

Tribhuvan University
Institute of Science and 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.

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 $k = \dots\dots\dots$
- 0/0
 - 2
 - 0
 - 4**
9. The absolute maximum of $f(x) = x^3 + 3x^2$ on $[-3, 1]$ is
- 4**
 - 0
 - 2
 - 12
10. The integral $\int_a^b f(x) dx = \dots\dots\dots$
- $F(a) - F(b)$
 - $F(a) + F(b)$
 - $F(b) - F(a)$**
 - $F(x) + c$
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
- $e^{-x} + c$
 - e^x
 - $\ln x$
 - e^{-x}**
13. The function $f(x) = x^3 - 12x - 5$, in $(-2, 2)$ is
- increasing**
 - decreasing
 - neither increasing nor decreasing
 - none of the above
14. If $z = e^{xy}$ then $z_x = \dots\dots\dots$
- xy
 - zy**
 - xz
 - e^{xy}
15. The equation of the plane through the point $P(-3, 0, 7)$ perpendicular to $n = (5, 2, -1)$ is.....
- $5x - 2y - z - 22 = 0$
 - $5x - 2y + z + 22 = 0$
 - $x - 2y - z + 22 = 0$
 - $5x - 2y - z + 22 = 0$**

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?
- Nominal**
 - Ordinal
 - Interval
 - 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
- not be changed
 - be multiple of that constant value
 - be decreased/increase by that constant value**
 - be reciprocal of that constant
18. If there are 20 observations each equal to 20, then the variance of this distribution is
- 400
 - 20
 - 1
 - 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?
- a. Execute, fetch, decode
 - b. Fetch, execute, decode
 - c. Decode, fetch, execute
 - d. Fetch, decode, execute**

39. Pipelining is a technique where instructions are
- a. Overturned
 - b. Overlapped**
 - c. Overwhelmed
 - d. Overtuned
40. Which of the following is true regarding Booth's Algorithm?
- a. Binary division
 - b. Binary addition
 - c. Binary multiplication**
 - d. Binary Subtraction

System Analysis and Design

41. Which one of the following information system development models focuses more on risk handling?
- a. Waterfall
 - b. Prototyping
 - c. Spiral**
 - d. RAD
42. Which one of the following is process modeling tool in structured development?
- a. Class diagram
 - b. Data flow diagram**
 - c. Entity relationship diagram
 - d. Use case diagram
43. Which one of the following is logic modeling tool in structured development?
- a. Decision table
 - b. Decision tree
 - c. Entity relationship diagram
 - d. Both a and b**
44. Which one of the following is Agile development methodology?
- a. Scrum
 - b. Extreme Programming
 - c. Kanban
 - d. 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?
- Create table
 - Drop table
 - Alter table**
 - Create domain
47. Which one of the following normal forms removes transitive dependency?
- 1NF
 - 2NF
 - 3NF**
 - 4NF
48. Which one of the following concepts in database management system allows relationships between relationships?
- Specialization
 - Generalization
 - Aggregation**
 - Both a and b
49. Which one of the following is the execution order of commands in SQL query?
- SELECT, FROM, WHERE
 - SELECT, WHERE, FROM
 - FROM, SELECT, WHERE
 - FROM, WHERE, SELECT**
50. Which of the following recovery technique requires undo operation?
- Deferred update
 - Shadow paging
 - Immediate update**
 - 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
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}
- a. **4**
 - b. 5
 - c. 6
 - d. 7
60. Which data structure is required to convert the infix to prefix notation?
- a. **Stack**
 - b. Linked List
 - c. Binary Tree
 - d. Queue

Computer Graphics

61. From the given list of options, which one is the accurate and efficient line-generating algorithm?
- a. Midpoint algorithm
 - b. DDA algorithm
 - c. **Bresenham's line algorithm**
 - d. None of the above
62. Which of the following is a Computer Graphics Curve?
- a. Bezier Curves
 - b. Implicit Curves
 - c. Explicit Curves
 - d. **All of the above**
63. The three primary colors define which of these color models?
- a. CMY and HSV
 - b. RGB and HSV
 - c. **RGB and CMY**
 - d. 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
- SCM
 - EDI**
 - Both of these
 - None of these
67. Which dimension of e-commerce enables commerce beyond the boundaries of the country?
- Richness
 - Interactivity
 - Global Reach**
 - Ubiquity
68. Which is the set of rules that limits access to information?
- Availability
 - Integrity
 - Authenticity
 - Confidentiality**
69. Which type of E - Commerce is Amazon?
- B2B
 - B2C**
 - G2B
 - G2C
70. Which is the function of specifying access rights to resources related to information security?
- OTP
 - Pin
 - Authorization**
 - Passcode

C Programming

71. Let $a=4$, what will be the value of variable a after executing the statement $a=a<<1$.
- 1
 - 2
 - 4
 - 8**
72. Consider $a=4$ and $b=5$; what will be the values of c , a , and b after executing the statement: $c=++a + b++$;
- $a=5$ $b=6$ and $c=11$
 - $a=5$ $b=5$ and $c=10$
 - $a=5$ $b=6$ and $c=10$**
 - $a=4$ $b=6$ 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?
- a. Protected Access Specifier
 - b. Friend Function**
 - c. Virtual Function
 - d. Abstract Class
79. We can define objects of one class within another class as member variables. What we call this feature of OOP?
- a. Encapsulation
 - b. Inheritance
 - c. Membership
 - d. Aggregation**

80. How can we resolve ambiguity due to multipath inheritance in C++?
- a. **By using virtual base class**
 - b. By using virtual function
 - c. By using friend function
 - d. By using scope resolution operator

Operating Systems

81. Which of the following is example of shell?
- a. **Command Prompt**
 - b. Disk cleaner
 - c. Disk defragmenter
 - d. All of the above
82. Which of the following is non busy waiting technique of interprocess communication?
- a. Lock variable
 - b. Peterson's solution
 - c. Strict Alteration
 - d. **Sleep and wakeup**
83. Which of the following is not a deadlock recovery technique?
- a. **Ostrich Algorithm**
 - b. Preemption
 - c. Rollback
 - d. 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
- a. 2 bit
 - b. 4 bit
 - c. **5 bit**
 - d. 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?
- .id1**
 - #id1
 - %id1
 - \$id1
88. to print statement in PHP
- Echo**
 - Print
 - Echof
 - printf
89. Which of the following is used for defining schema of XML?
- DTD
 - XSD
 - Both a and b**
 - None of above
90. Which of following is valid variable definition in PHP?
- \$x y =2;
 - \$x_y=2;**
 - \$x_y=2
 - \$x y as 2;

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
- a. Min
 - b. Max**
 - c. min max Both
 - d. None of above
95. Training artificial neural networks includes
- a. updating weights**
 - b. updating inputs
 - c. updating outputs
 - d. updating number of input layers

Management Information System

96. Which of following is used for non-routine decision making for middle level management?
- a. Decision Support System**
 - b. Transaction Processing System
 - c. Management Information System
 - d. 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.
- a. Value chain
 - b. Value web**
 - c. Firm chain
 - d. 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”.
- a. Golden Rule
 - b. Utilitarian Principle
 - c. Risk Aversion Principle
 - d. Descartes' rule of change**
99. Which of following defines the supply chain management systems based on build-to-order model?
- a. Push-based model
 - b. Pull-based model**
 - c. Build-to-Stock Model
 - d. None of above

100. Key performance indicators (KPIs), which are the measures proposed byfor understanding how well the business firm is performing along any given dimension.
- a. clerical workers
 - b. junior management
 - c. **senior management**
 - d. executives