NFAT Prep India (NPI)

1. Which protocol provides security at the network layer?
   a) SSL
   b) IPSec
   c) SSH
   d) TLS

2. Which TCP flag is used to initiate a connection?
   a) FIN
   b) ACK
   c) SYN
   d) RST

3. What is the main advantage of using VLANs in networking?
   a) Increased bandwidth
   b) Reduced network security
   c) Improved network segmentation
   d) Faster routing decisions

4. Which of the following is NOT a type of network topology?
   a) Star
   b) Mesh
   c) Circular
   d) Bus

5. Which memory allocation strategy results in the least amount of fragmentation?
   a) First Fit
   b) Best Fit
   c) Worst Fit
   d) Next Fit

6. What is the primary purpose of the kernel in an operating system?
   a) Managing user accounts
   b) Controlling hardware and system resources
   c) Running application software
   d) Managing external devices only
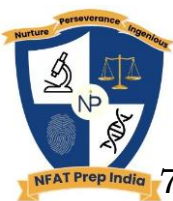
7. Which of the following is NOT a valid process state?
   a) Ready
   b) Executing
   c) Suspended
   d) Terminated

8. What is the main disadvantage of a monolithic kernel?
   a) Difficult to modify and maintain
   b) Poor performance
   c) Cannot handle multiple processes
   d) Uses too little memory

9. Which of the following is a self-balancing binary search tree?
   a) AVL Tree
   b) Heap
   c) B-Tree
   d) Red-Black Tree

10. What is the space complexity of Merge Sort?
    a) O(1)
    b) O(n)
    c) O(log n)
    d) O(n log n)

11. A circular queue prevents which problem in a normal queue?
    a) Overflow
    b) Underflow
    c) Wastage of memory
    d) Sorting

12. In graph traversal, which algorithm guarantees the shortest path in an unweighted graph?
    a) DFS
    b) BFS
    c) Dijkstra's Algorithm
    d) Floyd-Warshall Algorithm

13. What does the JNZ instruction do in assembly?
    a) Jump if zero
    b) Jump if not zero
    c) Jump if negative
    d) Jump to the next instruction
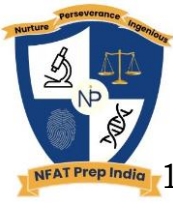
14. In x86 assembly, what is the role of the RET instruction?
    a) Return from a function by restoring the saved instruction pointer
    b) Reset the CPU registers
    c) Repeat a loop execution
    d) Restore the stack pointer

15. What does the XOR AX, AX instruction do?
    a) Sets AX to 0
    b) Copies AX to another register
    c) Performs bitwise XOR with a memory address
    d) Inverts all bits of AX

16. Which instruction shifts all bits of a register to the left, filling the LSB with zero?
    a) SHR
    b) SHL
    c) ROL
    d) SAR

17. What does the term RAII stand for in C++?
    a) Resource Allocation Isolated Instance
    b) Resource Allocation Is Initialization
    c) Random Access Inheritance Implementation
    d) Recursive Algorithm Implementation

18. Which of the following describes the use of virtual destructors in C++?
    a) They ensure proper cleanup in an inheritance hierarchy
    b) They prevent memory leaks
    c) They prevent function overloading
    d) They improve program performance

19. How does std::move improve performance in C++?
    a) Enables efficient resource transfer by avoiding unnecessary copies
    b) Increases the size of the object
    c) Forces the compiler to create new objects
    d) Locks objects for thread safety
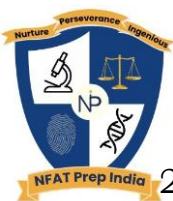
20. Main difference between deep copy and shallow copy in C++?
    a) Shallow copy only copies pointers, deep copy duplicates entire objects
    b) Deep copy is faster
    c) Shallow copy allocates new memory
    d) No difference

21. How is an array passed to a function in C?
    a) By value
    b) By reference
    c) By pointer
    d) Both b and c

22. Which operator has the highest precedence in C?
    a) * (Multiplication)
    b) ++ (Increment)
    c) () (Parentheses)
    d) && (Logical AND)

23. What is the purpose of the volatile keyword in C?
    a) Prevent compiler optimizations on a variable
    b) Make a variable constant
    c) Define a global variable
    d) Allocate memory dynamically

24. What will be the output of the following code?

    C

    CopyEdit

```
#inlude <stdio.h>

Int main () {

Char *ptr= "Hello";

Printf("%c", *(ptr + 3)) ;

Return 0;

}
```
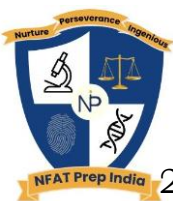
    a) H
    b) e
    c) l
   d) o

25. What will happen if you declare the main method as private in Java?
    a) Compilation error
    b) Runtime error
    c) No error, executes normally
    d) JVM cannot access main

26. Which statement about Java's final keyword is correct?
    a) A final method cannot be overridden
    b) A final class cannot be extended
    c) A final variable cannot be reassigned
    d) All of the above

27. Which keyword refers to the parent class in Java?
    a) parent
    b) this
    c) super
    d) base

28. What happens if you define a constructor in an interface?
    a) Compilation error
    b) Runtime error
    c) It will execute normally
    d) Constructor will be inherited

29. What is the default access modifier for a class in C#?
    a) public
    b) private
    c) internal
    d) protected

30. Which .NET feature ensures cross-language interoperability?
    a) Common Language Specification (CLS)
    b) Common Intermediate Language (CIL)
    c) JIT Compilation
    d) Windows Communication Foundation (WCF)

31. Primary purpose of ASP.NET MVC?
    a) Execute JavaScript on client
    b) Manage SQL Server databases
    c) Build web apps using Model-View-Controller architecture
    d) Replace Windows Forms
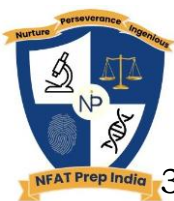
32. What is the use of Reflection in .NET?
    a) Execute unmanaged code
    b) Inspect and manipulate metadata
    c) Improve performance
    d) Generate random numbers

33. Output of this code in Python?

    print("Hello" * 3)

    a) HelloHelloHello
    b) 3Hello
    c) Error
    d) Hello Hello Hello

34. What does the zip() function do in Python?
    a) Combines lists into a dictionary
    b) Iterates over multiple iterables as tuples
    c) Sorts two lists together
    d) Compresses files into ZIP archive

35. What is the output of the following Python code?

    CopyEdit

    a = [1, 2, 3, 4]

    print(a[-1])
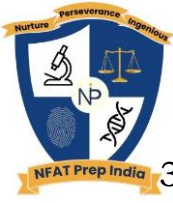
    a) 4
    b) 1
    c) -1
    d) Error

36. Which of the following Python data types is mutable?
    a) Tuple
    b) String
    c) List
    d) Integer

37. What is denormalization in databases?
    a) Reduce redundant data
    b) Introduce redundancy for faster performance
   c) Split into multiple tables
    d) Ensure referential integrity

38. Which is a disadvantage of using indexes in a database?
    a) Increased query speed
    b) Increased storage usage
    c) Decreased data consistency
    d) Reduced referential integrity

39. What does the cascade option in foreign key constraints do?
    a) Prevents deletion of referenced records
    b) Automatically deletes/updates dependent records
    c) Disables integrity constraints
    d) Duplicates the data

40. Which technique prevents dirty reads in a database?
    a) Shared locking
    b) Exclusive locking
    c) Snapshot isolation
    d) Optimistic concurrency control

41. Which organization is responsible for global IP address allocation?
    a) ICANN
    b) IEEE
    c) W3C
    d) IETF

42. Protocol used for sending emails from client to server?
    a) IMAP
    b) POP3
    c) SMTP
    d) FTP

43. What is the default port for HTTPS?
    a) 21
    b) 443
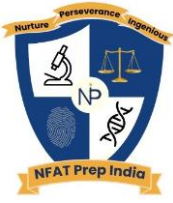   c) 80
    d) 53
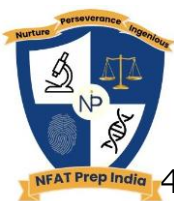
44. Protocol for secure remote login?
    a) Telnet
    b) SSH
    c) RDP
    d) HTTP

45. In synchronous counters, flip-flops are triggered:
    a) Sequentially
    b) Asynchronously
    c) Simultaneously
    d) Randomly

46. Which of the following is a universal gate?
    a) XOR
    b) NAND
    c) AND
    d) OR

47. Minimum number of NAND gates needed to make an OR gate?
    a) 1
    b) 2
    c) 3
    d) 4

48. A shift register is used for:
    a) Arithmetic operations
    b) Data storage
    c) Serial-to-parallel conversion
    d) All of the above

49. Default HTTP status code for a successful GET request?
    a) 200
    b) 201
    c) 204
    d) 404

50. In CSS, which property creates a flexbox container?
    a) display: flex;
    b) position: absolute;
   c) align-items: center;
    d) justify-content: flex-start;

51. In JavaScript, what does Promise.all([p1, p2, p3]) return?
    a) The first resolved promise
    b) A single promise that resolves when all resolve
    c) An array of promises
    d) It runs promises in sequence

52. Which HTML attribute requires a field before form submission?
    a) validate
    b) required
    c) mustfill
    d) mandatory

53. Federated Learning in AI is designed to:
    a) Process data on cloud servers
    b) Train models without sharing raw data
    c) Reduce neural network size
    d) Speed up blockchain transactions

54. 6G networks are expected to introduce:
    a) Reduced need for cloud computing
    b) AI-driven intelligent networks
    c) Replacement of fiber-optic cables
    d) Eliminate latency completely

55. Advantage of graphene-based transistors?
    a) Increased battery life
    b) High speed with low energy use
    c) Better display quality
    d) Reduced quantum interference

56. The Turing Test evaluates:
    a) Machine learning model accuracy
    b) Human-like AI intelligence
    c) Network efficiency
    d) Quantum computing power

57. Design Patterns in software engineering are used to:
    a) Increase code redundancy
    b) Solve common design problems
   c) Improve database efficiency
    d) Create user interfaces
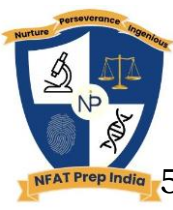
58. Which of these is **not** a non-functional requirement?
   a) Performance
   b) Security
   c) Maintainability
   d) User authentication

59. Mutation Testing is used to:
   a) Measure maintainability
   b) Introduce small code changes to test robustness
   c) Improve database security
   d) Check syntax errors

60. Which methodology is linear and sequential?
   a) Agile
   b) Waterfall
   c) Spiral
   d) RAD

61. In prototyping, the main purpose of the prototype is to:
   a) Replace final system
   b) Refine requirements
   c) Test system security
   d) Eliminate documentation

62. A Data Dictionary is:
   a) Used for spell-checking
   b) A repository of data definitions
   c) A table of functional modules
   d) A list of database primary keys

63. Use Case Diagrams are used to:
   a) Define database schemas
   b) Show user interactions with the system
   c) Define system architecture
   d) Replace flowcharts

64. In OOD, which technique reduces component dependency?
   a) Encapsulation
   b) Redundancy
   c) Global Variables
   d) Code Duplication
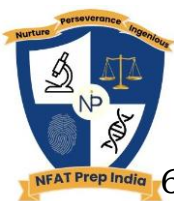
65. CPI (Clock Cycle per Instruction) depends on:
    a) Only clock frequency
    b) Only instruction set architecture
    c) Both instruction set and CPU design
    d) Only number of registers

66. Principle of locality in cache memory says:
    a) Programs access data sequentially
    b) Data accessed once isn't accessed again
    c) Large programs need less cache
    d) Main memory is faster

67. Main advantage of a superscalar processor:
    a) Execute multiple instructions per cycle
    b) Simpler instruction set
    c) Lower power consumption
    d) No need for pipelining

68. Virtual address space of a 64-bit processor is:
    a) 64 GB
    b) 16 TB
    c) 4 PB
    d) 18 EB

69. Number of bits required to represent 256 states?
    a) 8
    b) 10
    c) 16
    d) 4

70. Fastest logic family in switching speed?
    a) TTL
    b) CMOS
    c) ECL
    d) DTL

71. Address lines for a 16K × 8 memory chip?
    a) 10
    b) 12
    c) 14
   d) 16
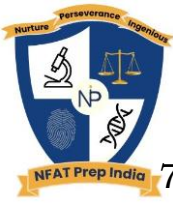
72. Maximum count of a 4-bit up/down counter?
    a) 8
    b) 15
    c) 16
    d) 31

73. The Halting Problem is:
    a) Decidable
    b) Undecidable
    c) Regular language
    d) Solvable by finite automaton

74. Which operations are closed in regular languages?
    a) Complement
    b) Intersection
    c) Concatenation
    d) All of the above

75. Language accepted by finite automaton is always:
    a) Recursive
    b) Regular
    c) Context-free
    d) Recursively enumerable

76. Which grammar is **not** accepted by a deterministic pushdown automaton (DPDA)?
    a) Ambiguous context-free grammar
    b) Regular grammar
    c) Unambiguous context-free grammar
    d) Right-linear grammar

77. Find the missing number: 3, 6, 11, 18, 27, ?
    a) 35
    b) 36
    c) 38
    d) 39

78. Identify the missing term: 81, 27, 9, 3, ?
    a) 1
    b) 2
    c) 0
    d) 3
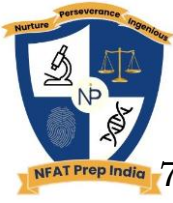
79. Find the next number: 7, 14, 28, 56, ?
   a) 98
   b) 84
   c) 112
   d) 86

80. What is the missing number? 11, 22, 33, ?, 55
   a) 40
   b) 44
   c) 45
   d) 47

81. Which sentence is in **present continuous tense**?
   a) She writes a letter.
   b) She has written a letter.
   c) She is writing a letter.
   d) She will write a letter.

82. Identify the error: "Each of the students have a book."
   a) "Each" should be replaced with "All"
   b) "Have" should be replaced with "Has"
   c) "Students" should be "Student"
   d) No error

83. Passive voice of: "She wrote a letter."
   a) A letter was written by her.
   b) A letter is written by her.
   c) A letter will be written by her.
   d) A letter has been written by her.

84. Which sentence is in **past perfect continuous tense**?
   a) They had been waiting for the bus for an hour.
   b) They waited for the bus.
   c) They are waiting for the bus.
   d) They will have waited for the bus.

85. Which is the **smallest country** in the world by land area?
   a) Monaco
   b) San Marino
   c) Vatican City
   d) Liechtenstein

86. What is the **hardest natural substance** on Earth?
    a) Platinum
    b) Diamond
    c) Graphene
    d) Titanium

87. Which **ocean is the deepest**?
    a) Atlantic Ocean
    b) Arctic Ocean
    c) Indian Ocean
    d) Pacific Ocean

88. Which country has the **most pyramids**?
    a) Egypt
    b) Sudan
    c) Mexico
    d) Peru

89. A sum becomes **2.25 times** in 2 years at compound interest. What is the rate?
    a) 25%
    b) 50%
    c) 30%
    d) 40%

90. A shopkeeper increases the price by 25% and gives 20% discount. Net effect?
    a) 0%
    b) 2% increase
    c) 5% increase
    d) 10% increase

91. If CAT = 24, DOG = 26, what is FISH?
    a) 42
    b) 44
   c) 46
    d) 48
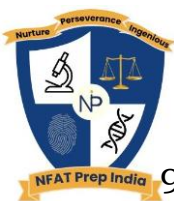
92. A can complete a task in 20 days, B in 30 days. How much in 5 days together?
a) 1/4
b) 1/3
c) 1/2
d) 2/3

93. If matrix A is diagonalizable, then:
a) A has real eigenvalues
b) A has a full set of linearly independent eigenvectors
c) A is symmetric
d) $AT = A^{-1}$

94. If the rank of a 4×5 matrix is 3, what is the dimension of its null space?
a) 2
b) 1
c) 3
d) 5

95. A symmetric matrix is always:
a) Diagonalizable
b) Singular
c) Invertible
d) Unitary

96. If A and B are invertible, which is true?
a) $(AB)^{-1} = A^{-1}B^{-1}$
b) $(AB)^{-1} = B^{-1}A^{-1}$
c) $A^{-1}B^{-1} = B^{-1}A^{-1}$
d) $AB = I$

97. Who was the **first Indian Nobel laureate**?
a) C.V. Raman
b) Rabindranath Tagore
c) Mother Teresa
d) Amartya Sen

98. ISRO headquarters is in:
a) Chennai
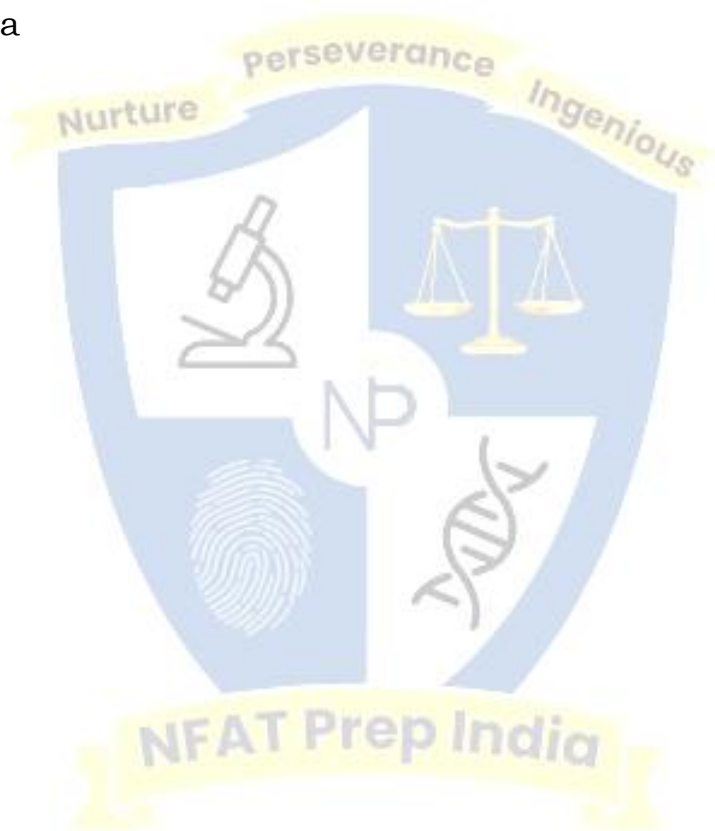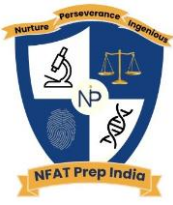b) Bengaluru
c) Hyderabad
d) Thiruvananthapuram
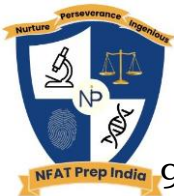
99. First general elections in independent India were held in:
    a) 1947
    b) 1950
    c) 1951–52
    d) 1955

100. Kaziranga National Park is in:
    a) West Bengal
    b) Assam
    c) Arunachal Pradesh
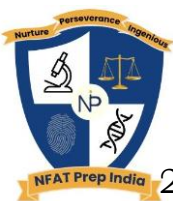   d) Odisha

✅ Answers

1. b) IPSec

2. c) SYN

3. c) Improved network segmentation

4. c) Circular

5. b) Best Fit

6. b) Controlling hardware and system resources

7. b) Executing

8. a) Difficult to modify and maintain

9. a) AVL Tree

10. b) O(n)

11. c) Wastage of memory

12. b) BFS

13. b) Jump if not zero

14. a) Return from a function

15. a) Sets AX to 0

16. b) SHL

17. b) Resource Allocation Is Initialization

18. a) Ensure proper cleanup

19. a) Avoiding unnecessary copies

20. a) Shallow copies pointers

21. d) Both b and c

22. c) () (Parentheses)

23. a) Prevent compiler optimizations

24. d) o

25. d) JVM cannot access main

26. d) All of the above

27. c) super

28. a) Compilation error

29. c) internal

30. a) Common Language Specification (CLS)

31. c) Build web apps using MVC

32. b) Inspect and manipulate metadata

33. a) HelloHelloHello

34. b) Iterates over iterables as tuples

35. a) 4

36. c) List

37. b) Introduce redundancy

38. b) Increased storage usage

39. b) Automatic deletion/update

40. b) Exclusive locking

41. a) ICANN

42. c) SMTP

43. b) 443

44. b) SSH

45. c) Simultaneously

46. b) NAND

47. b) 2

48. d) All of the above

49. a) 200

50. a) display: flex;

51. b) A single promise that resolves when all resolve

52. b) required

53. b) Train models without sharing raw data
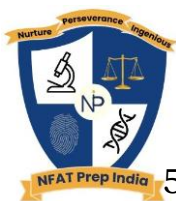
54. b) AI-driven intelligent networks

55. b) High speed with low energy use

56. b) Human-like AI intelligence

57. b) Solve common design problems

58. d) User authentication

59. b) Introduce small code changes

60. b) Waterfall

61. b) Refine requirements

62. b) Repository of data definitions

63. b) User interactions

64. a) Encapsulation

65. c) Both instruction set and CPU design

66. a) Access data sequentially

67. a) Execute multiple instructions per cycle

68. d) 18 EB

69. a) 8

70. c) ECL

71. c) 14

72. b) 15

73. b) Undecidable

74. d) All of the above

75. b) Regular
76. a) Ambiguous context-free grammar

77. d) 39

78. a) 1

79. b) 84

80. b) 44

81. c) She is writing a letter
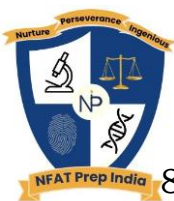
82. b) "Have" should be replaced with "Has"

83. a) A letter was written by her

84. a) They had been waiting for the bus

85. c) Vatican City

86. b) Diamond

87. d) Pacific Ocean

88. b) Sudan

89. b) 50%

90. c) 5% increase

91. b) 44

92. b) 1/3

93. b) Full set of linearly independent eigenvectors

94. a) 2

95. a) Diagonalizable

96. b) $(AB)^{-1} = B^{-1}A^{-1}$

97. b) Rabindranath Tagore

98. b) Bengaluru

99. c) 1951–52

100. b) Assam