into two segments but lets the two segments appears as one to higher protocols?
- Switch
  - ✓ Bridge
  - Gateway
  - Router
45. Which of the following is not a level of data abstraction?
- Physical Level
  - ✓ Critical Level
  - Logical Level
  - View Level
46. In an entity relationship diagram, dashed ellipse represents .....
- Multi-valued Attribute
  - ✓ Derived Attribute
  - Composite Attribute
  - Descriptive Attribute
47. Which of the following is high level data model?
- Relational Model
  - ✓ Object Oriented Model
  - Entity Relationship Model
  - Object Relational Model
48. Deferred update is also known as .....
- UNDO/REDO algorithm
  - UNDO/NO-REDO algorithm

- c. NO-UNDO/REDO algorithm
- d. Both a and b
49. Standard TTL has a multiple emitter input transistor and a ..... output
- a. totem-pole
- b. bipolar
- c. register
- d. transistor
50. Instead of counting with binary numbers, a ring counter uses words that have a single high.....
- a. bytes
- b. bit
- c. gate
- d. chip
51. which logic family dissipates the minimum power?
- a. DTL
- b. TTL
- c. ECL
- d. CMOS
52. A logic circuit which is used to change a BCD numbers into an equivalent decimal numbers is.
- a. decoder
- b. encoder
- c. multiplexer
- d. demultiplexer
53. Whenever the POP H instruction is executed, .....
- A. data bytes in the HL pair are stored on the stack
- B. two data bytes at the top of the stack are transferred to the HL register pair
- C. two data bytes at the top of the stack are transferred to the program counter
- D. two data bytes from the HL register that were previously stored on the stack are transferred back to the HL register.
54. The next address generator is sometime called a .....

- A. Instruction sequence  
 B. program sequence  
 C. **micropogram sequence**  
 D. Translator
55. The stack organized computer has .....  
 A. three- address instruction  
 B. two-address instruction  
 C. one-address instruction  
 D. zero-address onstruction.
56. Microprocessor is a device which has at least .....  
 A. Memory  
 B. I/O devices  
 C. registers  
 D. **CPU**
57. ..... model randomly generates the time that elapses until the next event occurs.  
 A. previous event increment  
 B. just in time  
 C. next event increment  
 D. **real time**
58. Simulation always refers to .....  
 A. building diagrams  
 B. **building mathematical representation**  
 C. a and b  
 D. none of the above
59. When we speak of the fixed time increment models, we are referring to the .....  
 A. **length of time for which the simulation is run**  
 B. length of the time the model is developed  
 C. length of the mean time to failure  
 D. all of the above
60. In assigning random numbers in a monte carlo simulation, it is important to .....

- A. develop stochastic model
- B. develop real variate model
- C.  develop cumulative probability distribution
- D. none of the above

61. Which of the following is not OOP feature in C++ ?

- a. Encapsulation
- b. Abstraction
- c. Polymorphism
- d.  Exceptions.

62. Additional information sent when an exception is thrown may be placed in .....

- a. the throw keyword
- b. the function that caused the error
- c. the catch block
- d.  An object of the exception class.

63. Run time polymorphism is achieved by .....

- a. Friend function
- b.  virtual function
- c. operator overloading
- d. none of the above

64. The actual source code for implementing a template function is created when .....

- a. The declaration of function appears
- b.  The function is invoked
- c. The definition of the function appears
- d. None of the above

65. NOT(P OR Q) is equivalent with NOT(P) AND NOT(Q) is .....

- a.  Tautology
- b. contradiction
- c. contingency
- d. none of the above

66. The minimum number of cards to be dealt from an arbitrary shuffled deck of 52 cards to guarantee that three cards are from some suit is .....

a. 17

b. 8

c. 9

d. 12

67. In a tree between every pair of vertices there is .....

a. ✓ Exactly one path

b. A self loop

c. two circuits

d. n numbers of paths

68. A connected multigraph with at least two vertices has an Euler circuit if and only if .....

a. Each of its vertices has odd degree

b. ✓ Each of its vertices has even degree

c. At least one of its vertices has odd degree

d. At least one of its vertices has even degree.

69. Evaluate the following prefix expression  $+ * 2 + / 12 \ 2 \ 5 \ 1$ .

a. ✓ 23

b. 24

c. 25

d. 37

70. What is the maximum total numbers of nodes in a tree that has N levels ? Note that the root is level zero.

a.  $2^{2N}$ b. ✓  $2^N - 1$ c.  $2^{N+1} - 1$ d.  $2^N - 2N$ 

71. Which one is very useful in situation when data have to stored and then retrieved in reserve order?

a. ✓ STACK

b. Queue

c. List

d. Link list

72. Which of the following is true about the characteristics of abstract data types?

i. it represents a types.

ii. it represents a set of operations .

a. True, false

b. false, true

c. true, true

d. false, false

73. Interrupts which are initiated by an instruction are .....

a. hardware

b. software

c. internal

d. external

74. The most common addressing techniques employed by a CPU is .....

a. immediate

b. direct

c. indirect

d. all of the above

75. Address and data line in 8085 are .....

a. separate lines

b. only lower byte of address is multiplexed.

c. common lines

d. shared line

76. Part of the computer where data and instructions are held is .....

a. register unit

b. accumulator

c. memory unit

d. CPU

77. Problem statement includes all except .....

a. input

- b. output
  - c. processing
  - d. storage
78. .... design and implements database structure in SDCL.
- a. programmer
  - b. project manager
  - c. DBA
  - d. system analyst
79. Enhancements upgrades and bug fixes are done during the ..... of SDLC
- a. maintenance and evaluation phase
  - b. Problem identification
  - c. development and documentation
  - d. design
80. .... is not a factor in the failure of system development projects.
- a. Size of company
  - b. Failure of system integration
  - c. inadequate user involvement
  - d. Continuation of project that should have been cancelled
81. The high voltage level of a digital signal in positive logic is .....
- a. 0 and 1 both
  - b. 0
  - c. 1
  - d. none
82. A computer program that converts entire program into machine language is called .....
- a. Assembler
  - b. commander
  - c. Interpreter
  - d. compiler
83. In analog computer .....
- a. input signal is converted to digital form

- b. input program is never converted to digital form
- c. output is converted to digital form
- d. none

84. Which is true?

- a. Field are composed of bytes
- b. Fields are composed of characters
- c. Records are composed of fields
- d. all of the above

85. The act of parsing source program to proper syntactic classes is called .....

- a. syntax analysis
- b. Lexical analysis
- c. Intermediate code generation
- d. Interpretation and analysis

86. Which from is not intermediate code?

- a. postfix
- b. syntax tree
- c. 3-address code
- d. Quadruples

87. .... is the most powerful parser

- a. canonical LR
- b. operator precedence
- c. LALR
- d. SLR

88. Syntax directed translation scheme is described because .....

- a. Easy to modify
- b. Description is independent to any implementation
- c. Based on syntax
- d. all of the above

89. Which of the following method can be used to system of linear equations as well as to find inverse of a matrix?

- a. gauss elimination method

- b. gauss Jordan method
- c. cholesky's method
- d. gauss seidal method
90. Simpson's 1/3 rule used in numerical integration can be derived by putting  $n = \dots$  in general quadrature formula.
- 0
  - 1
  - 2
  - 3
91. Which of the following method solves initial value problem by using slope at two points?
- Eulers method
  - Heuns method
  - RK methpod
  - picards method
92. Given  $f(x) = 10$  at  $x=1$ ,  $f(x) = 18$  at  $x=2 = 24$  at  $x=3$ , we wish to find  $f(2.5)$ , for this we have to .....
- Use interpolation
  - Use extrapolation
  - Use regression
  - Solve boundary value problem
93. In which of the storage placement strategic a program is placed in the largest available hole in the main memory?
- best fit
  - first fit
  - worst fit
  - buddy
94. Banker's algorithm for resource allocation deals with .....
- Deadlock prevention
  - deadlock avoidance
  - deadlock recovery

- d. mutual exclusion
95. There is no ..... with linked allocation of files.
- internal fragmentation
  - External fragmentation
  - starvation
  - all of these
96. Optimal page-replacement algorithm is .....
- replace the page that has not been used for a long time
  - replace the page that has been used for a long time
  - replace the page that will not be used for a long time
  - none of these
97. Worst case time complexity of merge sort is .....
- $O(\log n)$
  - $O(n \log n)$
  - $O(n)$
  - $O(n^2)$
98. Time complexity of heapify operation can be described by the recurrence relation.
- $T(n)=T(n/2)+1$
  - $T(n)=T(n/2)+n$
  - $T(n)=T(2n+3)+1$
  - $T(n)=T(2n/2)+2$
99. Which of the following statement is false?
- Greedy algorithms are more efficient than DP algorithms
  - Greedy algorithms guarantees optimal solution
  - Greedy algorithms are used for solving optimization problems
  - All of the above
100. Which of the following shortest path algorithms follows dynamic programming strategy?
- Dijkstra Algorithm
  - DAG Algorithm
  - Floyd Warshall Algorithm
  - Bellman Ford Logarithms

Tribhuvan University  
 Institute of Science and Technology  
 Central Department of Computer Science and Information Technology  
 M.Sc. Computer Science and Information Technology  
 Entrance Examination, March 23, 2017

**Full Marks: 100**

**Time: 2 Hours**

**Pass Marks: 35**

**Tick (✓) the correct answer**

**Attempt all questions. Each question carries ONE mark.**

1. The value of  $\lim_{x \rightarrow 1} -\frac{\sqrt{2x}(x-1)}{|x-1|}$  is

- a.  $-\sqrt{3}$
- b.  $\sqrt{3}$

- c.  $-\sqrt{2}$
- d. 2

2. If  $\int_{-1}^1 f(x)dx = 5$  and  $\int_1^4 f(x)dx = -2$  then what is the value of  $\int_{-1}^4 f(x)dx$ ?

- a. 1
- b. 2

- c. 0
- d. 3

3. The series  $\sum_{n=0}^{\infty} \frac{2(-1)^n}{5 \times 3^n}$  is convergent to

- a.  $\frac{3}{10}$
- b.  $\frac{5}{7}$

- c.  $-\frac{4}{9}$
- d. 0

4. The eccentricity of circle is

- a. -1
- b. 1

- c. 0
- d.  $\infty$

5. The distance from the point (2, 2, 3) to the plane  $2x + y + 2z = 4$  is

- a.  $\frac{5}{3}$
  - b.  $\frac{8}{3}$
- $d = \sqrt{a^2 + b^2 + c^2}$
- distance = take always +ve value

- c. 2
- d.  $\frac{1}{3}$

6. The value of  $\int_0^1 \int_0^1 \int_0^1 xyz dx dy dz$  is

- a.  $\frac{1}{8}$
- b.  $\frac{1}{2}$

- c.  $\frac{1}{4}$
- d.  $\frac{2}{3}$

7. What is the  $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 - xy}{\sqrt{x} - \sqrt{y}}?$

- a. 1
- b. -1

c. 0

- d. 2

8. If the roots of  $P_0 \frac{d^2y}{dx^2} + P_1 \frac{dy}{dx} + P_2 y = 0$  are real and equal then C.F. is

- a.  $(C_1 + C_2 x)e^{mx}$
- b.  $C_1 e^{m_1 x} + C_2 e^{m_2 x}$

- c.  $e^{\alpha x}(A \cos \beta x + B \sin \beta x)$
- d. None

9. The curvature for the space curve  $\vec{r}(t) = \cos t \vec{i} + \sin t \vec{j} + t \vec{k}$  is

- a.  $\frac{1}{3}$
- b.  $\frac{2}{5}$

- c. 1
- d.  $\frac{1}{2}$

10. The length of major axis of the ellipse  $9x^2 + 25y^2 = 225$  is

- a. 6 compare eqn with  $x^2/a^2 + y^2/b^2 = 1$  major axis is  $2*$
- b. 10 greater value and minor smaller value
- c. 8
- d. None

11. The set of least squares solution of  $Ax = b$  coincides with the nonempty set of solutions of the normal equation

- a.  $Ax A^T = b A^T$
- b.  $A^T x = b$

- c.  $A^T A x = A^T b$
- d. None

12. Let  $U$  be an  $m \times n$  matrix with orthonormal columns and let  $x$  be in  $\mathbb{R}^n$  then

- a.  $\|Ux\| = 1$
- b.  $\|Ux\| = \|U\|$

- c.  $\|Ux\| = 0$
- d.  $\|Ux\| = \|x\|$

13. An  $n \times n$  matrix  $A$  is diagonalizable iff  $A$  has

- a.  $n$  linearly dependent eigen vectors
- b.  $n$  linearly independent eigen vectors
- c.  $n$  roots
- d. None of these

14. Let  $A = \begin{bmatrix} 2 & 4 & -2 & 1 \\ -2 & -5 & 7 & 3 \\ 3 & 7 & -8 & 6 \end{bmatrix}$ . If the null space of  $A$  is a subspace of  $\mathbb{R}^k$  then the value of  $k$  is

- a. 3
- b. 4

- c. 2
- d. 1

15 Let A be a square matrix. If a multiple of one row of A is added to another row to produce a matrix B then

- a.  $\det A = \det B$
- b.  $\det A = -\det B$
- c.  $\det A \neq \det B$
- d. None

16 Let  $A = \begin{bmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{bmatrix}$ ,  $u = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$  and  $T: \mathbb{R}^2 \rightarrow \mathbb{R}^3$  be a transformation defined by  $Tx = Ax$  then

$T(u)$  is

a.  $\begin{bmatrix} 5 \\ 1 \\ -9 \end{bmatrix}$

b.  $\begin{bmatrix} 4 \\ 1 \\ 2 \end{bmatrix}$

c.  $\begin{bmatrix} 1 \\ -5 \\ 6 \end{bmatrix}$

d.  $\begin{bmatrix} 1 \\ 2 \\ 1 \end{bmatrix}$

17. What is the value of h and k so that system of linear equation  $x_1 + 3x_2 = 2$  and  $3x_1 + hx_2 = k$  has infinite many solutions

- a.  $h = 2/3$  &  $k = 1$
- b.  $h = 9$  &  $k = 2/3$
- c.  $h = 2$  &  $k = 4$
- d.  $h = 1$  &  $k = 2/3$

18. Let A be a  $n \times n$  matrix then the null matrix of A is defined by

- a.  $\text{Nul } A = \{x : x \in \mathbb{R}^n : Ax \neq 0\}$
- b.  $\text{Nul } A = \{x : x \in \mathbb{R}^n : Ax = b\}$
- c.  $\text{Nul } A = \{x \in \mathbb{R}^n : Ax = 0\}$
- d. None

19. Which of the following pairs of vectors are orthogonal?

a.  $a = \begin{bmatrix} 8 \\ -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} -2 \\ -3 \end{bmatrix}$

b.  $a = \begin{bmatrix} 12 \\ 3 \\ -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} 2 \\ -3 \\ 3 \end{bmatrix}$

c.  $a = \begin{bmatrix} 3 \\ 2 \\ -5 \\ 2 \end{bmatrix}$ ,  $b = \begin{bmatrix} -4 \\ 1 \\ -2 \\ 6 \end{bmatrix}$

d. None of these

20. What is the distance between the vectors  $u = (2, 3)$  and  $v = (3, -1)$ ?

- a.  $\sqrt{15}$
- b. 8
- c.  $\sqrt{17}$
- d.  $\sqrt{11}$

21. What is the maximum number of processes that can be simultaneously inside the critical section at once to avoid race condition?
- a. 0
  - b. 1**
  - c. 2
  - d. 4
22. What is process?
- a. It is program stored in disk.
  - c. It is program in execution**
  - b. It is content of main memory
  - d. It is job in secondary memory
23. Which of the process scheduling algorithm is not practically feasible?
- a. Shortest Job First**
  - c. Round Robin
  - b. First Come First Serve
  - d. Priority Scheduling
24. If size of memory is 16 MB and page size is 4K, how many bits are used to represent page number?
- a. 4       $\log_2(16\text{mb}/4\text{KB})$
  - c. 12**
  - b. 8
  - d. 16
25. Which of the following recurrence cannot be solved by masters method?
- a.  $T(n)=2T(n/2)+n$
  - b.  $T(n)=T(n-1)+1$**
  - c.  $T(n)=T(n/2)+1$
  - d.  $T(n)=2T(n/2)+n^2$
26. What is the solution of the recurrence relation  $T(n)=4T(n/2)+n$ ?
- a.  $O(n)$
  - b.  $O(n^2)$**
  - c.  $O(n^4)$
  - d.  $O(n^{1/2})$
27. Which of the following algorithm is not greedy algorithm?
- a. Prim's Algorithm
  - b. Kruskals Algorithm**
  - c. Dijkstra Algorithm
  - d. Floyd Warshall Algorithm**
28. Which of the following algorithm design strategy can be used for dealing with NP-complete problems?
- a. Approximation Algorithms**
  - b. Dynamic Programming
  - c. Greedy Algorithms
  - d. Randomized Algorithms
29. What is convergence rate of Newton Raphson method?
- a. Linear
  - b. Super linear**
  - c. Quadratic
  - d. Logarithmic

30. If we want to find the unknown values of  $y$  for some  $x$  which lies at the end of a set of tabular values, which interpolation is better?
- Newton's divided difference interpolation
  - Newton's forward difference interpolation
  - Newton's backward difference interpolation
  - Lagrange interpolation
31. When Cholesky method can be used for solving system of linear equations?
- Coefficient matrix is square
  - Coefficient matrix is symmetric
  - Coefficient matrix is asymmetric
  - Coefficient matrix is identity matrix
32. Which of the following rule approximates the integrand by a second order polynomial?
- Trapezoidal Rule
  - Simpson's 1/3 Rule
  - Simpson's 3/8 Rule
  - Gaussian Integration
33. Odd parity of word can be tested by
- OR gate
  - AND gate
  - XOR gate
  - NOR gate
34. Sum of minterms of Boolean functions give conditions in which function is
- Dont care
  - Variable
  - 0
  - 1
35. Exclusive-OR is an
- Prime function
  - Undefined function
  - Even function
  - Odd function
36. In T flipflop when state of T flipflop has to be complemented T must be
- 0
  - 1
  - must be high so 1
  - T
  - T+1
37. How many pins are there in 8086?
- 24
  - 46
  - 32
  - 40
38. What is the store by register?
- Data
  - Operands
  - Memory
  - All of these

39. Which is not the control bus signal?
- READ
  - WRITE
  - RESET
  - None of these
40. Which RAM is created using MOS transistors?
- Dynamic RAM
  - Static RAM
  - Permanent RAM
  - SD RAM
41. Dynamic model is
- Time dependent
  - Independent of Time
  - a run time model
  - None of these
42. A stochastic simulation model have
- one or more non random outputs
  - no random output
  - One or more random outputs
  - All of these
43. A mathematical model implements
- z-notation
  - Algebraic notation
  - P-notation
  - Symbolic notation
44. Markov process is based on
- Memorylessness
  - Analytical
  - Random
  - None of these
45. A circle, if scaled only in one direction becomes a?
- Parabola
  - Hyperbola
  - Ellipse
  - Remains a circle
46. A line with endpoints codes as 0000 and 0100 is
- Partially invisible
  - Completely visible
  - Completely invisible
  - Trivially invisible
47. Which attributes of image transformation rotate the image by a given angle?
- Translate - X
  - Translate - Y
  - Both a and b
  - None of these
48. Back face removal is an example of
- Object space model
  - Image space model
  - Combination of both
  - None of these

- 49 Let  $S = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21\}$ . What is the smallest integer  $N > 0$  such that for any set of  $N$  integers, chosen from  $S$ , there must be two distinct integers that divide each other?
- a. 10
  - c. 9
  - b. 7**
  - d. 8
50. "John is good and John is nice" implies "John is good", is derived by
- a. Conjunction law
  - c. Implication law
  - b. Simplification law**
  - d. Contra positive law
51. In network flow slack is
- a. Difference of flow and capacity
  - c. Both a and b
  - b. Difference of capacity and flow**
  - d. None of these
52. A minimal spanning tree of a graph  $G$  is
- a. A spanning sub graph
  - c. Minimum weight
  - b. A tree
  - d. All of these**
53. In a JK flip-flop the function  $K=J'$  is used to realize
- a. T flip-flop**
  - c. D flip-flop
  - b. SR flip-flop
  - d. M/S JK flip-flop
54. Decimal equivalent of binary number 101001.1011
- a. 41.0875
  - c. 41.6875
  - b. 40.6875
  - d. 40.0875**
55. A CPU generally handles the interrupt by executing interrupt service routine
- a. As soon as interrupt is raised
  - b. By checking the interrupt register at the end of fetch cycle
  - c. By checking the interrupt register after finishing the executing the current instruction**
  - d. By checking the interrupt register at fixed time interval.
56. Which of the following coordinates various operations using timing signals?
- a. Memory unit
  - c. Input output unit
  - b. Control unit**
  - d. Arithmetic logic unit

57. The pre-order traversal sequence of a binary search tree is 30, 20, 10, 15, 25, 23, 39, 35, and
42. Which one of the following is the post-order traversal sequence of the same tree?
- 10, 20, 15, 23, 25, 35, 42, 39, 30
  - 15, 10, 25, 23, 20, 42, 35, 39, 30
  - 15, 20, 10, 23, 25, 42, 35, 39, 30
  - 15, 10, 23, 25, 20, 35, 42, 39, 30
58. The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is:
- ~~2^h - 1~~
  - ~~2^(h-1) - 1~~
  - ~~2^(h+1) - 1~~
  - ~~2^h~~
59. Which of the following sorting algorithms has the lowest worst-case complexity?
- Bubble sort
  - Selection sort
  - ~~Merge sort~~
  - Quick sort
60. Which of the following searching techniques do not require the data to be in sorted form
- ~~Linear Search~~
  - ~~Binary Search~~
  - Interpolation Search
  - All of these
61. The members of a class by default are
- ~~Private~~
  - ~~Protected~~
  - Public
  - Mandatory to specify
62. Which of the following is not a type of constructor?
- Copy constructor
  - ~~Friend constructor~~
  - Default constructor
  - Parameterized constructor
63. Which of the following is not the member of class?
- Static function
  - ~~Friend function~~
  - Const function
  - Virtual function
64. Which of the following are available only in the class hierarchy chain?
- Public data members
  - Private data members
  - ~~Protected data members~~
  - Member functions
65. Three address code involves
- Exactly three addresses
  - ~~At most three addresses~~
  - No unary operators
  - None of these

66. Consider a grammar

$$A ::= Bx \mid yC \mid _e$$

$$B ::= CzA$$

$$C ::= xB$$

What is First(A)?

- a. {y}
- b. {y,z}

c. {x,y}

d. {x,y,z}

67. The graph that shows basic blocks and their successor relationship is called

- a. DAG
- b. Flow Graph

c. Control graph

d. None of these

68 A "stream of token" is the output of

- a. Lexical analyser
- b. Syntax analyser

c. Semantic analyser

d. Code optimizer

69. One Gigabyte is approximately equal to

- a. 1000,000 bytes
- b. 1000,000,000 bytes

c. 1000,000,000,000 bytes

d. None of these

70. The first internet search engine was

- a. Yahoo
- b. Altavista

c. Archie

d. Google

71. An octal number 1002 is equal to the hexadecimal number

- a. 202
- b. 101

c. 514

d. 1000000010

72. Firewall is used in computer \_\_\_\_\_

- a. For monitoring
- b. For authentication.

c. For data transmission

d. For security

73. In the Analysis phase, the development of the \_\_\_\_\_ occurs, which is a clear statement of the goals and objectives of the project.

- a. documentation
- b. flowchart

c. program specification

d. design

74. The DFD is the basic component of ..... system.

- a. Conceptual
- b. Logical
- c. Physical
- d. None of these

75. Systems are modified whenever

- a. user's requirements change
- b. new computers are introduced in the market
- c. new software tools become available in the market
- d. other similar organization modify these system

76. Enhancements, upgrades, and bug fixes are done during the \_\_\_\_\_ step in the SDLC.

- a. Problem Identification
- b. Design
- c. Development and Documentation
- d. Maintenance and Evaluation

77. Which string can be generated by  $S \rightarrow aS|bA$ ,  $A \rightarrow d|ccA$ ?

- a. Aabccd small a not A
- b. Adabcca
- c. Abcca
- d. Abababd

78. Which of the following is NOT the set of regular expression  $R = (ab + abb)^* bbab$ ?

- a. Ababbbbab
- b. abbbab
- c. ababbabbbab
- d. abababab

79. Which of following is a mapping done by the transition function in DFA?

- a.  $\Sigma \times Q \rightarrow \Sigma$
- b.  $Q \times Q \rightarrow \Sigma$
- c.  $\Sigma \times \Sigma \rightarrow Q$
- d.  $Q \times \Sigma \rightarrow Q$

80. What a Turing Machine can do in a one move?

- a. May change its state
- b. Write a symbol on the cell being scanned
- c. Move the head one position left or right
- d. All of the above

81. How can you create a link in a in html which will be opened in new browser window/tab?

- a. `<a href = "url" target = "new">`
- b. `<a href = "url" target= "_blank">`
- c. `<a href = "url".new>`
- d. `<a href = "url" target ="open">`

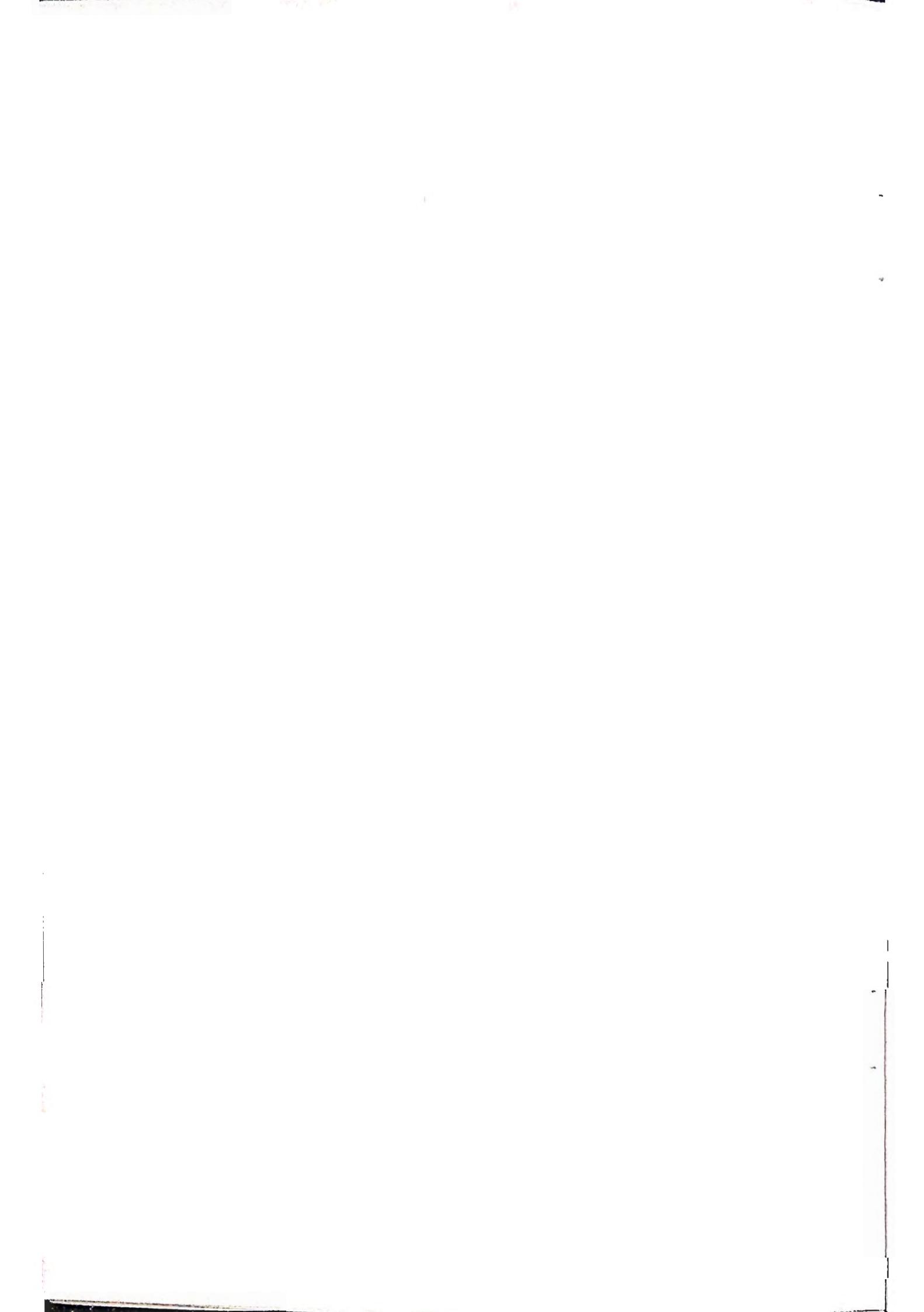
82. Which of following is true about the CSS defined using class in HTML?

- a. The class selector uses the HTML class attribute and is defined with a ". "
- b. The class selector uses the HTML class attribute and is defined with a "#"
- c. Generally the class selector is used to specify style for a single unique element

- d. The class selector is used only in internal CSS
83. Where is the correct place to insert a JavaScript?
- a. The <body> section
  - b. The <head> section
  - c. Both the <head> section and the <body>
  - d. The <Title> section
84. Among XSD indicators, which of following represent order indicator?
- a. Choice
  - b. maxOccurs
  - c. Group name
  - d. Order
85. Which of following is the strategy used to reduce the number of tree branches and the number of static evaluations applied in case of a game tree?
- a. Minimax strategy
  - b. Alpha-beta pruning strategy
  - c. Constraint satisfaction strategy
  - d. Static Max strategy
86. In Scripts, which of following represent object involved in events?
- a. Props
  - b. Roles
  - c. Track
  - d. Events
87. Which of following is used in Version Space Method?
- a. Generalization Specialization Tree
  - b. Number of Versions
  - c. Vector Space Model
  - d. Specialization Tree
88. Which of following is not an activation function?
- a. Linear
  - b. Threshold
  - c. Sigmoid
  - d. Asymptotic Function
89. Which of the following is a valid identifier in C programming?
- a. Var-1
  - b. Var\_1
  - c. Ivar
  - d. All of these
90. The arguments in a function call in C programming are called
- a. Actual arguments
  - b. Formal arguments
  - c. Parameters
  - d. Both a and b
91. Which of the following function in C programming is used to allocate memory dynamically with all bits set to zero?
- a. malloc()
  - b. free()
  - c. calloc()
  - d. delete()

92. An individual structure member can be accessed in terms of its corresponding pointer variable by using
- a. > operator
  - b. \* operator
  - c. . operator
  - ✓ d.  $\rightarrow$  operator
93. Which of the following component in ER diagram represents multi-valued attribute?
- a. Ellipses
  - ✓ b. Double ellipses
  - c. Diamond
  - d. Rectangle
94. Which of the following SQL command is used to insert attributes in an existing relation?
- a. Create table
  - ✓ b. Alter table
  - c. Drop table
  - d. Create domain
95. Which of the following FD is trivial?
- a.  $A \rightarrow B$  trivial functional dependency (FD)
  - b.  $A \rightarrow BC$
  - ✓ c.  $AB \rightarrow B$
  - d.  $AB \rightarrow C$
96. Which of the following is shadow paging algorithm?
- a. UNDO/REDO
  - ✓ b. UNDO/NO-REDO
  - c. NO-UNDO/REDO
  - d. NO-UNDO/NO-REDO
97. ADSL is the abbreviation of
- a. Asymmetric Dual Subscriber Line
  - b. Asymmetric Digital System Line
  - ✓ c. Asymmetric Dual System Line
  - ✓ d. Asymmetric Digital Subscriber Line
98. Router operates in which layer of OSI reference model?
- a. Physical Layer
  - ✓ b. Network Layer
  - c. Transport Layer
  - d. Application Layer
99. What is the minimum header size of an IP packet?
- a. 10 bytes
  - ✓ b. 20 bytes
  - c. 30 bytes
  - d. 60 bytes
100. Which of the following is the number of bits used in IPv6 address?
- a. 16
  - b. 32
  - ✓ c. 64
  - ✓ d. 128





**Tribhuvan University**  
**Institute of Science and Technology**  
**Central Department of Computer Science and Information Technology**  
**M.Sc. CSIT Entrance Examination, March 23, 2018**

**Full Marks: 100****Time: 2 Hrs****Pass Marks: 35**

**Attempt all questions. Please Tick/Encircle the correct answer. Any omission or correction to the answers is not allowed.**

---

1. The vectors  $(3, 2)$  and  $(6, 2)$  are
  - a. Equal
  - b. Orthogonal
  - c. Linearly independent
  - d. Linearly dependent
  
2. If  $A = \begin{pmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 7 \end{pmatrix}$  and  $\vec{u} = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$ , then  $T(\vec{u}) = A\vec{u} =$ 
  - a.  $\begin{pmatrix} 5 \\ 1 \\ -9 \end{pmatrix}$
  - b.  $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$
  - c.  $\begin{pmatrix} 5 \\ 1 \\ 9 \end{pmatrix}$
  - d.  $\begin{pmatrix} -3 \\ 5 \\ 7 \end{pmatrix}$
  
3. The matrix  $\begin{pmatrix} 3 & -9 \\ 2 & 6 \end{pmatrix}$  is
  - a. Diagonal
  - b. Symmetric
  - c. Invertible
  - d. Non invertible
  
4. The area of the parallelogram determined by the points  $(-2, -2), (0, 3), (4, -1)$  and  $(6, 4)$  is
  - a. 28
  - b. -28
  - c. 0
  - d. 25

5. If  $\vec{b}_1 = (2, 1)$ ,  $\vec{b}_2 = (-1, 1)$ ,  $\vec{x} = (4, 5)$  and  $E = (\vec{b}_1, \vec{b}_2)$  then the coordinate vector  $(x)_B$  of  $\vec{x}$  relative to B is

a.  $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$

b.  $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$

c.  $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

d.  $\begin{pmatrix} -3 \\ -2 \end{pmatrix}$

6. The rank of A =  $\begin{pmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & 6 \\ 0 & 0 & 0 & 0 \end{pmatrix}$

a. 0

b. 1

$\checkmark$  c. 2

d. 3

7. The Eigen values of A =  $\begin{pmatrix} 3 & 2 \\ 3 & 8 \end{pmatrix}$  are

a. -3, 8

ans is 9 and 2

c. 3, -8

b. 3, 8

d. -3, -8

8. The unit vector of  $\vec{v} = (1, -2, 2, 0)$  in the direction of  $\vec{v}$  is

a.  $(1, -2, 2, 0)$

unit vector =  $u/|u|$

c.  $(1/3, -2/3, 2/3, 0)$

b.  $(1/9, -2/9, 2/9, 0)$

$|u| = \text{underoot } x^2 + y^2 + z^2$

d.  $(1/3, 2/3, 2/3, 0)$

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

a.  $\checkmark$  Orthogonal

c. Equal

b. Not orthogonal

d. Linearly dependent

10. The vectors  $\vec{a} = (5, 6, -1)$  and  $\vec{b} = (4/3, -1, 2/3)$  are

a. Parallel

$\checkmark$  c. Orthogonal

b. Equal

d. Dependent

11. The solution of  $|x - 3| \geq 1$  is

a.  $\checkmark (-\infty, 2] \cup [4, \infty)$

c.  $(-\infty, 2) \cup (4, \infty)$

b.  $[-\infty, 2] \cup [4, \infty]$

d.  $(-\infty, 2] \cup [4, \infty)$

do derivative and put first value 2 in derivative that is m value  
then do  $y=mx+c$  and find c do and put in  $y=mx+c$

12. Equation of normal to the curve  $f(x) = x^2 + 1$  at  $(2, 5)$  is

- a.  $4y - y + 3 = 0$   
✓ b.  $y - 4x + 3 = 0$

- c.  $4y + x = 0$   
d.  $4y + x + 22 = 0$

13. The function  $y = \sqrt{4 - x^2}$  is not differentiable at  $x =$

- a.  $\pm 1$   
b.  $\pm 1.5$

- ✓ c.  $\pm 2$   
d. 0

14.  $x \xrightarrow{\lim} 0 \frac{x - 2x^2}{3x^2 + 5x} =$

- ✓ a. 0/0  
b. 2/5

- c. 1/3  
d. 1/5

15.  $\int \frac{\sin(\ln x)}{x} dx =$

- a.  $\frac{-\cos(\ln x)}{x} + A$   
✓ b.  $-\cos(\ln x) + A$

- c.  $\cos(\ln x) + A$   
d.  $\frac{\cos(\ln x)}{x} + A$

16. Power series expansion of  $f(x) = \cos x$  is

- a.  $1 - x^2/2! + x^4/4! - x^6/6! + \dots$   
✓ b.  $1 + x^2/2! + x^4/4! + x^6/6! + \dots$

- c.  $1 + x^2/2! - x^4/4! + x^6/6! - \dots$   
d.  $1 - x^3/3! + x^5/5! - \dots$

17. The directrix of the parabola  $x^2 = 8y$  is

- ✓ a.  $y = 2$   $(x-h)^2 = 4p(y-k)$  or  $(y-k)^2 = 4p(x-h)$   
b.  $y = -2$  after p value - p = 0 and y - p value = 0

- c.  $x = 2$   
d.  $x = -2$

18. If  $\vec{v} = (t\cos t)\vec{i} + (t\sin t)\vec{j}$ , then the unit tangent vector  $\vec{T}$  is

- a.  $(\cos t)\vec{i} + (\sin t)\vec{j}$   
b.  $(\cos t)\vec{i} + (t\sin t)\vec{j}$

find derivative

- ✓ c.  $(\cos t)\vec{i} - (\sin t)\vec{j}$   
d.  $(\cos t)\vec{i} - (t\sin t)\vec{j}$

19. If  $u = x^2 + y - z = \sin(x + y)$  then  $\frac{du}{dx}$  is

- a.  $x + \sin(x + y)$   
b.  $2x + \sin(x + y)$

find separate derivation of x and

sin and add

- ✓ c.  $2x + \cos(x + y)$   
d.  $-1 - \cos(x + y)$

20.  $\int_0^{\pi} \int_0^{\sin x} y dx dy =$

- a.  $\pi/4$
- b. 0
- c.  $\pi$
- d.  $\pi/3$

21. In C, if you pass an array as an argument to a function, what actually gets passed?

- a. Value of elements in array
- b. First element of the array
- c. Base address of the array
- d. Address of the last element of array

22. What is the output of the code

```
main()
{
    int a = 2;
    printf("%d", a++);
    printf(",%d", ++a);
}
```

- a. 3,4
- b. 2,4
- c. 2,3
- d. None of the above

23. If there is any error while opening a file, fopen will return

- a. Nothing
- b. EOF
- c. NULL
- d. Depends on compiler

24. Function fabs defined math.h header file takes argument of type integer

- a. True
- b. False
- c. Depends on the implementation
- d. Depends on the standard

25. The processes that are residing in main memory and are ready and waiting to execute are kept on a list called

- a. Job Queue
- b. Ready Queue
- c. Execution Queue
- d. Process Queue

26. For non sharable resources like a printer, mutual exclusion

- a. Must Exist
- b. Must Not Exist
- c. May Exist
- d. None of the above

27. Every address generated by the CPU is divided into two parts
- a. frame bit & page number
  - b. page number & page offset
  - c. page offset & frame bit
  - d. frame offset & page offset
28. To ensure difficulties do not arise in the readers - writers problem, \_\_\_\_\_ are given exclusive access to the shared object
- a. Readers
  - b. Writers
  - c. readers and writers
  - d. none of the mentioned
29. Physical model of simulation can be classified as
- a. Numerical and Analytical
  - b. Mathematical and Numerical
  - c. Static and Dynamic
  - d. Analytical and Static
30. Face validity means
- a. Input-output validation
  - b. process validation
  - c. Model validation
  - d. Mathematical validation
31. Which of the following test is used for uniformity test of random number
- a. Kolmogorov-Smirnov test
  - b. Gap test
  - c. Auto-correlation test
  - d. Poker test
32. Where the outcome of activity can be completely described by its input, the activity is said to be:
- a. Indigenous
  - b. Exogenous
  - c. Stochastic
  - d. Deterministic
33. How many different strings can be made by reordering the letters of the word "SUCCESS"
- a. 520
  - b. 240
  - c. 420
  - d. 640
34. Suppose that  $P(n)$  is a propositional function. Determine for which positive integers  $n$  the statement  $P(n)$  must be true when  $P(1)$  is true and if  $P(n)$  is true then  $P(n+2)$  is true, for all positive integer  $n$ .
- a.  $P(3)$
  - b.  $P(2)$
  - c.  $P(4)$
  - d.  $P(6)$
35. A full binary tree with  $m$  vertices contains..... Internal nodes.
- a.  $(2n-1)$
  - b.  $\log_2 n$
  - c.  $2n+1$
  - d.  $(n-1)/2$

36. Let a connected planer graph has 20 vertices, each of degree 3. Into how many regions does a representation of this planer graph split the plane?

- a. 30
- b. 20
- c. 12
- d. 60

37. Let  $A = \{a, b\}$ ,  $B = \{c, d\}$ , then  $(A^* \cap B) \cup (B^* \cap A)$  consists of

- a.  $\{a, b, c, d, \epsilon\}$
- b.  $\{a, b, \epsilon\}$
- c.  $\{c, d, \epsilon\}$
- d.  $\{\}$

38. Which of following is true for extended transition function of DFA?

- a.  $Q \times \Sigma \rightarrow Q$
- b.  $Q^* \times \Sigma^* \rightarrow \Sigma$
- c.  $Q \times \Sigma^* \rightarrow Q$
- d.  $Q \times \Sigma \rightarrow \Sigma$

39. Which of following is a turing machine that is able to simulate other turing machines?

- a. Nested Turing machines
- b. Universal Turing machine
- c. Counter machine
- d. Nested Machine

40. Which of the following grammars are in Chomsky Normal Form:

- a.  $S \rightarrow AB \mid BC \mid CD, A \rightarrow 0, B \rightarrow 1, C \rightarrow 2, D \rightarrow 3$
- b.  $S \rightarrow AB, S \rightarrow BCA \mid p \mid q$
- c.  $S \rightarrow ABa, A \rightarrow aaB, B \rightarrow Ac$
- d.  $A \rightarrow d \mid ccA \mid \epsilon$

41. Which of following css type for an element has highest priority?

- a. External style
- b. Internal style
- c. Inline style
- d. Intag style

42. Which is the valid syntax in JavaScript to define a variable containing an integer number 7?

- a. `var x="7";`
- b. `var x=7;`
- c. `int x=7;`
- d. `int x, x=7;`

43. Choose the correct HTML tag for the largest heading?

- a. `<H1>`
- b. `<H6>`
- c. `<H2>`
- d. `<H4>`

44. In XSLT, which of following is used to extract value of an XML element and add it to the output stream?

- a. `<xsl:value>`
- b. `<xml:value>`
- c. `getXMLElement()`
- d. `<xsl:value-of>`

45. Which of the following is not the part of ADT description?

- a. Data
- b. Operation
- c. All of the above
- d. None of the above

46. Quick sort algorithm is an example of

- a. Binary search approach
- b. Greedy approach
- c. Dynamic approach
- d. Divide and conquer approach

47. What is the worst case logarithmic time complexity, where n is the number of elements in the array

- a.  $O(\log n - 1)$
- b.  $O(\log n)$
- c.  $O(\log n + 1)$
- d. None of the above

48. In case of Tower of Hanoi, the objective of the puzzle is to move the entire stack from one peg to another peg, obeying the following simple rules except:

- a. Only one disk can be moved at a time.
- b. Each move consists of taking the upper disk from one of the stacks and placing it on top of another stack.
- c. No disk may be placed on top of a greater disk.
- d. None of the above.

49. To eliminate redundant code, we should use

- a. Operator overloading.
- b. Inheritance.
- c. Both a and b
- d. None of the above.

50. Which of the following approach is used by object oriented design:

- a. Top-down approach.
- b. Bottom-up approach.
- c. Both a and b.
- d. None of the above.

51. In C++, the default return type for all the function is

- a. char
- b. int
- c. void
- d. None of the above.

52. Virtual member functions are most commonly used for

- a. Operator overloading.
- b. Polymorphism.
- c. None of the above.
- d. All of the above.

53. In graphical system the array of pixels in the picture are stored in
- Memory
  - Frame buffer
  - Processor
  - All of the mentioned
54. On raster system, lines are plotted with
- Lines
  - Dots
  - Pixels
  - None of the mentioned
55. \_\_\_\_\_ is a rigid body transformation that moves objects without deformation.
- Rotation
  - Scaling
  - Translation
  - All of the mentioned
56. Back face removal is an example of
- Object space method
  - Image space method
  - Combination of both
  - None of above
57. Which of the following strategies are adopted if information requirements are not well defined?
- Structured analysis development method
  - Systems development life cycle method
  - Prototyping method
  - Spiral method
58. Unified modeling language
- Is an object oriented programming language
  - Is useful in describing object oriented design models graphically
  - Allows to represent multiple views of a system
  - Is an object oriented system development methodology
59. CASE tools are used \_\_\_\_\_
- To get routine work in a development project done
  - To train users of the system
  - As a productivity tool in systems development
  - Not to automate the implementation phase of a development project
60. \_\_\_\_\_ represents a Whole Part or Composition relationship.
- Aggregation
  - Inheritance
  - Stereotype
  - Association

61. Which table shows the electrical state of digital circuit's output for every possible combination of electrical states in the inputs?
- Function Table
  - Truth Table
  - Routing Table
  - ASCII Table
62. What logic function is produced by adding an inverter to each input and the output of an AND gate?
- NAND
  - NOR
  - OR
  - XOR
63. The gray code for decimal 7 is
- 0111
  - 0100
  - 1011
  - 0101
64. A shift register can be used for
- Parallel to serial conversion
  - Serial to parallel conversion
  - Digital delay line
  - All of the above
65. Address space can be partitioned by using .....
- Address space I/O Scheme
  - Hardware I/O Scheme
  - Memory mapped I/O Scheme
  - Instruction set scheme
66. Which one of them is false regarding PROM
- Manufactured by blowing fusible nichrome wire links
  - Reprogramming possible
  - Programmed by the user
  - None of the above
67. 8085 has .....bit address space
- 32
  - 64
  - 16
  - 8
68. Which stack is used in 8085?
- FIFO
  - LIFO
  - FILO
  - LILO
69. Which of the following level describes how data are stored in the database?
- Physical level or internal level
  - Logical level
  - View level
  - External level

70. Which of the following normal form is based on transitive dependency?

- a. 1NF
- b. 2NF
- c. ✓ 3NF
- d. 4NF

71. "A transaction is either performed in its entirety or not performed at all" is

- a. ✓ Atomicity
- b. Consistency
- c. Isolation
- d. Durability

72. Which of the following locks do not conflict?

- a. Read, Write
- b. ✓ Read, Read
- c. Write, Read
- d. Write, Write

73. Which of the following is a class A network address?

- a. 192.168.2.10
- b. 160.34.5.7
- c. 145.45.7.9
- d. ✓ 100.100.100.100

74. Which of the following layer of TCP/IP is responsible for reliable transfer of data?

- a. Network access layer
- b. Internet layer
- c. ✓ Transport layer
- d. Physical layer

75. Which of the following is the number of bits used in IPv6 address?

- a. 16
- b. 32
- c. 64
- d. ✓ 128

76. Which of the following is LAN technology

- a. ✓ Ethernet
- b. X.25
- c. ATM
- d. Frame relay

77. A ..... Stores data on floppy disk cartridges with at least 70 times the capacity of floppy disk.

- a. DVD drive
- b. Hard Disk drive
- c. ✓ Zip Disk Drive
- d. None of the above

78. What is the name for a webpage address?

- a. Domain
- b. Directory
- c. Protocol
- d. ✓ URL

79. Which character representation code is widely used for microcomputers?

- a. HTML
- b. Unicode
- c. ✓ ASCII
- d. EBCDIC

80. Which of the protocols below is used for sending email?

- a. FTP
- b. SMTP
- c. TCP/IP
- d. HTTP

81. An example of peephole optimization is

- a. Loop optimization
- b. Local optimization
- c. Data flow analysis
- d. None of the above

82. A compiler that runs on one machine and produce code for a different machine is called

- a. One pass compiler
- b. Two pass compiler
- c. Cross compiler
- d. none

83. .... grammar produces more than one parse tree for some sentence.

- a. Unambiguous
- b. Left recursive
- c. Regular
- d. Ambiguous

84. Type checking is carried out in

- a. Lexical analysis
- b. Syntax analysis
- c. Syntax directed translation
- d. Optimization

85. Which of the following algorithm is generally used CSP search algorithm?

- a. Breadth-first search algorithm
- b. Depth-first search algorithm
- c. Hill-climbing search algorithm
- d. None of the mentioned

86. A \_\_\_\_\_ is used to demonstrate, on a purely syntactic basis, that one formula is a logical consequence of another formula.

- a. Deductive Systems
- b. Inductive Systems
- c. Reasoning with Knowledge Based Systems
- d. Search Based Systems

87. Which is used to construct the complex sentences?

- a. Symbols
- b. Connectives
- c. Logical connectives
- d. All of the mentioned

88 The truth values of traditional set theory is \_\_\_\_\_ and that of fuzzy set is

- a. Either 0 or 1, between 0 & 1
- b. Between 0 & 1, either 0 or 1
- c. Between 0 & 1, between 0 & 1
- d. Either 0 or 1, either 0 or 1

89 To solve  $x^2 - 2 = 0$  by Newton Raphson technique. If initial guess is  $x_0 = 1.0$ , subsequent estimate of  $x$  (i.e.  $x_1$ ) will be

- a. 1.414
- b. 1.5
- c. 2.0
- d. None of these

90 In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to

- a. Diagonal matrix
- b. Lower triangular matrix
- c. Upper triangular matrix
- d. Singular matrix

91 In which of the following method, we approximate the curve of solution by the tangent in each interval

- a. Picard's method
- b. Euler's method
- c. Newton's method
- d. Runge Kutta method

92 Which of the following statements applies to the bisection method used for finding roots of functions?

- a. Converges within a few iterations
- b. Guaranteed to work for all Continuous functions
- c. Is faster than the Newton-Raphson method
- d. Requires that there be no error in determining the sign of the function

93 How many carry bits are used to detect overflow in case of signed arithmetic?

- a. 0
- b. 1
- c. 2
- d. 3

94 What will be the result if 2 is left shifted by 3 position?

- a. 5
- b. 6
- c. 8
- d. 16

95. What we call the technique that uses opcode as address of next micro-operation?

- a. Direct Mapping
- b. Inline Mapping
- c. Opcode Mapping
- d. Sequential Mapping

96. Which of the following IO handling technique is best for the devices that perform only one task?

- a. Polling
- b. Interrupt Driven IO
- c. DMA
- d. IO Processor

97. Which of the following recurrence cannot be solved by masters method?

- a.  $T(n) = 2T(n/2) + n$
- b.  $T(n) = T(n-1) + 1$
- c.  $T(n) = T(n/2) + 1$
- d.  $T(n) = 2T(n/2) + n^2$

98. What is best case time complexity of merge sort?

- a.  $O(n)$
- b.  $O(n \log n)$
- for worst also
- c.  $O(n^2)$
- d.  $O(\log n)$

99. Which of the following algorithmic paradigm is not used for solving optimization problems?

- a. Recursive
- b. Greedy
- c. Dynamic Programming
- d. All of the above

100. Which of the following algorithm design strategy can be used for dealing with NP-complete problems?

- a. Approximation Algorithms
- b. Dynamic Programming
- c. Greedy Algorithms
- d. Randomized Algorithms

**Linear algebra:**

1. Product of identity matrix and any matrix A is equal to

- A. product matrix
- B. unidentified matrix
- C. matrix A
- D. identity matrix

Ans C

2. Product of identity matrix and any matrix A is equal to

- A. product matrix
- B. unidentified matrix
- C. matrix A
- D. identity matrix

Ans A

3. The system of linear equations

$$(4d - 1)x + y + z = 0$$

$$-y + z = 0$$

$$(4d - 1)z = 0$$

has a non-trivial solution, if d equals

- A. 1/2
- B. 1/4
- C. 3/4
- D. 1

Ans B

4: If A and B are square matrices of size  $n \times n$ , then which of the following statement is not true?

- A.  $\det(AB) = \det(A)\det(B)$
- B.  $\det(kA) = kn\det(A)$
- C.  $\det(A + B) = \det(A) + \det(B)$
- D.  $\det(A^T) = 1/\det(A^{-1})$

Ans C

5: The matrix  $B = AT$ , where A is any matrix is

- A. Skew symmetric
- B. Symmetric about the secondary diagonal
- C. Always symmetric
- ~~D. Another general matrix~~

Ans C

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6: Eigen values of a real symmetric matrix are always

- A. Positive
- B. Real and imaginary
- C. Negative
- D. Real

Ans : D

7. Let A be a Hermitian matrix. Then, which of the following statements is false?

- A. The diagonal entries of A are all real.
- B. There exists a unitary U such that  $U^*AU$  is a diagonal matrix.
- C. If  $A^3 = I$ , then  $A = I$ .
- D. If  $A^2 = I$ , then  $A = I$ .

Ans:D

8 Let A be a complex  $n \times n$  matrix. Let  $\lambda_1, \lambda_2, \lambda_3$  be three distinct eigenvalues of A, with corresponding eigenvectors  $z_1, z_2, z_3$ . Then, which of the following statements is false?

- A.  $z_1 + z_2, z_1 - z_2, z_3$  are linearly independent.
- B.  $z_1, z_2, z_3$  are linearly independent.
- C.  $z_1, z_1 + z_2, z_1 + z_2 + z_3$  are linearly independent.
- D.  $z_1, z_2, z_3$  are linearly independent if and only if A is diagonalizable.

Ans: D

9: Let A,B be two complex  $n \times n$  matrices that are Hermitian and  $C_1 = A + B, C_2 = iA + (2 + 3i)B$ , and  $C_3 = AB$ .

Then, among  $C_1, C_2, C_3$ , which is/are Hermitian?

- A. Only  $C_1$
- B. Only  $C_2$
- C. Only  $C_3$
- D. All of them

Ans:A

10: If A and B be real symmetric matrices of size  $n \times n$ , then

- A.  $AAT = I$
- B.  $A = A^{-1}$
- C.  $AB = BA$
- D.  $(AB)^T = BA$

Ans:D

### Calculus

1. If  $f(x) = \int_x^y t dt$ , then  $\frac{df}{dx}$

A.  $2x^2$

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B.  $\sqrt{x}$

C. 0

D. 1

Ans: A

2. Coordinates of midpoint of line joining two points (16, 4) and (36, 6) are:

A. (26, 5)

B. (5, 26)

C. (10, 1)

D. (1, 10)

Ans: A

2. The set  $\{x : a < x < b\}$  can also written as

A. [a, b]

B. (a, b)

C. [a, b)

D. (a, b]

Ans: B

3. The points (- 2, 0), (- 1, 0), (1, 0) and (2, 0) lie on

A. y - axis

B. x- axis

C.  $y = - x$

D.  $y = 5x$

Ans: B

4. The three lines define by the equation  $x + 2y = 0$ ,  $2x + y = 0$  and  $3x + 5y = 0$  are

A. Parallel

B. Perpendicular

C. Concurrent

D. Not parallel

Ans: C

5. The slope of a line segment is  $1/3$ . The slope of a perpendicular line is

A.  $-3$

B.  $0.3$

C.  $-1/3$

if 2 lines are perpendicular than value is -1 i.e  $1/3 * m2 = -1$

D.  $1/3$

Ans: A

6. Given points A(6,3) and B(3,-1). The distance between A and B is approximately

A. 4.5

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- B. 5  
C. 7  
D. 2.6

Ans: B

7.  $\int_0^1 e^{-6x} dx =$

- A)  $\frac{-e^{-6}}{6}$   
B)  $-6e^{-6}$   
C)  $e^{-6} - 1$   
D)  $\frac{1}{6} - \frac{e^{-6}}{6}$

Ans: D

8.  $\int x^3 \cos(x^4) dx$

- A)  $-\frac{1}{4} \cos(x^4) + C$   
B)  $\frac{1}{4} \sin(x^4) + C$   
C)  $-\frac{x^4}{4} \sin(x^4) + C$   
D)  $\frac{x^4}{4} \sin(x^4) + C$

Ans: B

9: If a line is parallel to y-axis then slope of the line perpendicular to this line is

- A. 2  
B. 0  
C. 1  
D. -1

Ans: B

10: The following function has a local minima at which value of x

$$f(x) = x\sqrt{5-x^2}$$

- A.  $\frac{\sqrt{5}}{2}$   
B.  $\sqrt{5}$   
C.  $\frac{\sqrt{5}}{2}$   
D.  $\sqrt{\frac{5}{2}}$

Ans: C

## Information technology

1: Joystick is used to ?

- A. Move cursor on the screen
- B. Computer games
- C. Both a and b
- D. None of these

Ans C

2: Computer microphone converts audio signals into the

- A. electrical waves
- B. electromagnetic waves
- C. digital signals
- D. analog signals

Ans A

3: For reproducing sound the CD audio player uses a ?

- A. Quartz Cristal
- B. Titanium Needle
- C. Laser Beam
- D. Barium Titanium Ceramic

Ans C

4: A peripheral device used in a word processing system is

- A. Floppy disk
- B. Magnetic card reader
- C. CRT
- D. All of these

Ans D

## C programing

1. Who is known as the father of C Language ?

- A. James A. Sosling
- B. Vjarne Stroustrup
- C. Dennis Ritchie
- D. Dr. E. F. Codd

Ans C

2: Which of the following is invalid?

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- A "
- B " "
- C 'a'
- D abc'

Ans:C

**3: Which is the right way to declare constant in C?**

- A. int constant var =10;
- B. int const var = 10;
- C. const int var = 10;
- D. B & C Both

Answer : D

**4: The Default Parameter Passing Mechanism is called as**

- A. Call by Value
- B. Call by Reference
- C. Call by Address
- D. Call by Name

Ans : A

### Discrete structure

**1: If X and Y be the sets. Then the set ( X - Y ) union ( Y - X ) union ( X intersection Y ) is equal to?**

- A. X union Y
- B.  $X^c$  union  $Y^c$
- C. X intersection Y
- D.  $X^c$  intersection  $Y^c$

Ans:A

**2: The complete graph with four vertices has k edges where k is:**

- A. 3
- B. 4       $k = (n * (n-1)) / 2.$
- C. 5
- D. 6

Ans:D

**3: Let A and B be any two arbitrary events then which one of the following is true ?**

- A.  $P(A \text{ intersection } B) = P(A). P(B)$
- B.  $P(A \cup B) = P(A) + P(B)$
- C.  $P(AB) = P(A \text{ intersection } B). P(B)$
- D.  $P(A \cup B) \geq P(A) + P(B)$

Ans: D

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4) A continuous non - intersecting curve in the plane whose origin and terminus coincide ?

1. Planer
2. Jordan
3. Hamiltonian
4. All of these

Ans. B

## Data structure

1: Which if the following is/are the levels of implementation of data structure

- A Application level
- B Abstract level
- C Implementation level
- D All of the above

Ans. D

2: In ..... , search start at the beginning of the list and check every element in the list.

- A) Linear search
- B) Binary search
- C) Hash Search
- D) Binary Tree search

Ans. A

3: Which of the following data structures are indexed structures?

- A. Linear arrays
- B. Linked lists
- C. Queue
- D. Stack

Ans. A

4: The time complexity of quick sort is .....

- A)  $O(n)$
- B)  $O(n^2)$
- C)  $O(n \log n)$       not worst
- D)  $O(\log n)$

Ans. C

## Digital Logic

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**1: Diagram which is used to show logic elements and their interconnections is said to be**

- A. circuit diagram
- B. system diagram
- C. logic diagram
- D. gate diagram

**Ans:C**

**2: The universal gate is .....**

- A. NAND gate
- B. OR gate
- C. AND gate
- D. None of the above

**Ans:A**

**3: The greatest negative number which can be stored in 8 bit computer using 2's complement arithmetic is .....**

- A. -256
- B. -128
- C. -255
- D. -127

**Ans:B**

**4: Latch is a device with**

- A. One stable state
- B. Two stable state
- C. Three stable state
- D. None of the Mentioned

**Ans:B**

**Micropocessor**

**1: The devices that provide the means for a computer to communicate with the user computers are referred to as:**

- A. CPU
- B. ALU
- C. I/O

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D. none of the above

Ans C

2: The \_\_\_\_\_ ensures that only one IC is active at a time to avoid a bus conflict caused by two ICs writing different data to the same bus.

- A. control bus
- B. control instructions
- C. address decoder
- D. CPU

Answer. C

3: Because microprocessor CPUs do not understand mnemonics as they are, they have to be converted to \_\_\_\_\_.

- A. hexadecimal machine code
- B. binary machine code
- C. assembly language
- D. all of the above

Answer. B

4: What does microprocessor speed depends on

- A. Clock
- B. Data bus width
- C. Address bus width
- D. Size of register

Ans. C

### Computer organization

1: The two phases of executing an instruction are \_\_\_\_\_

- A. Instruction decoding and storage
- B. Instruction fetch and instruction execution
- C. Instruction execution and storage
- D. Instruction fetch and Instruction processing

Ans. B

2: A collection of lines that connects several devices is called:

- A. peripheral connection wires
- B. bus
- C. Both a and b

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D. Internal wires

Ans:B

**3: Instruction in different stages of pipeline do not interfere with one another, separation is done by**

- A. Pipe stage
- B. Pipeline stacks
- C. Pipeline registers
- D. Processor cycle

Ans:C

**4: If a comparing instruction and branch instruction uses some architectures, to treat these comparisons chooses as**

- A. Error
- B. Exceptions
- C. Special cases
- D. All above

Ans: C

## Operating System

**1: To avoid the race condition, the number of processes that may be simultaneously inside their critical section is**

- A. 8
- B. 1
- C. 16
- D. 0

Ans: B

**2: When a thread needs to wait for an event it will**

- A. Block
- B. Execute
- C. Terminate
- D. Update

Ans: A

**3: In priority scheduling algorithm**

- A. CPU is allocated to the process with highest priority
- B. CPU is allocated to the process with lowest priority

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- C. Equal priority processes can not be scheduled
- D. None of the mentioned

Ans A

4: A common synchronization mechanism used in multiprocessor operating system is

- A. Complex
- B. Locks
- C. Lockstep
- D. None

Ans B

OOPS language

1: Which of the following is an abstract data type?

- A. Class
- B. Int
- C. String
- D. Double

Ans A

2: Which of the following type of class allows only one object of it to be created?

- A. Virtual class
- B. Abstract class
- C. Singleton class
- D. Friend class

Ans C

3: When a class serves as base class for many derived classes, the situation is called:

- A. Polymorphism
- B. hierarchical inheritance
- C. hybrid inheritance
- D. multipath inheritance

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Ans:B

**4: Consider the declarations**

```
char a;  
const char aa = 'h';  
char *na;  
const char *naa;
```

**Which of the following statements**

**Statement I:** aa = a;  
**Statement II:** na = &a;  
**Statement III:** na = &aa;

**is/are illegal?**

- A. Only I and II
- B. Only II and III
- C. Only I and III
- D. All the three statements are illegal

Ans :C

## Numerical method

**1.What is the other name of Jacobi's method?**

- A. Simultaneous method
- B. Diagonal method
- C. Displacement method
- D. Simultaneous displacement method

Ans:D

**2: By using Newton-raphson method, Double (Repeated) root of  $4x^3 - 8x^2 - 3x + 9 = 0$  is?**

- A. 1.6
- B. 1.55
- C. 1.4
- D. 1.5

Ans: D

**3: Errors may occur in performing numerical computation on the computer due to**

- A.Rounding errors
- B.Power fluctuation
- C.Operator fatigue
- D.All of these

Ans - A

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**4: In which of the following method, we approximate the curve of solution by the tangent in each interval.**

- A. Picard's method
- B. Euler's method
- C. Newton's method
- D. Runge Kutta method

Ans: B

**Database**

**1: In a relational schema, each tuple is divided into fields called**

- A. Relations
- B. Domains
- C. Queries
- D. All of the above

Ans: B

**2. Which one of the following provides the ability to query information from the database and to insert tuples into, delete tuples from, and modify tuples in the database?**

- A. DML(Data Manipulation Language)
- B. DDL(Data Definition Language)
- C. Query
- D. Relational Schema

Ans: A

**3: In an ER model, ..... is described in the database by storing its data.**

- A. Entity
- B. Attribute
- C. Relationship
- D. Notation

Ans: A

**4: The \_\_\_\_\_ condition allows a general predicate over the relations being joined.**

- A. On
- B. Using
- C. Set
- D. Where

Ans: A

## Computer Graphics

1: Which of the following is not a line-type?

- A Dashed line
- B Dark line
- C Dotted line
- D Only b

Ans:B

2: Graphics is one of the \_\_\_\_\_ major key element in design of multimedia application

- A Three
- B Four
- C Five
- D Six

Ans:C

3: Color depth can be defined by \_\_\_\_\_ which can be displayed on a display unit

- A Bits per pixel
- B Bytes per pixel
- C Megabyte per pixel
- D None of these

Ans:A

4: The division of the computer screen into rows and columns that define the no. of pixels to display a picture is called

- A Persistence
- B Resolution
- C Encapsulated post script
- D None

Ans:B

## Automata

1: L= language of words containing even number of a's. Regular Expression is

- A.  $(a+b)aa(a+b)$
- B.  $(b+aba)$
- C.  $a+bbaaba$
- D.  $(a+b)ab(a+b)$

Ans:B

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**2: A language L is accepted by a finite automaton if and only if it is**

- A.context - free
- B.context-sensitive
- C.recursive
- D.Right-linear

Ans D

**3: The output of the lexical and syntax analyzer can stated as:**

- A. parse stream, parse tree
- B. token tree, parse tree
- C. token stream, parse tree
- D. all of the mentioned

Ans C

**4: The scanner outputs:**

- A. Stream of tokens
- B. Image file
- C. Intermediate code
- D. Machine code

Ans A

### System analysis and design

**1: The step-by-step instructions that solve a problem are called \_\_\_\_\_.**

- A. An algorithm
- B. A list
- C. A plan
- D. A sequential structure

Ans A

**2: Documentation is prepared**

- A. at every stage
- B. at system design
- C. at system analysis
- D. at system development

Ans:A

**3: A rectangle in a DFD represents**

- A. a process
- B. a data store
- C. an external entity
- D. an input unit

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Ans:C

**4: ..... is a tabular method for describing the logic of the decisions to be taken.**

- A. Decision tables
- B. Decision tree
- C. Decision Method
- D. Decision Data

Ans:A

### **Simulation and modeling**

**1: A simulation model uses the mathematical expressions and logical relationships of the**

- A. real system.
- B. computer model.
- C. performance measures.
- D. estimated inferences.

Ans: A

**2: Which of the following statements are NOT true of simulation?**

- A. Simulation models the behaviour of a system
- B. The equations describing the operating characteristics of the system are known
- C. A simulation model cannot prescribe what should be done about a problem
- D. Simulation models can be used to study alternative solutions to a problem

Ans:B

**3: Select the valid reasons for using simulation.**

- A. Relationship between the variables is nonlinear
- B. Optimized solutions are obtained
- C. Conduct experiments without disrupting the real system
- D. Answers 1 and 3

Ans:D

**4: Monte Carlo simulation gets its name from which of the following?**

- A. Data collection
- B. Analysis
- C. Model formulation
- D. Random-number assignment

Ans:D

### Artificial intelligence

1: Which is not the commonly used programming language for AI?

- (a) PROLOG      (b) Java      (c) LISP

(d)

Perl

Ans: C

2: A search algorithm takes \_\_\_\_\_ as an input and returns \_\_\_\_\_ as an output.

- A. Input, output
- B. Problem, solution
- C. Solution, problem
- D. Parameters, sequence of actions

Ans: B

3: Which search agent operates by interleaving computation and action?

- A. Offline search
- B. Online search
- C. Breadth-first search
- D. Depth-first search

Ans: B

4: Artificial Intelligence has its expansion in the following application.

- A. Planning and Scheduling
- B. Game Playing
- C. Robotics
- D. All of the above

Ans: D

### Computer network

1: A station in a network forwards incoming packets by placing them on its shortest output queue. What routing algorithm is being used?

- A. hot potato routing
- B. Flooding
- C. static routing
- D. delta routing

Ans: A

2: In networking terminology UTP means

- A. Unshielded Twisted pair
- B. Ubiquitous Teflon port
- C. Uniformly Terminating port
- D. Unshielded T-connector port

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Ans:A

**3: A communication path way that transfers data from one point to another is called**

- A. Link
- B. Node
- C. Medium
- D. Topology

Ans:A

**4: Communication channel is shared by all the machines on the network in:**

- A. broadcast network
- B. unicast network
- C. multicast network
- D. none of the mentioned

Ans:A

### **Design and analysis Algorithm**

**1: Following are called logical operators**

- A. +, -, \*, /
- B. <, >, <=, >=
- C. AND, OR, NOT
- D. \, MOD

Answer:- C

**2: The PAC stands for**

- A. Program Analysis Chart
- B. Problem Algorithm Code
- C. Problem Access Code
- D. Problem Analysis Chart

Answer:- D

**3: How many passes are required to sort a file of size n by bubble sort method?**

- A. N<sup>2</sup>
- B. N
- C. N-1
- D. N/2

Answer:- C

**4: In stack terminology, insertion operation is defined to be**

- A. INSERT operation

- B. EDIT operation
- C. PUSH operation
- D. POP operation

Ans C

## Compiler design

1: In a compiler, keywords of a language are recognized during

- A. parsing of the program
- B. the code generation
- C. the lexical analysis of the program
- D. dataflow analysis

Ans C

2: Which of the following groups is/are token together into semantic structures?

- A. Syntax analyzer
- B. Intermediate code generation
- C. Lexical analyzer
- D. Semantic analyzer

Ans C

3: \_\_\_\_\_ is considered as a sequence of characters in a token.

- A. Texeme
- B. Pattern
- C. Lexeme
- D. Mexeme

Ans C

4: To recover from an error, the operator precedence parser may

- A. insert symbols onto the stack and onto the input
- B. delete symbols from the stack
- C. delete symbols from the input
- D. all of these

Ans D

## Web technology

1: A program running on server machine, is called

- A. Web server
- B. Web application
- C. Web process
- D. Web program

Ans A

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**2: Internal communication within institutions is done through**

- A. LAN
- B. WAN
- C. EBB
- D. MMS

Ans:A

**3: URL stands for**

- A. unique reference label
- B. uniform reference label
- C. uniform resource locator
- D. unique resource locator

Ans:C

**4: What is the correct HTML for adding a background color?**

- A.<background>yellow<Background>
- B.<body color = "yellow">
- C.<body bg color = "yellow">
- D.<body bg ="yellow">

Ans:C

**Best of Luck**

C programming

1. Compiler generates \_\_\_ file.
- A - Executable code  
B - Object code  
C - Assembly code  
D - None of the above.

2. The words if, else, auto, float etc. have predefined meaning and users cannot use them as variables. These words are called

- A. constant  
B. identifier  
C. data types  
D. keywords

3. Which operators perform operations on data in binary level?

- A. Logical operator  
B. Bitwise operator  
C. Additional operators  
D. None of the above

4. The size of a character variable in C is

- A. 8 bytes  
B. 4 bytes  
C. 2 bytes  
D. 1 byte

Software Engineering

5. What is the final outcome of the requirements analysis and specifications phase ?

- A. Drawing the data flow diagram  
B. The SRS Document  
C. Coding the project  
D. The User Manual

6. What is noise in terms of software development ?

- A. Writing irrelevant statement to the software development in the SRS document  
B. Adding contradictory requirements in SRS document  
C. Writing over-specific requirements  
D. None of these above

7. Black box testing can be applied to :

- A. UML diagram  
B. Data flow diagram

C. Entity-relationship diagram

D. Flowcharts

8. Which one of the following testing is performed by user?

A.  Acceptance testing

B. Unit testing

C. Compatibility testing

D. None of these

#### Database Management System

9. The data model which describes how the data is actually stored is :

A.  internal model

B. external model

C. logical model

D. none of these

10. Data about data is normally termed as :

A. directory

B. data bank

C.  meta data

D. none of the above

11. A view of database that appears to an application program is known as :

A. schema

B.  subschema

C. virtual table

D. none of the above

12. Every weak entity set can be converted into a strong entity set by :

A. using generalization

B.  adding appropriate attributes

C. using aggregation

D. none of the above

#### Digital Logic

13. The ER model includes additional concepts like :

A. Specialization

B. Generalization

C. Categorization

D. All of the above

14. Using an additional NOT gate, a JK flip-flop can be converted into

- A. T flip-flop
- B. RS flip-flop
- C. Master Slave flip-flop
- D. D flip-flop

15. In a J-K Flip Flop the function K=J' is used to realize

- A. T-Flip-Flop
- B. S-R Flip-Flop
- C. D-Flip-Flop
- D. M/S J-K Flip-Flop

16. Which Logic circuit would you use for addressing memory ?

- A. Full adder
- B. Multiplexer
- C. Decoder
- D. Direct memory access circuit

#### Data structure and Algorithm

17. Which of the following has search efficiency is O(1)-

- A. Tree
- B. Heap
- C. Hash Table
- D. Linked-List

18. A pivot element to partition unsorted list is used in

- A. Merge Sort
- B. Quick Sort
- C. Insertion Sort
- D. Selection Sort

19. Time required to merge two sorted lists of size m and n, is

- A. O(m + n)
- B. O(m \* n)
- C. O(m log n)
- D. O(n log m)

20. Quick sort algorithm is an example of

- A. Greedy approach
- B. Improved binary search
- C. Dynamic Programming
- D. Divide and conquer

**Compiler Design And Construction**

21. In a compiler, keywords of a language are recognized during

- A. parsing of the program
- B. the code generation
- C. the lexical analysis of the program
- D. dataflow analysis

22. The grammar  $A \rightarrow AA \mid (A) \mid \epsilon$  is not suitable for predictive-parsing because the grammar is

- A. ambiguous
- B. left-recursive
- C. right-recursive
- D. an operator-grammar

23. In a bottom-up evaluation of a syntax directed definition, inherited attributes can

- A. always be evaluated
- B. be evaluated only if the definition is L-attributed
- C. be evaluated only if the definition has synthesized attributes
- D. never be evaluated

24. Which of the following statements is false?

- A. An unambiguous grammar has same leftmost and rightmost derivation
- B. An LL(1) parser is a top-down parser
- C. LALR is more powerful than SLR
- D. An ambiguous grammar can never be LR(k) for any k

**C++**

25. If no exception is thrown, then

- A. a catch block will cause an error
- B. the first catch block coded will execute
- C. the last catch block coded will execute
- D. any catch blocks coded will be bypassed.

26. The C++ operator used to allocate memory is

- A. mem
- B. allocate
- C. new
- D. create

27. Which is not the feature of structured programming?

- A. Support for modular programming
- B. User-defined data types
- C. Emphasis on algorithm
- D. Data abstraction

28. Which of the following can be passed to function template as an argument?

- A. User-defined data types
- B. Primitive data type
- C. Struct type
- D. All of these

### Operating System

29. What is the electronic signal that cause computer to stop current program?

- A. signal
- B. interrupt
- C. shell
- D. command

30. What is a running program under execution called?

- A. Task
- B. Job
- C. Process
- D. Any of the above

31. How many primary partitions can be created?

- A. 1
- B. 2
- C. 3
- D. 4

32. A 12 address lines maps to the memory of

- A. 1k bytes
- B. 0.5k bytes
- C. 2k bytes
- D. None of these

### Discrete Structure

33. Which of the following propositions is tautology?

- A. $(p \vee q) \rightarrow q$
- B. $p \vee (q \rightarrow p)$
- C. $p \vee (p \rightarrow q)$
- D. Both (b) & (c)

34. Identify the valid conclusion from the premises  $P \vee Q$ ,  $Q \rightarrow R$ ,  $P \rightarrow M$ ,  $\neg M$

- A. $P \wedge (R \vee R)$
- B. $P \wedge (P \wedge R)$
- C. $R \wedge (P \vee Q)$
- D. $Q \wedge (P \vee R)$

35. Assuming that  $n = k$  is true, and that \_\_\_\_\_ is also true, corresponds to the second step of mathematical induction.

- A.  $n=k+1$
- B.  $n=k+1$
- C.  $n=k+2$
- D.  $n=k-2$

36.  $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R)$  is equivalent to

- A.P
- B.Q
- C.R
- D.True = T

Computer Network

37 Twisted pair have maximum segment of

- A.500 m
- B.200 m
- C.100 m
- D.2000 m

38 Frequency range at which the land coaxial cables are used, is

- A.10<sup>6</sup> to 10<sup>8</sup> Hz

the frequency range at which the land coaxial cables aril be used is  
 $10^6$ to  $10^8$  Hz

- B.10<sup>10</sup> to 10<sup>11</sup> Hz
- C.10<sup>3</sup> to 10<sup>4</sup> Hz
- D.None of these

39. Which of the following is not a transceiver function?

- A.Transmission and receipt of data
- B.Checking of line voltages
- C.Addition and subtraction of headers
- D.Collision detection

40 Working of the WLAN generally involves

- A.telephone lines
- B.micro waves
- C.satellites
- D.All of these

WGN

Computer Graphics

41. The subcategories of orthographic projection are

- A. cavalier, cabinet, isometric
- B.cavalier, cabinet
- C.isometric, dimetric, trimetric
- D. isometric, cavalier, trimetric

42 Raster systems display a picture from a definition in a

- A.display file program
- B. frame buffer
- C.display controller
- D.none of the above

43. Back face removal is an example of

- A. object space method
- B. image space method
- C. combination of both
- D. none of the above

44. The best hidden surface removal algorithm is

- A. painters
- B. depth buffer
- C. area subdivision
- D. depends on the application

### Computer Architecture

45. Which of the following is not a form of memory?

- A. Instruction cache
- B. Instruction register
- C. Instruction opcode
- D. Both (a) and (b)

46. Desirable characteristic(s) of a memory system is(are)

- A. Speed and reliability
- B. Low power consumption
- C. Durability and compactness
- D. All of these

47. A dynamic RAM consists of

- A. 6 transistors
- B. 2 transistors and 2 capacitors
- C. 1 transistor and 1 capacitor
- D. None of these

48. Which of the following is the internal memory of the system (computer)?

- A. CPU register

B. Cache

C. Main memory

D. All of these

## Automata Theory

49. Pumping lemma is generally used for proving that

A. given grammar is regular

B. given grammar is not regular

C. whether two given regular expressions are equivalent or not

D. None of these

50. Any string of terminals that can be generated by the following CFG is

$S \rightarrow X Y$

$X \rightarrow aX \mid bX \mid a$

$Y \rightarrow Ya \mid Yb \mid a$

A. has atleast one 'b'

B. should end in a 'a'

C. has no consecutive a's or b's

D. has atleast two a's

51. Set of regular languages over a given alphabet set is closed under

A. union

B. complementation      closed under operations union, concatenation and Kleene star.

C. intersection

D. All of these

52. Which of the following statement is correct?

A. All languages can not be generated by CFG

B. Any regular language has an equivalent CFG

C. Some non regular languages can't be generated by CFG

D. both (b) and (c)

## Numerical Method

53. The convergence of which of the following method is sensitive to starting value?

- A. False position
- B. Gauss seidal method
- C.  Newton-Raphson method
- D. All of these

54. Newton-Raphson method of solution of numerical equation is not preferred when

- A. Graph of A(B) is vertical
- B. Graph of x(y) is not parallel
- C.  The graph of f(x) is nearly horizontal-where it crosses the x-axis.
- D. None of these

55. Newton-Raphson method is applicable to the solution of

- A.  Both algebraic and transcendental Equations
- B. Both algebraic and transcendental and also used when the roots are complex
- C. Algebraic equations only
- D. Transcendental equations only

56. In which of the following methods proper choice of initial value is very important?

- A. Bisection method
- B. False position
- C.  Newton-Raphson
- D. Bairsto method

DAA

57. Push operation of a stack comprises of

- A. 4 steps
- B.  5 steps
- C. 6 steps
- D. 7 steps



58. In Unicast Routing, Dijkstra algorithm creates a shortest path tree from a

- A. Graph  
B. Chart  
C. Station  
D. Link

59. In slow-start algorithm, size of congestion window increases exponentially until it reaches

- A. 0  
B. n-1  
C. Threshold  
D. n+1

60. Which of the following sort is most efficient

- A. Quick Sort  
B. Merge Sort  
C. Bubble Sort  
D. Heap Sort

### Artificial Intelligence

61. Internal state of neuron is called \_\_\_\_\_, is the function of the inputs the neurons receives

- A. Weight  
B. Activation or activity level of neuron  
C. Bias  
D. None of these

62. Expert systems

- A. Combining different types of method or information  
B. Approach to the design of learning algorithms that is structured along the lines of the theory of evolution  
C. An information base filled with the knowledge of an expert formulated in terms of if-then rules  
D. None of these

63. Perceptron is

- A. General class of approaches to a problem.

- B.Performing several computations simultaneously
- C.Structures in a database those are statistically relevant
- D.Simple forerunner of modern neural networks, without hidden layers

64. Prolog is

- A.A programming language based on logic
- B.A computer where each processor has its own operating system, its own memory, and its own hard disk
- C.Describes the structure of the contents of a database
- D.None of these

65. which system model is applies to computational procedure to solve equations

- A.Dyanamic Model
- B.Static Model
- C.Analytical Model
- D.Numerical Model

66. In Discrete System, Changes are

- A. predominantly continuous
- B.primarily Discrete      are discontinuous
- C.Depends on the System
- D.None of the Above

67. In bank system ,what is the customer

- A.Entity
- B.Activity
- C.Enviroment
- D.none of the Above

68. Which of the following is simulation Language

- A.JAVA
- B.GPSS
- C.Javascript

D. None of the Above

69. Correct HTML tag for the largest heading is

A.<head>

B.<h6>

C.<heading>

D.<h1>

70. The attribute of <form> tag

A.Method

B.Action

C.Both (a)&(b)

D.None of these

71. HTML is a subset of

A.SGML

B.SGML

C.SGMD

D.None of these

72. <DT> tag is designed to fit a single line of our web page but <DD> tag will accept a

A.line of text

B.full paragraph

C.word

D.request

Microprocessor

73. Processor status word of 8085 microprocessor has five flags. They are

A. S, Z, AC, P, CY

B. S, OV, AC, P, CY

C. S, Z, OV, P, CY

D. S, Z, AC, P, OV

74. The cycle required to fetch and execute an instruction in a 8085 microprocessor is which one of the following?

- A. Clock cycle
- B. Memory cycle
- C. Machine cycle
- D. Instruction cycle

75 The number of output pins in 8085 microprocessor are

- A. 40
- B. 27
- C. 21
- D. 19

76. Temporary registers in 8085 are

- A. B and C
- B. D and E
- C. H and L
- D. W and Z

#### System analysis and Design

77. Testing of software with actual data and in actual environment is called

- A. Alpha testing
- B. Beta testing
- C. Regression testing
- D. None of the above

78. Which process model is also called as classic life cycle model?

- A. Waterfall model
- B. RAD model
- C. Prototyping model
- D. Incremental model

79. Requirements prioritization and negotiation belongs to :

A. Requirements validation

B. Requirements elicitation

elicitation

C. Feasibility study

D. Requirements reviews

80. The ..... model is preferred for software development when the requirements are not clear.

A. Rapid Application Development

B. Rational Unified Process

Evolutionary Model

C. Evolutionary Model

D. Waterfall Model

81. What is the equation of the line that passes through point (9, 7) and is perpendicular to the line  $y = \frac{1}{3}x - 5$ ?

A.  $y = -\frac{1}{3}x + 10$

$y = mx + b$

B.  $y = -3x + 34$

$m = \text{resiproc of } \frac{1}{3}x \text{ i.e } -3$

C.  $y = -3x + 7$

D.  $y = 3x - 20$

82. In the Cartesian plane, points R(-16, 45) and Q(26, 5) are the endpoints of one of the diameters of a circle.

Which of the following statements is true?

A. The radius of this circle is 20.6 units.

use mid point and distance formula to find r

B. The radius of this circle is 29 units.

C. The coordinates of the centre of this circle are (5, 20).

D. The coordinates of the centre of this circle are (21, 25).

83. What are the values of the slope, the zero, and the initial value, respectively?

A.  $\frac{8}{5}, 5, 8$

B.  $\frac{5}{8}, -8, 5$

C.  $\frac{8}{5}, -8, 5$

D.  $\frac{5}{8}, 5, 8$

84. Find  $dy/dx$  if  $y = e \sin 3x$

- (a)  $e \cos 3x$   
**(b)  $3e \cos 3x$**   
(c)  $3(\cos 3x) e \sin 3x$   
(d)  $3e \sin 3x$

85. Find the limit of sequence as  $n > \infty$ , whose general term is  $5n+2/2-7n$

- A. 0  
B.  $\infty$   
C. 1  
**D. -5/7**

86. If  $f(x) = \sqrt{x^2 - 4}$ , the domain of  $f$  is

- A.  $(-\infty, -2) \cup [2, \infty]$   
B.  $(-\infty, -\infty)$   
C.  $[-2, 2]$   
**D.  $[-3, 3]$**

87. If  $f(x) = \sin x$  and  $g(x) = \cos x$ , then  $(f \circ g)(x) = ?$

- (a)  $(\sin x) (\cos x)$   
(C)  $\sin(\cos x)$   
**(D)  $\cos(\sin x)$**   
(b)  $\tan x$

88.  $d/dx(\sin x) - d^2/dx^2(\cos x) = ?$

- A.  $2 \sin x$   
B.  $2 \cos x$   
C. 0  
D.  $-2 \sin x$

89. slope of a straight line parallel to x-axis is

- A. -1  
**B. 0**  
C. 1

D Undefined

90.  $y = \tan^{-1}(\cot x)$ , find  $dy/dx$

A.  $-x^2$

B. 1

C. -1

D.  $\csc^2 x / 1 - \cot^2 x$

Linear Algebra

91. In Cramer's rule, dimension of matrix of coefficients is

A.  $1 \times mn$

B.  $1 - mn$

1  $\times mn$

C.  $n \times n$

D.  $1 + mn$

92. Which of these functions is not uniformly continuous on  $(0, 1)$ ?

A.  $\sin x/x$

B.  $1/x^2$

C.  $f(x) = 1$  for  $x \in (0, 1)$ ,  $f(0) = f(1) = 0$

D.  $\sin(x)$

93. The system of linear equations

$$(4d - 1)x + y + z = 0$$

$$-y + z = 0$$

$$(4d - 1)z = 0$$

has a non-trivial solution, if d equals

A. 1/2

B. 1/4

C. 3/4

D. 1

94. The rank of a  $3 \times 3$  matrix  $C (= AB)$ , found by multiplying a non-zero column matrix  $A$  of size  $3 \times 1$  and a non-zero row matrix  $B$  of size  $1 \times 3$ , is

A.0

B.1

C.2

**D.3**

95. If  $A$  and  $B$  be real symmetric matrices of size  $n \times n$ , then

A. $AA^T = I$

B. $A = A^{-1}$

C. $AB = BA$

**D. $(AB)^T = BA$**

96. Order of the power set of a set of order  $n$  is

A. $n$

B. $2n$

C. $n^2$

**D. $2^n$**

97 Identity element in the group given below with respect to matrix  $\{\begin{pmatrix} x & x \end{pmatrix}\}$  multiplication is

$$G = \left\{ \begin{bmatrix} x & x \\ x & x \end{bmatrix} : x \in \mathbb{R}, x \neq 0 \right\}$$

A.  $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

B.  $\begin{pmatrix} -1 & 0 \\ 0 & -1 \end{pmatrix}$

C.  $\begin{pmatrix} 1 & 1 \\ \frac{1}{2} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$

D.  $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

98. If A and B are square matrices of size  $n \times n$ , then which of the following statement is not true?

A. $\det(AB) = \det(A)\det(B)$

B. $\det(kA) = k^n \det(A)$

$\det(A+B) = \det(A) + \det(B)$  " is not correct

C. $\det(A+B) = \det(A) + \det(B)$

D. $\det(A^T) = 1/\det(A^{-1})$

99. The matrix  $B = AT$ , where A is any matrix is

A.skew symmetric

B.symmetric about the secondary diagonal

C.always symmetric

D.another general matrix

100. If A and B are non-zero square matrices, then  $AB = 0$  implies

A.A and B are orthogonal

B.A and B are singular

C.B is singular

D.A is singular

