

Tribhuvan University  
Institute of Science and Technology  
Central Department of Computer Science and Information Technology  
MIT Entrance Model Question

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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**Basic Mathematics**

1. The system:  $x - y = 7$ ;  $-x + y = 3$  has .....

  - a. one solution
  - b. no solution
  - c. infinitely many solutions
  - d. two solutions

2. The vectors  $\mathbf{a} = (2, 3)$  and  $\mathbf{b} = (4, 6)$  are .....

  - a. Linearly dependent
  - b. Orthogonal
  - c. Parallel
  - d. linearly independent

3. The matrix  $A = \begin{bmatrix} 1 & 2 \\ 5 & 0 \end{bmatrix}$  is .....

  - a. triangular
  - b. diagonal
  - c. nonsingular
  - d. symmetric

4. If  $A = \begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix}$  then  $A^{-1}$  is .....

  - a.  $\begin{pmatrix} -1 & -2 \\ -3 & -5 \end{pmatrix}$
  - b.  $\begin{pmatrix} 5 & -2 \\ -3 & 1 \end{pmatrix}$
  - c.  $1/\begin{pmatrix} 1 & 2 \\ 3 & 5 \end{pmatrix}$
  - d.  $\begin{pmatrix} 5 & -2 \\ -3 & 1 \end{pmatrix}$



5. For all vectors  $\mathbf{a}$  and  $\mathbf{b}$  in a vector space  $V$  we have .....
- $|\mathbf{a} + \mathbf{b}| \leq |\mathbf{a}| + |\mathbf{b}|$
  - $|\mathbf{a} + \mathbf{b}| < |\mathbf{a}| + |\mathbf{b}|$
  - $|\mathbf{a} + \mathbf{b}| > |\mathbf{a}| + |\mathbf{b}|$
  - $|\mathbf{a} + \mathbf{b}| \geq |\mathbf{a}| + |\mathbf{b}|$
6. The set of positive integers with respect to addition operation is not a group as it has .....
- identity element
  - no inverse element
  - no associative property
  - no commutative property
7. The range of  $y = \sqrt{x-3}$  is .....
- $(-\infty, 3]$
  - $(0, 3)$
  - $[0, \infty)$
  - $[-\infty, \infty]$
8. If  $\lim_{x \rightarrow 2} \frac{x^k - 2^k}{x-2} = 32$ , then  $k =$  .....
- 0/0
  - 2
  - 0
  - 4
9. The absolute maximum off  $f(x) = x^3 + 3x^2$  on  $[-3, 1]$  is .....
- 4
  - 0
  - 2
  - 12
10. The integral  $\int_a^b f(x) dx =$  .....
- $F(a) - F(b)$
  - $F(a) + F(b)$
  - $F(b) - F(a)$
  - $F(x) + c$
11. The integral  $\int_0^3 \frac{dx}{x-3}$  .....
- converges
  - diverges
  - is not an improper integral
  - none of the above



12. The solution of  $y' + y = 0$ ,  $y(0) = 1$  is .....

- a.  $e^{-x} + c$
- b.  $e^x$
- c.  $\ln x$
- d.  $e^{-x}$

13. The function  $f(x) = x^3 - 12x - 5$ , in  $(-2, 2)$  is .....

- a. increasing
- b. decreasing
- c. neither increasing nor decreasing
- d. none of the above

14. If  $z = e^{xy}$  then  $z_x = \dots$

- a.  $xy$
- b.  $zy$
- c.  $xz$
- d.  $e^{xy}$

15. The equation of the plane through the point  $P(-3, 0, 7)$  perpendicular to

$\mathbf{n} = (5, 2, -1)$  is.....

- a.  $5x - 2y - z - 22 = 0$
- b.  $5x - 2y + z + 22 = 0$
- c.  $x - 2y - z + 22 = 0$
- d.  $5x - 2y - z + 22 = 0$

### Basic Statistics

16. If you are asked to choose the favorite color from the set of seven colors, what level of measurement would be used from the following?

- a. Nominal
- b. Ordinal
- c. Interval
- d. Ratio

17. The arithmetic mean of 6 observations is 2. If a constant value is subtracted from/added to each observation, then the arithmetic mean will .....

- a. not be changed
- b. be multiple of that constant value
- c. be decreased/increase by that constant value
- d. be reciprocal of that constant

18. If there are 20 observations each equal to 20, then the variance of this distribution is ....

- a. 400
- b. 20
- c. 1
- d. 0

19. A student is to be selected for scholarship from two campus –Campus A , and campus B.

The probability of selecting any one campus is 50%. The probability of selecting a student from Campus A is 80% and that from Campus B is 20%. What is the probability of selecting student from any campus?

- a. 0.40
- b. 0.5
- c. 0.1
- d. None of the above

20. Which of the following is true if the correlation coefficient between two variables X and Y is -0.9?

- a. There is strong correlation because of X
- b. Correlation coefficient does not measure the cause and effect relationship between the variables
- c. There is strong correlation because of Y
- d. None of the above statement is correct

### Software Engineering

21. CMM stands for .....

- a. Capability Maturity Model
- b. Configuration Maturity Model
- c. Capability Maturity Machine
- d. Common Maturity Model

22. Use case diagram helps in gathering .....

- a. Non functional requirement
- b. Functional requirement
- c. Virtual requirement
- d. All of the above

23. The process of generating design specification from code is .....

- a. Reengineering
- b. Reverse engineering
- c. Design engineering
- d. Process engineering

24. Which of the following team structure assigns leader on a adhoc basis?
- a. Controlled Centralized
  - b. Democratic Decentralized**
  - c. Controlled Decentralized
  - d. Democratic Centralized
25. "Are we building the product right?" resembles to .....
- a. Validation
  - b. Alpha-testing
  - c. Regression-testing
  - d. Verification**

### Digital Logic

26. Which of the following is the universal gate?
- a. AND
  - b. OR
  - c. NAND**
  - d. NOT
27. Ripple counter is .....
- a. Synchronous
  - b. Asynchronous**
  - c. Serial
  - d. Cyclic
28. Which of the following is true regarding Multiplexer?
- a. One to one
  - b. One to many
  - c. Many to one**
  - d. Many to many
29. Flip flop can be considered as ..... Element.
- a. Memory**
  - b. Cache
  - c. Flip
  - d. Race
30. What is the base of BCD?
- a. 2
  - b. 8
  - c. 10**
  - d. 16

## Computer Networks

31. Which are valid ARQ?
  - a. Stop and wait
  - b. Go back
  - c. Selective
  - d. All of the above
32. Router lies in the ..... Layer
  - a. Physical
  - b. Data
  - c. Network
  - d. Session
33. TCP header ranges from ..... Bytes.
  - a. 10-20
  - b. 20-40
  - c. 40-60
  - d. 60-80
34. Which one of the following is true regarding IPv6?
  - a. Classful
  - b. Classless
  - c. Class A
  - d. Class C
35. Which of the following is true regarding coaxial Cable?
  - a. Supports high bandwidth
  - b. Are reliable
  - c. Less affected by noise or cross talk
  - d. All of the above

## Microprocessor and Architecture

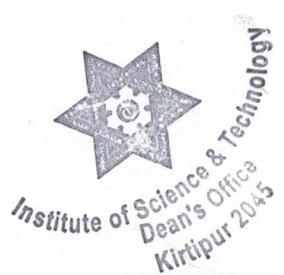
36. 8085 microprocessor consists of ..... Pins.
  - a. 20
  - b. 30
  - c. 40
  - d. 55
37. Which of the following is true regarding address bus?
  - a. Unidirectional
  - b. Bidirectional
  - c. Any directional
  - d. All of the above



38. Which sequence is valid?
- Execute, fetch, decode
  - Fetch, execute, decode
  - Decode, fetch, execute
  - Fetch, decode, execute**
39. Pipelining is a technique where instructions are .....
- Overtuned
  - Overlapped**
  - Overwhelmed
  - Overtuned
40. Which of the following is true regarding Booth's Algorithm?
- Binary division
  - Binary addition
  - Binary multiplication**
  - Binary Subtraction

### System Analysis and Design

41. Which one of the following information system development models focuses more on risk handling?
- Waterfall
  - Prototyping
  - Spiral**
  - RAD
42. Which one of the following is process modeling tool in structured development?
- Class diagram
  - Data flow diagram**
  - Entity relationship diagram
  - Use case diagram
43. Which one of the following is logic modeling tool in structured development?
- Decision table
  - Decision tree
  - Entity relationship diagram
  - Both a and b**
44. Which one of the following is Agile development methodology?
- Scrum
  - Extreme Programming
  - Kanban
  - All of the above**



45. User testing of a completed information system using simulated data is called
- a. **Alpha testing**
  - b. Beta testing
  - c. Gama testing
  - d. Stress testing

### **Database Management System**

46. Which of the following SQL command is used to remove attributes from an existing relation?
- a. Create table
  - b. Drop table
  - c. Alter table**
  - d. Create domain
47. Which one of the following normal forms removes transitive dependency?
- a. 1NF
  - b. 2NF
  - c. 3NF**
  - d. 4NF
48. Which one of the following concepts in database management system allows relationships between relationships?
- a. Specialization
  - b. Generalization
  - c. Aggregation**
  - d. Both a and b
49. Which one of the following is the execution order of commands in SQL query?
- a. SELECT, FROM, WHERE
  - a. SELECT, WHERE, FROM
  - b. FROM, SELECT, WHERE
  - c. FROM, WHERE, SELECT**
50. Which of the following recovery technique requires undo operation?
- a. Deferred update
  - b. Shadow paging
  - c. Immediate update**
  - d. Checkpoint



## Introduction to Information Technology

51. Components that provide internal storage to the CPU are
- Registers
  - Program Counters
  - Controllers
  - Internal chips
52. Which of the following is designed to control the operations of a computer?
- System Software
  - Application Software
  - Utility Software
  - User
53. Which one of the following devices provides communication between a computer and the outer world?
- Compact
  - I/O
  - Drivers
  - Storage
54. A service that allows a user to log in into another computer somewhere on the Internet.
- Telnet
  - FTP
  - e-mail
  - UseNet
55. Which one of the following is database management system?
- Word
  - Excel
  - Power point
  - Access

## Data Structure and Algorithm

56. Which of the following is a linear data structure?
- Array
  - Binary Tree
  - Binary Search Tree
  - AVL tree



Signature

57. If the size of the stack is 10 and we try to add the 11th element in the stack then the condition is known as .....
- Underflow
  - Garbage Collection
  - Overflow**
  - None of the above
58. Which of the following sorting algorithms can be used to sort a random linked list with minimum time complexity?
- Insertion Sort
  - Quick Sort
  - Merge Sort**
  - Selection Sort
59. How many swaps are required to sort the given array using bubble sort - { 2, 5, 1, 3, 4}
- 4
  - 5
  - 6
  - 7
60. Which data structure is required to convert the infix to prefix notation?
- Stack**
  - Linked List
  - Binary Tree
  - Queue

### Computer Graphics

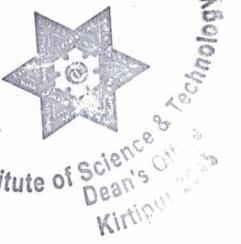
61. From the given list of options, which one is the accurate and efficient line-generating algorithm?
- Midpoint algorithm
  - DDA algorithm
  - Bresenham's line algorithm**
  - None of the above
62. Which of the following is a Computer Graphics Curve?
- Bezier Curves
  - Implicit Curves
  - Explicit Curves
  - All of the above**
63. The three primary colors define which of these color models?
- CMY and HSV
  - RGB and HSV
  - RGB and CMY**
  - HSV and HLS



64. Geometric transformation include
- a. Transition
  - b. Drawing
  - c. Scaling
  - d. None of the above
65. The process of positioning an object along a straight line path from one coordinate point to another is called
- a. Translation
  - b. Reflection
  - c. Shearing
  - d. Transformation

### E-Commerce

66. .... is an early form of E-commerce
- a. SCM
  - b. EDI
  - c. Both of these
  - d. None of these
67. Which dimension of e-commerce enables commerce beyond the boundaries of the country?
- a. Richness
  - b. Interactivity
  - c. Global Reach
  - d. Ubiquity
68. Which is the set of rules that limits access to information?
- a. Availability
  - b. Integrity
  - c. Authenticity
  - d. Confidentiality
69. Which type of E - Commerce is Amazon?
- a. B2B
  - b. B2C
  - c. G2B
  - d. G2C
70. Which is the function of specifying access rights to resources related to information security?
- a. OTP
  - b. Pin
  - c. Authorization
  - d. Passcode



## C Programming

71. Let  $a=4$ , what will be the value of variable  $a$  after executing the statement  $a=a<<1$ .
- a. 1
  - b. 2
  - c. 4
  - d. 8
72. Consider  $a=4$  and  $b=5$ ; what will be the values of  $c$ ,  $a$ , and  $b$  after executing the statement:  $c=++a + b++;$
- a.  $a=5$        $b=6$  and  $c=11$
  - b.  $a=5$        $b=5$  and  $c=10$
  - c.  **$a=5$        $b=6$  and  $c=10$**
  - d.  $a=4$        $b=6$  and  $c=10$
73. Let  $char c='a'$ , what will be the output of following statements  $c=c+1$ ;  $printf("c=%c",c);$
- a.  $c=a$
  - b.  $c=b$
  - c.  $c=c$
  - d. Error
74. What will be the best size of character array for storing string of 10 characters?
- a. 11
  - b. 10
  - c. 9
  - d. All of the above
75. Which operator is used to access content of a pointer variable?
- a. Ampersand Operator
  - b. **Indirection Operator**
  - c. Star Operator
  - d. Arrow Operator

## Object Oriented Programming

76. Which of the following statement is FALSE about 'endl'?
- a. It takes cursor of next line
  - b. It is a manipulator
  - c. **It is an IO stream**
  - d. It is used with cout.
77. Which of the following statement is TRUE about member variables?
- a. Memory for member variables is allocated at the time of class declaration
  - b. **Memory for member variables is allocated at the time of object creation**
  - c. Memory for member variables is allocated at run time
  - d. None of the above



78. Which concept of C++ breaches data hiding principle of OOP?
- Protected Access Specifier
  - Friend Function**
  - Virtual Function
  - Abstract Class
79. We can define objects of one class within another class as member variables. What we call this feature of OOP?
- Encapsulation
  - Inheritance
  - Membership
  - Aggregation**
80. How can we resolve ambiguity due to multipath inheritance in C++?
- By using virtual base class
  - By using virtual function
  - By using friend function
  - By using scope resolution operator

### Operating Systems

81. Which of the following is example of shell?
- Command Prompt**
  - Disk cleaner
  - Disk defragmenter
  - All of the above
82. Which of the following is non busy waiting technique of interprocess communication?
- Lock variable
  - Peterson's solution
  - Strict Alteration
  - Sleep and wakeup**
83. Which of the following is not a deadlock recovery technique?
- Ostrich Algorithm**
  - Preemption
  - Rollback
  - Killing Processes
84. What will be the size of page number if virtual memory is of size 128 KB and page size is 4 KB
- 2 bit
  - 4 bit
  - 5 bit**
  - 7 bit



85. What will be the size of bitmap for memory of size 256 KB with block size of 2 KB, if 50% memory is already occupied?
- a. 256 bit
  - b. **128 bit**
  - c. 64 bit
  - d. 32 bit

### Web Technology

86. ..... is not a heading tag in HTML.
- a. H0
  - b. H1
  - c. H2
  - d. H3
87. Which of following is syntax for valid CSS selector?
- a. .id1
  - b. #id1
  - c. %id1
  - d. \$id1
88. ..... to print statement in PHP
- a. Echo
  - b. Print
  - c. Echof
  - d. printf
89. Which of the following is used for defining schema of XML?
- a. DTD
  - b. XSD
  - c. **Both a and b**
  - d. None of above
90. Which of following is valid variable definition in PHP?
- a. \$x y=2;
  - b. \$x\_y=2;
  - c. \$x\_y=2
  - d. \$x y as 2;



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## Artificial Intelligence

91. Greedy Best First search expands nodes in the state space based on the evaluation function .....
- $F(n)=g(n)$
  - $F(n)=h(n)$**
  - $F(n)=h(n)+g(n)$
  - $F(n)=g(n)/2$
92. Which agent works based set of condition action rules?
- Simple reflex agent**
  - History agent
  - Model based agent
  - Prior goal based agent
93. Which of following is valid CNF?
- $P \rightarrow Q$
  - $(P \vee Q) \wedge (R \vee S)$
  - $(P \wedge Q) \vee (R \wedge S)$
  - $P \leftrightarrow Q$
94. In alpha beta pruning, alpha is the best choice found for .....
- Min
  - Max**
  - min max Both
  - None of above
95. Training artificial neural networks includes .....
- updating weights**
  - updating inputs
  - updating outputs
  - updating number of input layers

## Management Information System

96. Which of following is used for non-routine decision making for middle level management?
- Decision Support System**
  - Transaction Processing System
  - Management Information System
  - Executive Support System



97. .... is a collection of independent firms that use information technology to coordinate their value chains to produce a product or service for a market collectively.
- Value chain
  - Value web**
  - Firm chain
  - Collective chain
98. Under the ethical principles of rules to make a decision, which of following describes "If an action cannot be taken repeatedly, it should not be taken at any time".
- Golden Rule
  - Utilitarian Principle
  - Risk Aversion Principle
  - Descartes' rule of change**
99. Which of following defines the supply chain management systems based on build-to-order model?
- Push-based model
  - Pull-based model**
  - Build-to-Stock Model
  - None of above
100. Key performance indicators (KPIs), which are the measures proposed by ..... for understanding how well the business firm is performing along any given dimension.
- clerical workers
  - junior management
  - senior management**
  - executives

