

M.Tech. (Computer Science and Engineering) Entrance Test, 2022

1. If $P(A) = 0.8$, $P(B) = 0.5$ and $P(B|A) = 0.4$, what is the value of $P(A \cap B)$?
(A) 0.32 (B) 0.25
(C) 0.1 (D) 0.5
2. If $P(A) = 0.4$, $P(B) = 0.7$ and $P(B/A) = 0.6$, find $P(A \cup B)$.
(A) 0.46 (B) 0.86
(C) 0.76 (D) 0.54
3. The position vector of the point (1, 2, 0) is :
(A) $i + j + k$ (B) $i + 2j + k$
(C) $i + 2j$ (D) $2j + k$
4. A point from a vector starts is called.....and where it ends is called its.....
(A) terminal point, endpoint.
(B) initial point, terminal point
(C) origin, endpoint
(D) initial point, endpoint
5. Time period is a.....
(A) Vector quantity
(B) Scalar quantity
(C) Neither scalar nor vector
(D) Matrix

6. Can two different vectors have the same magnitude ?
- (A) Yes (B) No
(C) Cannot be determined (D) Depends on the vector
7. The optimal value of the objective function is attained at the points :
- (A) on X-axis
(B) on Y-axis
(C) corner points of the feasible region
(D) X-and Y-axis
8. Which of the following is *not* a type of Linear Programming Problem ?
- (A) Manufacturing problem (B) Diet problem
(C) Transportation problems (D) NP Complete problems
9. The linear inequalities or equations or restrictions on the variables of a linear programming problem are called :
- (A) A constraint (B) Decision variables
(C) Objective function (D) Multi-objective function
10. A set of values of decision variables that satisfies the linear constraints and non-negativity conditions of an L.P.P. is called its :
- (A) Unbounded solution
(B) Optimum solution
(C) Feasible solution
(D) Multi-objective function

11. Region represented by $x \geq 0, y \geq 0$ is :
- (A) First quadrant (B) Second quadrant
(C) Third quadrant (D) Fourth quadrant
12. Total number of possible matrices of order 3×3 with each entry 2 or 0 is :
- (A) 111 (B) 121
(C) 513 (D) 512
13. If A is a skew-symmetric matrix, then A^2 is a :
- (A) Skew-symmetric matrix
(B) Symmetric matrix
(C) Null matrix
(D) Cannot be determined
14. The function $f(x) = x + \cos x$ is :
- (A) Always increasing
(B) Always decreasing
(C) Increasing for a certain range of x
(D) $\sin x$
15. If $y = x^3 + x^2 + x + 1$, then y :
- (A) has a local minimum
(B) has a local maximum
(C) neither has a local minimum nor local maximum
(D) has a local neutral

16. The equation of the normal to the curve $y = \sin x$ at $(0, 0)$ is :
- (A) $x = 0$ (B) $y = 0$
(C) $x + y = 0$ (D) $x - y = 0$
17. The direction cosines of the y -axis are :
- (A) $(9, 0, 0)$ (B) $(1, 0, 0)$
(C) $(0, 1, 0)$ (D) $(0, 0, 1)$
18. Direction ratio of line joining $(2, 3, 4)$ and $(-1, -2, 1)$, are :
- (A) $(-3, -5, -3)$ (B) $(-3, 1, -3)$
(C) $(-1, -5, -3)$ (D) $(-3, -5, 5)$
19. The curve for which the slope of the tangent at any point is equal to the ratio of the abscissa to the ordinate of the point is :
- (A) An ellipse
(B) Parabola
(C) Circle
(D) Hyperbola
20. The minimum number of states required to recognize an octal number divisible by 3 are/is :
- (A) 1 (B) 3
(C) 5 (D) 55

21. If an Infinite language is passed to Machine M, the subsidiary which gives a finite solution to the infinite input tape is.....
- (A) Compiler (B) Interpreter
(C) Loader and Linkers (D) Syntax
22. In Non-Deterministic Finite Automata (NFA), this very state is like dead-end non-final state :
- (A) ACCEPT (B) REJECT
(C) DISTINCT (D) START
23. Which of the following is a regular language ?
- (A) String whose length is a sequence of prime numbers
(B) Set of palindrome strings
(C) Palindrome string
(D) String with even number of zeros
24. A binary string is divisible by 4 if and only if it ends with :
- (A) 100 (B) 1000
(C) 1100 (D) 0011
25. There exists an initial state, 17 transition states, 7 final states and one dumping state. Predict the maximum number of states in its equivalent DFA.
- (A) 226 (B) 224
(C) 225 (D) 223

26. The entity which generates Language is termed as :
(A) Automata (B) Tokens
(C) Grammar (D) Data
27. A multi-tape turing machine is.....powerful than a single tape turing machine.
(A) more
(B) less
(C) equal
(D) depends on the variables
28. Which of the following is *true* for two stack turing machines ?
(A) One read only input
(B) Two storage tapes
(C) One read only input and two storage tapes
(D) Three storage tapes
29. Which of the turing machines have existential and universal states ?
(A) Alternating turing machine
(B) Probabilistic turing machine
(C) Read-only turing machine
(D) Read-only compiler

30. Unix sort command uses.....as its sorting technique.
- (A) Quick Sort (B) Bucket Sort
(C) Radix Sort (D) Merge Sort
31. Let R be a relation on the set N of natural numbers defined by nRm if n divides m . Then R is :
- (A) Reflexive and symmetric
(B) Reflexive
(C) Null set
(D) Reflexive, transitive but not symmetric
32. The maximum number of equivalence relations on the set $A = \{1, 2, 3\}$ is :
- (A) 1 (B) 2
(C) 3 (D) 5
33. If set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is :
- (A) 0 (B) 1
(C) 120 (D) 5
34. Set A has 3 elements and set B has 4 elements. Then the number of injective mappings that can be defined from A to B is :
- (A) 24 (B) 22
(C) 33 (D) 44

35. Deadlock problem in an operating system is related to.....
- (A) cache memory (B) transportation problem
(C) context-sensitive resources (D) resource management
36. P, Q, R are three languages. If P and R are regular and if $PQ = R$, then :
- (A) Q has to be regular (B) Q cannot be regular
(C) Q need not be regular (D) Q cannot be a CFL
37. Software testing is a subset of.....
- (A) Programming language
(B) Automata theory
(C) Software integration
(D) Software Quality Assurance (SQA)
38. Which of the following is *not* possible algorithmically ?
- (A) Regular grammar to context free grammar
(B) Non-deterministic FSA to deterministic FSA
(C) Non-deterministic PDA to deterministic PDA
(D) Union and Intersection
39. 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) given expression is regular

40. The intersection of CFL and regular language :
- (A) is always regular
 - (B) is always context free
 - (C) both (A) and (B)
 - (D) need not be regular
41. In which of the following gates, the output is 1, if and only if at least one input is 1 ?
- (A) NOR
 - (B) AND
 - (C) OR
 - (D) NAND
42. The time required for a gate or inverter to change its state is called :
- (A) Rise time
 - (B) Decay time
 - (C) Propagation time
 - (D) Charging time
43. The maximum frequency at which digital data can be applied to gate is called :
- (A) Operating speed
 - (B) Propagation speed
 - (C) Binary level transaction period
 - (D) Charging time
44. Risk management is carried out during software development process using.....
- (A) Risk equation
 - (B) Risk graphs
 - (C) Risk table
 - (D) Graphs

45. A one-to-four line demultiplexer is to be implemented using a memory. How many bits must each word have ?
- (A) 1 bit (B) 2 bits
(C) 4 bits (D) 8 bits
46. What logic function is produced by adding an inverter to the output of an AND gate ?
- (A) NAND (B) NOR
(C) XOR (D) OR
47. Which table shows the logical state of a digital circuit output for every possible combination of logical states in the inputs ?
- (A) Function table (B) Truth table
(C) Routing table (D) ASCII table
48. The output of NOR gate is :
- (A) High if all of its inputs are high
(B) Low if all of its inputs are low
(C) High if all of its inputs are low
(D) High if only of its input is low
49. A toggle operation cannot be performed using a single :
- (A) NOR gate (B) AND gate
(C) NAND gate (D) XOR gate

50. Which table shows the electrical state of a digital circuit's output for every possible combination of electrical states in the inputs ?
- (A) Function table (B) Truth table
(C) Routing table (D) ASCII table
51. The function of an OR gate is to find the.....between the inputs which are binary in nature.
- (A) Maximum (B) Minimum
(C) Parity (D) Syntax
52. A.....gate is a logical gate which is the opposite of an AND logic gate.
- (A) NOT (B) OR
(C) NAND (D) XOR
53. Can you solve Class 'P' problem using an efficient algorithm ?
- (A) No
(B) Depending on decision variables
(C) Yes
(D) Depending on class variables
54. Which memory is difficult to interface with processor ?
- (A) Static memory
(B) Dynamic memory
(C) ROM
(D) RAM

55. The idea of cache memory is based on :
- (A) The property of locality of reference
 - (B) The heuristic 90-10 rule
 - (C) The fact that only a small portion of a program is referenced relatively frequently
 - (D) Virtual memory
56. How many RAM chips of size $(256K \times 1 \text{ bit})$ are required to build 1 M Byte memory ?
- (A) 8
 - (B) 12
 - (C) 24
 - (D) 32
57. A CPU and a Cache Memory in a Computer Desktop System can influence.....
- (A) compiler
 - (B) system performance
 - (C) interpreter
 - (D) printer
58. Machine learning is related to.....
- (A) Pattern learning
 - (B) Data learning
 - (C) System learning
 - (D) Deep learning

59. In artificial Neural Network interconnected processing elements are called :
- (A) Nodes or neurons (B) Weights
(C) Axons (D) Soma
60. A Tree 'T' in a given Graph 'G' cannot form a.....
- (A) Cycle (B) Connected Graph
(C) Connected Sub-graph (D) Sub-tree
61. The process of creating a specific class from a class template is called :
- (A) instantiation
(B) instant class
(C) function template
(D) template instantiation
62. The declaration of a function prototype is mandatory in a programming language so as to ensure that during compilation, there will be.....
- (A) No warning only
(B) No logical errors
(C) No error and No warning
(D) No assignment errors
63. Which of the following is related to Operating System ?
- (A) Null Pointer (B) Address mode
(C) Logical error (D) SPOOLING

64. A router is related to.....for 1 MB memory, the number of address lines required.
- (A) Interpreter (B) Compiler
(C) Operating System (D) Computer Network
65. Semaphore is used for :
- (A) synchronization (B) dead-lock
(C) exception (D) both (B) and (C)
66. NP-Hard Problem can be solved using.....
- (A) a Tree 'T' (B) a Graph 'G'
(C) a Sub-graph 'H' (D) Linear Reductions
67. Piggybacking is a technique for :
- (A) flow control (B) error control
(C) acknowledgement (D) slow control
68. Matrix Multiplication is.....
- (A) Commutative (B) NP Hard problem
(C) Not commutative (D) NP Soft Problem
69. The term 'Adversary Arguments' is related to.....
- (A) Programming language
(B) Opening and parsing of SQL statements
(C) PL/SQL statements
(D) Analysis of algorithm

70. The 'Principle of Optimality' is related to.....
- (A) Dynamic Programming (B) Greedy method
(C) Greedy strategy (D) Tree Traversal
71. The success of Quick Sort Algorithm depends on.....
- (A) Choice of Control Statements
(B) Choice of Pivot element
(C) Dynamic variables
(D) Static variable
72. The swapping of two variables in a sorting algorithm can be done.....
- (A) without using temporary variables also
(B) only using temporary variables
(C) by using dynamic variables only
(D) by using static variables only
73. Which of the following terms is related to an Operating System ?
- (A) Priority queue (B) Linked list
(C) Semaphore (D) Tree
74. The LINUX operating system is based on :
- (A) monolithic (B) micro-kernel
(C) multithreading (D) multitasking

75. Which of the following is *not* a backtracking algorithm ?
- (A) N queen problem
 - (B) Knight tour problem
 - (C) Tower of Hanoi
 - (D) M coloring problem
76. A program written using the data structure.....results in minimum page faults.
- (A) stack
 - (B) hash queue
 - (C) priority queue
 - (D) priority lists
77. Virtual memory is related to.....
- (A) grammar
 - (B) demand paging
 - (C) static memory
 - (D) dynamic memory
78. Suppose the letters a, b, c, d, e, f have probabilities $1/2, 1/4, 1/8, 1/16, 1/32, 1/32$ respectively. What is the average length of Huffman codes ?
- (A) 3
 - (B) 2.1
 - (C) 1.9375
 - (D) 1.5
79. WWW stands for.....
- (A) World Wide Web
 - (B) Internet Protocol
 - (C) Network Protocol
 - (D) World Wide Web Protocol

80. The time complexity of an algorithm is represented using.....
- (A) Big Oh Notation
 - (B) Indicator random variables
 - (C) Quadrants
 - (D) Reflexive functions
81. POST-BLOCK trigger is a :
- (A) Navigational trigger
 - (B) Key trigger
 - (C) Transactional trigger
 - (D) Dynamic trigger
82. Stack is used for.....
- (A) CALL_INPUT
 - (B) CLEAR-BLOCK
 - (C) CPU_QUERY
 - (D) Recursion
83. Which of the following is related to Prim's algorithm and Kruskal's algorithm ?
- (A) USER_EXIT
 - (B) Stack
 - (C) Queue
 - (D) Minimum Spanning Tree
84. A free tree is defined as a connected undirected graph with :
- (A) 1 cycle
 - (B) 2 cycles
 - (C) 3 cycles
 - (D) No cycle
85. Depth-first traversal of a graph is roughly analogous to.....traversal.
- (A) preorder
 - (B) inorder
 - (C) level-by-level
 - (D) postorder

86. The method of writing all operators either before their operands, or after them, is called :
- (A) polish notation (B) infix
(C) postfix (D) prefix
87. A linked binary tree with n nodes, $n \geq 0$ has exactly.....NULL links.
- (A) n (B) $n + 1$
(C) $n - 1$ (D) $n + 2$
88. A priority queue is a data structure with only two operations :
- (A) insert an item, remove an item having the largest or smallest key
(B) inserting and ordering the items
(C) removing and ordering the items
(D) inserting and setting priority value to existing items
89. The process of splitting a text or expression into pieces to determine its syntax is called :
- (A) parsing (B) recursive descent
(C) pruning (D) token
90. A data dictionary is a special file that contains :
- (A) the names of all fields in all fields
(B) the data types of all fields in all files
(C) the widths of all fields in all files
(D) metadata

91. Enterprise Resource Planning (ERP) is the best example for.....

- (A) DBMS
- (B) MIS
- (C) DSS
- (D) OLAP

92. The PERT and CPM are related to.....

- (A) Project management
- (B) Testing
- (C) Complex algorithms
- (D) Quality

93. Stack and Queue are.....techniques.

- (A) Optimization
- (B) Assignment
- (C) Data structure
- (D) Graph

94. Simplex method is related to solving.....

- (A) Graphical problems
- (B) Mathematical modeling
- (C) Optimization problem
- (D) Integral problems

95. Graphical User Interface (GUI) is an example for.....

- (A) Non-functional requirement
- (B) Functional requirement
- (C) Obsolete requirement
- (D) Internet protocol

96. The term “Median” is an example for a.....
- (A) descriptive statistics (B) random variable
(C) static variable (D) memory variable
97. Method of detecting and correcting transmission errors in data is known as :
- (A) handshake (B) debugging
(C) hamming code (D) checksum
98. Which of the following is used to minimize data errors when data is transferred ?
- (A) checksum (B) check bit
(C) transmit (D) patching
99. FTP stands for.....
- (A) File Transfer Protocol
(B) File Transmission Protocol
(C) File Transistor Protocol
(D) File Transmission Programme
100. There are two types of Knapsack problems namely :
- (A) codes and decodes
(B) 0-1 Knapsack and Fractional Knapsack
(C) 0-1 and 0-2 Knapsack
(D) 0- n and 0- m Knapsack

GENERAL APTITUDE

101. Direction : Read the given instructions carefully and answer the question given below :

$A + B (5)$ = A is 10 m to the NORTH of B

$A - B (7)$ = A is 12 m to the SOUTH of B

$A * B (12)$ = A is 17 m to the EAST of B

$A / B (11)$ = A is 16 m to the West of B

R/P (13), P/Q (19) , S + Q (5), U/S (19), U – T (5)

What is the shortest distance between S and P ?

(A) 23 m

(B) 25 m

(C) 26 m

(D) 28 m

102. Complete the series :

8, 4, 6, 15, 52.5, ?

(A) 230.52

(B) 232.52

(C) 234.25

(D) 236.25

103. Direction : Study the following information carefully and answer the question given below :

There are seven family members in a family in which four are males and three are females and two married couple in that family. S is the brother-in-law of T and paternal uncle of P. R is the father of V and son of M. V is sister of P and Q is grandfather of V.

How is Q related with T ?

- (A) Father
- (B) Grandfather
- (C) Father-in-law
- (D) Son

104. Direction : Read the following information carefully and answer the question given below :

“Backlog disc live heavily” is coded as “ 2\$A 4#I 8\$E 12#I ”

“Innocent band actress salute” is coded as ” 2#A 1\$C 9%N 19&A”

“Notify selfish model change” is coded as “14&O 13!O 19\$E 3&H”

“Langer hill external limelight” is coded as “12&A 12@I 8#I 5%X”

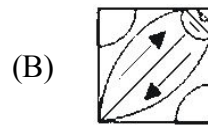
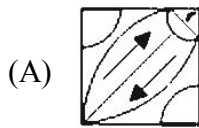
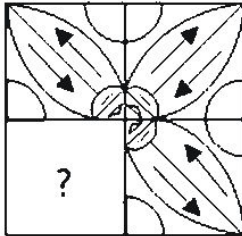
Find the code for "Take advance receipt" ?

- (A) 20#A 1\$D 18\$E
- (B) 2#A 1\$D 7\$E
- (C) 20#A 11#D 17\$E
- (D) 20\$A 1\$D 17\$E

105. Qualm : Nausea :: Burn : ?

- (A) Wet
- (B) Sear
- (C) Fresh
- (D) Sensible

106. Direction : Which answer figure will complete the pattern of the given incomplete figure ?



107. Direction : Read the following information carefully and answer the question given below :

Certain number of persons (that does not exceed 15) are standing in a straight linear row facing towards the north. 5 persons stand between B and E, who is third to the left of A. U is to the right of A. Not more than 3 persons stand between U and T. B is third to the left of U. I is fifth to the right of T. 2 persons stand between E and F, who is sitting at the extreme left end of the row. Three persons stand between A and L, who is towards the right of E.

How many persons are standing in the row ?

(A) 15

(B) 14

(C) 13

(D) 12

108. In the following question, there is a statement followed by two arguments I and

II. Read carefully and choose the right option from the given possible answers.

Given answers :

- (a) Only argument I is strong
- (b) Only argument II is strong
- (c) Either I or II is strong
- (d) Neither I nor II is strong

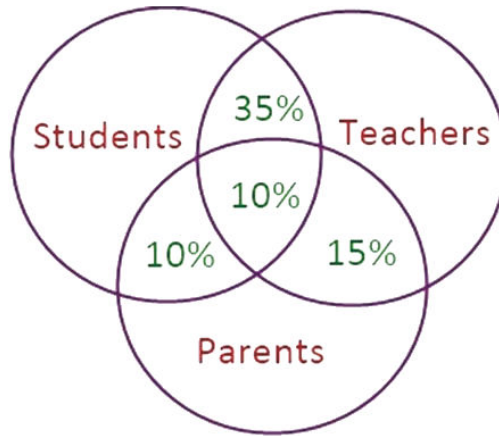
Statement : Government should stop spending huge amounts of money on international sports.

Arguments :

- I. Yes, this money can be utilized for upliftment of the poor.
- II. No, sportpersons will be frustrated and will not get international exposure.

- (A) (a)
- (B) (b)
- (C) (c)
- (D) (d)

109. In the given figure, 10% are students and parents, another 10% are students and teachers, 15% are teachers and parents. 35% are students and teachers. How many percentage are only teachers, parents and students ?



- (A) 45, 40, 65 (B) 40, 45, 65
(C) 40, 65, 45 (D) 65, 40, 45
110. Arrange the words given below in a meaningful sequence :
1. College
 2. Child
 3. Salary
 4. School
 5. Employment
- (A) 1, 2, 4, 3, 5
(B) 2, 4, 1, 5, 3
(C) 4, 1, 3, 5, 2
(D) 5, 3, 2, 1, 4

GENERAL ENGLISH

111. Direction : Which of the given below should replace the phrase given in bold in the following sentence to make the sentence grammatically correct ?

Indirect **taxes effect** the common man and increase the cost of living.

- | | |
|--------------------|-------------------------|
| (A) tax effects | (B) taxes are effective |
| (C) taxing efforts | (D) taxes affect |

112. The four sentences given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of four numbers as your answer :

1. The eventual diagnosis was skin cancer and after treatment all seemed well.
2. The viola player didn't know what it was; nor did her GP.
3. Then a routine scan showed it had come back and spread to her lungs.
4. It started with a lump on Cathy Perkins' index finger.

- | | |
|-------------|-------------|
| (A) 4 2 1 3 | (B) 2 4 1 3 |
| (C) 1 3 2 4 | (D) 1 3 4 2 |

113. Fill in the blank :

The consequences of his haughtiness were that his services were dispensed.....by his master.

- | | |
|-----------|----------|
| (A) about | (B) with |
| (C) from | (D) up |

114. Direction : The given sentence has been broken up into four different parts. The error, if any, will be in any one part of the sentence. Select the option which contains the part of the sentence which has an error (spelling, grammatical or contextual) :

Millions of people may be (A)/displaced and thousands of cities (B)/may drown because of melting glaciers (C)/and raising sea levels. (D)

- (A) Millions of people may be
- (B) displaced and thousands of cities
- (C) may drown because of melting glaciers
- (D) and raising sea levels

115. Direction : This question has two blanks, each blank indicating that something has been omitted. Choose the set of words for each blank that best fits in the context of the sentence :

Besides issues regarding peace and stability in the region, Minister.....India's energy concerns and said although Iran supplied as much as 11% of its needs, it had reduced oil.....from the West Asian country even though this hurt the economy.

- | | |
|-------------------------|-------------------------|
| (A) described, exports | (B) studied, security |
| (C) delineated, imports | (D) explained, projects |

116. Find the correctly spelt word :

- | | |
|--------------|---------------|
| (A) Vagebond | (B) Vegabonde |
| (C) Vegabond | (D) Vagabond |

117. In this question, out of the four alternatives, select the alternative which best expresses the meaning of the idiom/phrase.

My father is undoubtedly an **arm-chair critic**.

- (A) someone who gives advice based on practice not theory
- (B) someone who gives advice based on experience
- (C) someone who never gives advice
- (D) someone who gives advice based on theory not practice

118. Out of the four alternatives choose the one which can be substituted for the given words/sentence in the question :

Seat on elephant's back

- | | |
|------------|------------|
| (A) Howdah | (B) Dote |
| (C) Endue | (D) Hurtle |

119. Find the antonym of FATUOUS :

- | | |
|--------------|------------|
| (A) Crafty | (B) Frugal |
| (C) Sensible | (D) Inane |

120. Find the synonym of NABOB :

- | | |
|------------|--------------|
| (A) Bigwig | (B) Doubter |
| (C) Frolic | (D) Converse |