COMBINED TECHNICAL SERVICES EXAMINATION

(NON-INTERVIEW POSTS)

COMPUTER BASED TEST

PAPER – II – INFORMATION TECHNOLOGY

(DEGREE STANDARD) (CODE: 408)

1. ———————— is the keyword to indicate that an end of file or end of stream has been reached unexpectedly during input.

   (A) IO Exception
   (B) File Not Found Exception
   (C) Interrupted IO Exception
   (D) EOF Exception
   (E) Answer not known

2. The standard Templates library defines ———————— containers.

   (A) Ten
   (B) Three
   (C) Nine
   (D) Four
   (E) Answer not known

3. When a class is not used for creating objects its treated as

   (A) Inheritance
   (B) Derived class
   (C) Base class
   (D) Abstract class
   (E) Answer not known

4. Identify the following statement(s) is/are false about function declaration.

   (i) Function declaration consists of function type, function name, parameter list and Terminating semicolon

   (ii) The parameter list must be separated by commas

   (iii) A prototype declaration may be placed inside a function definition

   (iv) The parameter name need to be the same in the prototype declaration and the function definition

   (A) Only (i)
   (B) (i) and (iii) are false
   (C) (ii) and (iii) are false
   (D) Only (iv)
   (E) Answer not known

5. In C programming, By default, the return type of a function is

   (A) Char   (B) Double
   (C) Float   (D) Int
   (E) Answer not known

6. Which of the following statements are true?

   (i) The storage class <u>static</u> variables are allowed to be specified as static for local and global variables

   (ii) The storage class <u>register</u> has default value is 0

   (iii) The storage class <u>auto</u> have a scope of within the block or function where it is declared

   (A) (i)   (B) (ii), (iii)
   (C) (i), (ii)   (D) (i), (iii)
   (E) Answer not known

7. Which among the following statements are true?

   (i) The function gets() does not automatically replaces '\n' by '\0'

   (ii) The function fgets() takes three arguments

   (iii) fgets() does not prevent overflow

   (A) (i)   (B) (ii)
   (C) (iii)   (D) (i), (ii), (iii)
   (E) Answer not known

8. Which among the following was the invalid identifiers in C?

   (A) C1   (B) PROC1
   (C) 1PROC   (D) Ua11
   (E) Answer not known

9. If int *P [4]; then size of P is consider in GCC.

   (A) 4 bytes
   (B) 8 bytes
   (C) ✓16 bytes
   (D) 32 bytes
   (E) Answer not known

10. Find the output for the following C program:

    int main ()
    {   float a = 3.5;
         printf("%f", a%2);
         return 0;
    }

    (A) 3.5
    (B) 1.5
    (C) 1.75
    (D) ✓Compile time error
    (E) Answer not known

11. How you can declare the initialization of one-dimension array mention which is the correct statement?

    (A) int number = {1, 2, 3};
    (B) ✓int number [3] = {1, 2, 3};
    (C) int number = new int [3];
    (D) int number (3) = {1, 2, 3};
    (E) Answer not known

12. Which of the following is not a pure object oriented programming language?

    (A) Small talk
    (B) Java
    (C) Eiffel
    (D) ✓C++
    (E) Answer not known

13. The following terms are not available in general OOPs concept.

 (A) Modularity

 (B) Code reusability

 (C) ✓ Duplicate or Redundant Data

 (D) Efficient code

 (E) Answer not known

14. Why the class and scope of the static member variable is defined outside the class?

 (A) The static data members are not associated with the class

 (B) ✓ The static data member variable must be initialized otherwise the linker will generate an error

 (C) Duplicate copy of static variable is created inside the class

 (D) The static data members are not stored individually

 (E) Answer not known

15. Which of the approach to be followed in object oriented programming?

 (A) Top-down approach

 (B) ✓ Bottom-up approach

 (C) Standard approach

 (D) Sequential approach

 (E) Answer not known

16. In Python programming environment, which function constructs a list from those elements of the list for which a function returns true?

 (A) Map ()

 (B) Reduce ()

 (C) ✓ Fitter ()

 (D) Enumerate ()

 (E) Answer not known

17. In Python programming environment, the default access mode is

(A) write   (B) wb

(C) ✓ read   (D) rb

(E) Answer not known

18. Which of the following file access mode opens a file for both reading and writing and the file pointer is placed at the beginning of the file?

(A) r   (B) rb

(C) ✓ r+   (D) rb+

(E) Answer not known

19. In Python a string is appended to another string by uses of which operator?

(A) *   (B) +

(C) ✓ +=   (D) [ ]

(E) Answer not known

20. Is it possible to return more than one value in a single python return statement? If so, what is the type of returned values?

(A) No   (B) ✓ Yes, int

(C) Yes, List   (D) ✓ Yes, Tuple

(E) Answer not known

21. D data structure associated with each process in an operating system is

(A) Software

(B) System calls

(C) ✓ Process control Block

(D) Command-Interpreter

(E) Answer not known

22. ——————, the computer is switched on, a program that runs is a set of instructions stored in, Read-only memory that examines the system hardware to check whether all our hardware device function properly or not.

(A) Bootstrap loader

(B) ✓ Power on self test

(C) Application program

(D) MS. DOS.

(E) Answer not known

23. In ——————— mode, DMA gives control of buses to CPU after transfer of every byte of data.

(A) Burst mode

(B) ✓ Cycle – stealing mode

(C) Transparent mode

(D) Block mode

(E) Answer not known

24. A program which loads OS into memory is called as

(A) Configuration manager

(B) Addressing modes

(C) ✓ Bootstrap loader

(D) BIOS

(E) Answer not known

25. ———————— developers are concerned only with web based development and generally do not care what operating system is used.

(A) SaaS ✓ (B) IaaS

(C) ✓ PaaS (D) MaaS

(E) Answer not known

26. One user does not notice that the other is making use of the same resource. This phenomenon is called

(A) Failure Transparency (B) ✓ Concurrency transparency

(C) Performance transparency (D) Replication transparency

(E) Answer not known

27. A connection that is setup for a remote procedure call is sustained after the procedure return is

(A) Dynamic binding (B) ✓ Persistent binding

(C) Non Persistent binding (D) Synchronous binding

(E) Answer not known

28. Which routing technique is used in a distributed system?

(A) Fixed routing (B) Virtual routing

(C) Dynamic routing (D) ✓ All of the above

(E) Answer not known

29. In Scheduling, if there are absolute deadlines that must be met, then it is called

    (A) Interactive systems   (B) ✓ Hard real time system

    (C) Batch system   (D) Soft real time system

    (E) Answer not known

30. The reasons for process suspension may include

    (1) Swapping

    (2) Timing

    (3) Interactive user request

    (4) Resource availability

    (A) ✓ (1), (2), (3)

    (B) (2), (3), (4)

    (C) (1), (3), (4)

    (D) (1), (2), (3), (4)

    (E) Answer not known

31. A scheduling where in the jobs are allowed to move between the queues

    (A) Multilevel queue scheduling

    (B) RR scheduling

    (C) ✓ Multilevel feedback scheduling

    (D) Deadline scheduling

    (E) Answer not known

32. Wait – for graph is used to

    (A) Detect deadlock in multi-instance resources
    (B)✓ Detect deadlock in single-instance resources
    (C) Avoid deadlock in multi-instance resources
    (D) Avoid deadlock in single-instance resources
    (E) Answer not known

33. Appliances of cloud in platform-as-a-service.

    (A) Google Apps   (B) Windows Azure
    (C)✓ Google App engine   (D) Amazon EC_2
    (E) Answer not known

34. The REST interactions are "———————" in the sense that the meaning of a message does not depend on the state of the conversation.

    (A) Descriptive   (B) Constrained
    (C) Stateful   (D)✓ Stateless
    (E) Answer not known

35. Match the following :

The new API for interfacing 'IaaS' cloud computing facilities will allow

(a) Consumers	1. Standard interface
(b) Integrators	2. Single common interface
(c) Aggregators	3. Management services
(d) Providers	4. Cloud computing infrastructure interaction

	(a)	(b)	(c)	(d)
(A)	2	1	4	3
(B)	3	4	1	2
(C)	3	1	2	4
(D)✓	4	3	2	1

(E) Answer not known

36. VMM stands for

(A) ✓ Virtual Machine Monitor

(B) Virtual Machine Management

(C) Virtual Monitor Machine

(D) Virtual Management Machine

(E) Answer not known

37. Those directories in which the root directory has all system files and no other subdirectory is known as

(A) Single directory

(B) Hierarchical directory

(C) Sequential directory

(D)✓ Flat directory

(E) Answer not known

38. The page replacement algorithm that selects a page for which the time to next reference is the longest

    (A) First In First Out   (B) Least recently used
    (C) ✓Optimal   (D) Clock
    (E) Answer not known

39. ─────── enables users and applications to access records.

    (A) ✓Logical I/O   (B) Basic I/O
    (C) Sequential file   (D) Indexed file
    (E) Answer not known

40. External fragmentation can be reduced by compaction, only if the relocation is

    (A) Static and is done at assembly time
    (B) Dynamic and is done at load time
    (C)✓ Dynamic and is done at execution time
    (D) Not possible
    (E) Answer not known

41. The most natural representation of hierarchical clustering is a tree called ───────

    (A) Minimal Spanning tree   (B)✓Dendrogram
    (C) Polygram   (D) None of the above
    (E) Answer not known

42. A single presentation of all patterns in a training set is called

   (A) Learning rate
   (B) Batch
   (C) ✓ Epoch
   (D) Validation set
   (E) Answer not known

43. The technique used for preventing overfitting in a Neural Network by adding a penalty term to the loss function.

   (A) Dropout
   (B) Batch Normalization
   (C) ✓ Regularization
   (D) All of the above
   (E) Answer not known

44. How does one construct a Bayesian model in Probabilistic graphical models?

   (A) ✓ By defining conditional probability tables for each variable
   (B) By optimizing parameters using gradient descent
   (C) By applying reinforcement learning algorithms
   (D) By clustering data into distinct categories
   (E) Answer not known

45. Choose the right one

   The fundamental principle underlying probabilistic reasoning in machine learning and artificial intelligence

   (A) Deterministic algorithms for precise prediction
   (B) Ensuring scalability in large datasets
   (C) Maximizing computational efficiency
   (D) ✓ Utilizing probability distributions to model uncertainty.
   (E) Answer not known

46. Which of the following is true, when generalizing a back propagation algorithm to a feed forward network?

   (A) There are different nonlinearities for different layers

   (B) Each unit has a different learning rate

   (C) Input units include a bias unit

   (D)✓All of the above

   (E) Answer not known

47. Which of the following machine learning algorithm is based upon the idea of bagging?

   (A)✓Random - forest   (B) Decision Tree

   (C) Classification   (D) Regression

   (E) Answer not known

48. The two measures MB and MD are combined into a single measure called the certainty factor (CF) is defined by

   (A)✓ CF (H, E) = MB (H, E) – MD (H, E)

   (B) CF (H, E) = MB (H, E) + MD (H, E)

   (C) CF (H, E) = MB (H, E) * MD (H, E)

   (D) CF (H, E) = MB (H, E) / MD (H, E)

   (E) Answer not known

49. Which of the following agents is the best in terms of AI?

(A) An agent which needs user inputs for solving any problem

(B)✓ An agent which can solve any problem on its own without any human intervention

(C) An agent which needs an exemplary similar problem defined in its knowledge base prior to the actual problem

(D) All of the above

(E) Answer not known

50. Which of the following mentioned problems are not CSP (Constraint Satisfactory Problems)?

(A) Crypt - arithmetic problem   (B) N queens problem

(C) Sudoku   (D)✓ Monte - Carlo tree search

(E) Answer not known

51. Which among the following algorithms operate by searching from a start state to neighbouring states, without keeping track of the paths, nor the set of states that have been reached?

(A) Problem solving   (B) Search

(C)✓ Local search   (D) Execution

(E) Answer not known

52. Who is known as the father of Artificial Intelligence?

(A) Fisher Ada   (B) Alan Turing

(C) ✓ John Mc Carthy   (D) Allen Newell

(E) Answer not known

53. ——————— sentence is formed from a predicate symbol followed by a parenthesized list of terms.

(A) Complex ✓

(B) Logic

(C) ✓ Atomic

(D) Quantifiers

(E) Answer not known

54. Amongst which of the following is a correct syntax for panda's data frame?

(A) Pandas. DataFrame (data, index, dtype, Copy)

(B) ✓ pandas. DataFrame (data, index, columns, dtype, Copy)

(C) pandas. DataFrame (data, index, dtype, copy)

(D) pandas. DataFrame (data, index, rows, dtype, copy)

(E) Answer not known

55. How in data sciences, when comparing the means of two independent groups, the appropriate statistical test to use is the

(A) Paired t - Test

(B) Chi - squared Test

(C) ✓ Independent samples t - test

(D) Analysis of variance (ANOVA)

(E) Answer not known

56. Which Matplotlib function is used to save a figure to a file?

(A) ✓ save fig ( )

(B) save plot ( )

(C) export fig ( )

(D) download fig ( )

(E) Answer not known

57. Choose the odd one out in the python graphic libraries.

    (A)   Bokeh   (B) Vispy

    (C)   Vega   (D) Flow

    (E)   Answer not known

58. The correct correlation coefficient computation formula is

    (A) (Z) value $= \dfrac{X - L}{\sigma}$ (B) $r = \dfrac{Sp_{xy}}{\sqrt{ss_x \, ss_y}}$

    (C) $r = \dfrac{Sp_{xy}}{\sqrt{ss_x / ss_y}}$ (D) $r = \dfrac{\sqrt{Sp_{xy} + Sp_{xy \cdot \sigma}}}{\sqrt{ss_x \, ss_y}}$

    (E)   Answer not known

59. A frequency polygon can be ——————— (Choose the best answer)

    (A)   Drawn using variables

    (B)   Drawn using bar graph

    (C)   Drawn independently and by using histogram

    (D)   None of the above

    (E)   Answer not known

60. ——————— data visualization is commonly used to show the relationship between two numerical variables.

    (A)   Bar chart   (B) Line chart

    (C)   Scatter plot   (D) Pie chart

    (E)   Answer not known

61. Match the following :

	List I		List II
(a)	Cycle	1.	Undirected graph in which there is an direct edge between each pairs of node
(b)	Loop	2.	Connected graph with no cycle
(c)	Complete graph	3.	An edge whose endpoints are same
(d)	Tree	4.	Path that starts and ends at the same vertex

	(a)	(b)	(c)	(d)
(A)	3	4	2	1
(B)	2	1	4	3
(C) ✓	3	4	1	2
(D) ✓	4	3	1	2

(E)   Answer not known

62. Why are minimum spanning trees important in graph theory and network design?

(A)   It ensure every vertex is visited exactly once

(B)   It minimize the number of edges in Graph

(C) ✓ It connect all vertices with the minimum total edge weight

(D)   It prioritize nodes based on their Degree

(E)   Answer not known

63. If an algorithm's behaviour is bounded by "$O(f(n))$ if $g(n)$", what notation does it become when the condition is removed?

(A) ✓ $O(f(n))$

(B) $O(g(n))$

(C) $O(f(n)+g(n))$

(D) $O(f(n)*g(n))$

(E)   Answer not known

64. Consider the knapsack instance $n = 4$, $w = \{2,4,6,7\}$, $p = \{6,10,12,13\}$ and $c = 11$. When $k = 0$, the knapsack is filled in non increasing order of profit density. First we place object 1 into the knapsack, then object 2 and so on. Find out the solution.

(A) ✓ $x = \{1,1,0,0\}$ (B) $x = \{0,0,1,1\}$

(C) $x = \{0,1,0,1\}$ (D) $x = \{1,0,1,0\}$

(E) Answer not known

65. In the following which one is decision made in one stage is not changed in a later stage?

(A) Backtracking   (B) Divide and conquer

(C) ✓ Greedy Method   (D) Dynamic programming

(E) Answer not known

66. In subset sum problem, the total number of subsets of set size n is

(A) 2^{n^2} (B) $\dfrac{1}{2^n}$

(C) ✓ 2^n (D) $\dfrac{1}{2^{n^2}}$

(E) Answer not known

67. The cost of inserting a key in a hash table has at size of n is

(A) ✓ $O(1)$ (B) $O(n)$

(C) $O(n/2)$ (D) $O(\log n)$

(E) Answer not known

68. Stacks are known as ————————— data structure, the last item pushed (inserted) on to the stack is the first item poped (removed) from the stack.

   (A) First In First Out (FIFO)

   (B) First In Last Out (FILO)

   (C) Last In Last Out (LILO)

   (D) ✓ Last In First Out (LIFO)

   (E) Answer not known

69. Convert infix expression into post fix a + b * c + (d * e + f) * g

   (A) * + abc * + def * + gf   (B) abc * + def * + gf *

   (C) ✓ abc * + de * f + g * +   (D) abc + * def * + g * +

   (E) Answer not known

70. A linear data structure in which items are inserted at one end and deleted from other end is

   (A) Stack   (B) Linked list

   (C) ✓ Queue   (D) Array

   (E) Answer not known

71. When both node 'N' and parent 'P' are left or right child of grandparent G, then the rotation in splay tree is known as

   (A) Zig   (B) Zigzag

   (C) ✓ Zigzig   (D) Stair case

   (E) Answer not known

72. In ─────────── sorting algorithms can be used to sort a random linked list with minimum time complexity.

(A) Insertion sort

(B) Quick sort

(C) Heap sort

(D)✔Merge sort

(E) Answer not known

73. Evaluate the tree
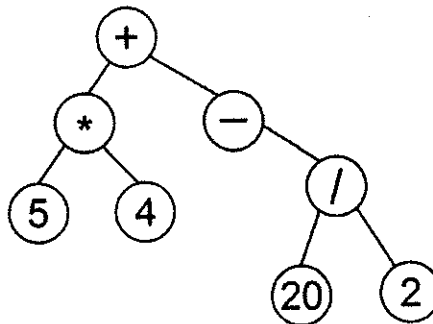
(A) 90

(B) 100

(C)✔110

(D) 105

(E) Answer not known

74. In a singly circular linked list, the last node of the list contains a pointer to the

(A) Previous node of the list

(B)✔First node of the list

(C) Base or starting address of the list

(D) Null value

(E) Answer not known

75. Which of the following statements about Abstract Data types is true?

    (A) Must always be implemented using object-oriented programming languages

    (B) ✔ Specify both the data structure and the algorithms used to manipulate it

    (C) Provide a concrete implementation of data structures without Abstraction

    (D) Can only encapsulate primitive data types such as integers and Booleans

    (E) Answer not known

76. Which of the following is not true about Linked Lists?

    (A) It is a collection of linked nodes

    (B) It helps in dynamic allocation of memory space

    (C) ✔ It allows direct access to any of the nodes

    (D) It requires more memory space in comparison to an array

    (E) Answer not known

77. Identify the following statement(s) is/are false.

(i) To increase or decrease the length of a one-dimensional array that contains elements in positions a[0 : n – 1].

(ii) In an array representation, use an array to store the list elements.

(iii) When an array is used to represent a data structure, whose size increases, the array length is often doubled whenever the array becomes full.

(iv) When array doubling is used, the total time spent changing the array length is more than the total time spent inserting elements into the data structure

(A) Only (i)

(B) (i) and (iii) are false

(C) (ii), (iii) and (i) are false

(D) Only (iv)

(E) Answer not known

78. The time complexity of a program to reverse a singly linked list is

(A) $O(n)$

(B) $O(1)$

(C) $O(n^2)$

(D) None of the above

(E) Answer not known

79. Consider the following two statements and choose the correct option:

S1 : Two elements a and b are equivalent if $(a,b) \in R$. An equivalent class is defined to be a maximal set of equivalent elements.

S2 : If we start with n classes that have one element each and perform u non redundant unions then no class has more than $u+1$ elements.

(A)   S1 is true and S2 is false   (B) S1 is false and S2 is true

(C)✓ Both S1 and S2 are true   (D) Both S1 and S2 are false

(E) Answer not known

80. Which of the following is not a primitive data type?

(A) Int   (B) Array

(C) Float   (D) Char

(E) Answer not known

81. Patterns are expressed in SQL using the _____ operator.

(A)   all   (B) distinct

(C)✓ like   (D) order by

(E) Answer not known

82. Insert/Delete, Update and select command are used

(A)✓ DML   (B) DCL

(C) DDL   (D) TCL

(E) Answer not known

83. Assertion [A] : Primary Key and unique constraints are same
Reason [R] : The columns with primary key/unique constraints have unique values for each row

(A) Both [A] and [R] are true
(B) ✓ [A] is false; [R] is true
(C) [A] is true; [R] is false
(D) Both [A] and [R] are false
(E) Answer not known

84. Which one of the commands is used to modify a column inside a table?

(A) Drop
(B) Update
(C) ✓ Alter
(D) Set
(E) Answer not known

85. Which of the following is not present in a SQL Command?

(A) ✓ DELETE
(B) SELECT
(C) ORDER BY
(D) WHERE
(E) Answer not known

86. Normalization of database is used to

(A) ✓ Eliminate Redundancy
(B) Improve Security
(C) Improve Efficiency
(D) Minimize Errors
(E) Answer not known

87. Consider a relation schema R (A,B,C). If $A \to B$ and $B \to C$ are functional dependencies on R, then which of the following can be considered as a candidate?

(A) ✓ A   (B) B

(C) BC   (D) AC

(E) Answer not known

88. Which of the following join is used to get all the tuples of relation X and Y with null values of corresponding missing values?

(A) Left outer join   (B) Right outer join

(C) Natural join   (D) Full outer join

(E) Answer not known

89. A database schema is the skeleton structure that represents the _____ of an entire database.

(A) ✓ Logical view   (B) Practical view

(C) Physical view   (D) Semantic view

(E) Answer not known

90. In which file organization, any record can be placed anywhere in the file where there is space for the record?

(A) ✓ Heap file organization

(B) Sequential file organization

(C) Hashing file organization

(D) Clustering file organization

(E) Answer not known

91. The task has zero value, if it is completed after the deadline called as

(A) Soft deadline
(B) Hard deadline
(C) ✓ Firm deadline
(D) Time deadline
(E) Answer not known

92. Which one of the following is not a concurrency control protocol?

(A) ✓ Transaction based protocol
(B) Lock based protocol
(C) Timestamp based protocol
(D) Validation based protocol
(E) Answer not known

93. Some buckets are assigned more records, so it may overflow even when other buckets have space. The situation is known as

(A) Overloading
(B) Insufficient bucket
(C) ✓ Skew
(D) Hashing
(E) Answer not known

94. If a single transaction acquires the sole privilege to interact with that specific database object at that time: no other transactions are allowed to read from it or write to it until the lock is released. This lock is

(A) Shared lock
(B) Read lock
(C) Write lock
(D) ✓ Exclusive lock
(E) Answer not known

95. When attempting to execute multiple transactions concurrently, you notice that some transactions are waiting indefinitely. What is the likely cause?

   (A) Network latency

   (B) Deadlocks

   (C) Inefficient query execution

   (D) Insufficient database indexing

   (E) Answer not known

96. DBMS running across multiple processors is called as

   (A) Centralized systems   (B) Parallel systems

   (C) Transaction processing   (D) Distributed systems

   (E) Answer not known

97. Replication is handled by _____ give protocol.

   (A) Locking   (B) Biased

   (C) Three phase commit   (D) Two phase commit

   (E) Answer not known

98. Find the three 'V's of big data

   (A) Volume, Variety, Velocity

   (B) Volume, Value, Vulnerability

   (C) Veracity, Velocity, Variety

   (D) Value, Variety, Velocity

   (E) Answer not known

99. CAP stands for

(A) Consistency, Atomicity, Parallel
(B)✓ Consistency, Availability, Partition Tolerance
(C) Consistency, Atomicity, Partition Protection
(D) Consistency, Availability, Parallel
(E) Answer not known

100. System will be consistent over time but might not be consistent at a particular moment which is known as

(A) Stabilization
(B) Redundancy
(C)✓ Eventually consistent
(D) Memcached
(E) Answer not known

101. Find the correlation coefficient ρ between the storage capacity X (in gigabytes) and the Data transfer speed Y (in megabites per second) of computer pendrives is defined as:

(A)✓ $\rho = \dfrac{\text{cov}(X,Y)}{\sigma_x \sigma_y}$

(B) $\rho = \dfrac{\text{cov}(X,Y)}{\sigma_x^2 \sigma_y^2}$

(C) $\rho = \dfrac{\text{cov}(X,Y)}{\sigma_x + \sigma_y}$

(D) $\rho = \dfrac{\text{cov}(X,Y)}{\sigma_x^2 + \sigma_y^2}$

(E) Answer not known

102. The joint density function of X and Y is $f(x,y) = e^{-(x+y)}$ when $x > 0, y > 0$ then X and Y are _____ random variable.

(A)✓ independent
(B) dependent
(C) identically distributed
(D) Not identically
(E) Answer not known

103. If two random variables have the joint density

$$f(x_1, x_2) = \begin{cases} x_1 x_2 & \text{for } 0 < x_1 < 1, \, 0 < x_2 < 2 \\ 0, & \text{elsewhere} \end{cases}$$

find the probability that both random variables will take on values less than 1.

(A) $1/2$

(B) $\left[\dfrac{1}{2}\right]^2$ ✓

(C) $\left[\dfrac{1}{2}\right]^3$

(D) 1

(E) Answer not known

104. The joint probability distribution of X and Y is given by $f(x, y) = \dfrac{1}{27}(2x + y)$, $x = 0, 1, 2$; $y = 0, 1, 2$. Are X and Y are independent random variable or identically distributed?

(A) Independent random variables

(B) Not independent random variables ✓

(C) Identically distributed

(D) Not identically distributed

(E) Answer not known

105. The correlation coefficient gives as

(A) Only Magnitude

(B) Only direction

(C) Both Magnitude and direction ✓

(D) None

(E) Answer not known

106. The measure of degree of Peakedness and Flatness is known as

(A) Skewness ✓

(B) Dispersion

(C) ✓ Kurtosis

(D) Distribution

(E) Answer not known

107. The monthly breakdowns of a Computer is a random variable having Poisson distribution with a mean equal to 1.8. Find the probability that this computer will function for a month with atleast one breakdown

(A) $e^{-1.8}$

(B) ✓ $1 - e^{-1.8}$

(C) $e^{-1.8} - 1$

(D) $1 + e^{-1.8}$

(E) Answer not known

108. Match List-I with List-II.

List I	List II
(a) Mesokurtic	(i) $\beta_2 < 3$ or $r_2 < 0$
(b) Platykurtic	(ii) $\beta_2 = \dfrac{\mu_4}{r_2^2}$ and $r_2 = \beta_2 - 3$
(c) Leptokurtic	(iii) $\beta_2 = 3$ or $r_2 = 0$
(d) Kurtosis	(iv) $\beta_2 > 3$ or $r_2 > 0$

	(a)	(b)	(c)	(d)
(A)	(iii)	(i)	(ii)	(iv)
(B)	(iii)	(iv)	(ii)	(i)
(C) ✓	(iii)	(i)	(iv)	(ii)
(D)	(iii)	(iv)	(i)	(ii)

(E) Answer not known

109. Choose the right answer.

A continuous random variable is

(A) Can only take on integer values

(B) Provide the probability that the variable equals a specific value

(C) ✓ Fall within a specific interval, that provided as the integral of its probability density function over that interval

(D) A continuous random variable can be negative

(E) Answer not known

110. In Transport department analysis scenarios involving the interception of buses, ships, aircraft or trains within a limited time, which probabilistic model is most suitable for estimating the likelihood of successful interception?

(A) Poisson Distribution   (B) Exponential Distribution

(C) ✓ Binomial Distribution   (D) Normal Distribution

(E) Answer not known

111. The Random process is basically a —————— Model that is used to characterize random signals.

(A) ✓ Probabilistic   (B) Deterministic

(C) Approximation   (D) Queueing

(E) Answer not known

112. Find the correct answer :

In the context of Markov Chains, the limiting distribution refers to

(A) The probability distribution of the initial State ✓

(B)✓ The Stationary distribution of the Markov Chain

(C) The transient states of the Markov Chain

(D) The expected value of the Markov Chain

(E) Answer not known

113. Examine whether the poisson process $\{X(t)\}$, given by the probability law $P\{X(t) = r\} = e^{-\lambda t}(\lambda t)^{r/r!}$, $\{r = 0,1,2,....\}$ is covariance stationary.

(A) The poison process is covariance stationary .

(B)✓ The poison process is not covariance stationary.

(C) The poison process is covariance stationary with uniform distribution

(D) The poison process is not covariance stationary with uniform distribution.

(E) Answer not known

114. Consider the following two statements and choose the correct option for Markov process:

S1 : Markov process is also known as memoryless property.

S2 : Board games played with dice like Monopoly, Snakes and ladders etc are some examples of Markov process.

(A) S1 is true and S2 is false

(B) S1 is false and S2 is true

(C)✓ Both S1 and S2 are true

(D) Both S1 and S2 are false

(E) Answer not known

115. Identify the following statement(s) is/are false. For any random process $X(t)$ with the autocorrelation function $R_{xx}(t_1, t_2)$ and auto covariance function $S_{xx}(t_1, t_2)$

(i) $R_{xx}(t_1, t_2) = R_{xx}(t_2, t_1)$

(ii) $C_{xx}(t_1, t_2) = R_{xx}(t_1, t_2) - \mu_x(t_1)\,\mu_x(t_2)$

(iii) If $\mu_x(t) = 0$ for all +, then $C_{xx}(t_1, t_2) = R_{xx}(t_1, t_2)$ for all t_1, t_2

(iv) $|\rho_{xx}(t_1, t_2)| \geq 1$

(A) Only (i)

(B) (ii) and (iii) are false

(C) (ii), (iii) and (iv) are false

(D)✓ Only (iv)

(E) Answer not known

116. In a queueing system, Little's law states that :

(A)✓ $L = \lambda \cdot W$ (B) $W = \lambda/L$

(C) $\lambda = L/W$ (D) $L = \lambda \cdot (1-W)$

(E) Answer not known

117. Customers arrive at a barber shop with an mean inter arrival time of 20 minutes. Customers spend an average of 15 minutes in the barber chain. What is the probability that a customer need not wait for a haircut?

(Hint : Use Little's formula)

(A) 0.75   (B) 0.50

(C)✓ 0.25   (D) 1

(E) Answer not known

118. Traffic intensity in a queueing system is indicated by

(A) Arrival rate / Service arrival rate

(B) Service rate / Arrival rate

(C) $\dfrac{\text{Arrival intensity}}{\text{Mean service} - \text{Arrival intensity}}$

(D)✓ $\dfrac{\text{Arrival intensity}}{\text{Mean service}}$

(E) Answer not known

119. A petrol pump station has 4 pumps. The service time follows an exponential distribution with a mean of 6 minutes and cars arrive for service in a poisson process at the rate of 30 cars per hour. Find out what percentage of time would the pumps be idle on an average?

(A) $1 - P(N \geq 4)$

(B) $P(N = 4)$

(C) $P(N \geq 4)$

(D) $1 - P(N \leq 4)$

(E) Answer not known

120. The ——————— is defined as the number of customers in the queueing system, the queue length is defined as the ——————— between the line length and the number of customers being served.

(A) Queue length; Exponential

(B) Line length; Sum

(C) Line length; Difference

(D) Line length; Multiply

(E) Answer not known

121. A centralized authentication server whose function is to authenticate users to servers and vice-versa is called

(A) Recursive resolvers

(B) Kerberos

(C) TLD server

(D) Authoritative server

(E) Answer not known

122. In Data Encryption standard, how many rounds involves for permutation and substitution functions?

(A) 8

(B) 16

(C) 32

(D) 64

(E) Answer not known

123. The security of Diffie-Hellman Key exchange protocol is based on the difficulty of ————————

(A) Factorization problem   (B) Subset-Sum problem

(C)✓ Discrete log problem   (D) Approximation problem

(E) Answer not known

124. A sending a packet to all destinations simultaneously is called as

(A) unicasting   (B) multicasting

(C) broadcasting   (D) routing

(E) Answer not known

125. The Transport layer is responsible for ————————

(A) node to node delivery of frame

(B) source to destination delivery of packet

(C)✓ source process to destination process delivery of message

(D) node to node delivery of bits

(E) Answer not known

126. Mention the number of bit occupied by header checksum in IPV4 header.

(A) 4 bits   (B) 8 bits

(C)✓ 16 bits   (D) 32 bits

(E) Answer not known

127. Consider 8 devices that are fully connected mesh network. How many total number of cable link need and the number of ports for each device?

(A) number of links = 28, number of port devices = 7

(B) number of links = 28, number of port devices = 8

(C) number of links = 32, number of port devices = 7

(D) number of links = 32, number of port devices = 8

(E) Answer not known

128. The following 190.241.178.35 is a ——————— IPV4 address.

(A) Class A   (B) Class B

(C) Class C   (D) Class D

(E) Answer not known

129. In the following, the correct sequence of BGP Message types are ———————

(A) Update, Open, Refresh, Notification, Keepalive

(B) Open, Update, Notification, Keepalive, Refresh

(C) Open, Notification, Refresh, Update, Keepalive

(D) Refresh, Notification, Keepalive, Open, Update

(E) Answer not known

130. DHCP stands for ———————

(A) Direct Host Configuration Protocol

(B) Datagram Host Configuration Protocol

(C) Dynamic Host Configuration Protocol

(D) Different Host Configuration Protocol

(E) Answer not known

131. Consider the following two statements and choose the correct option.

   S1 : HTTP supports proxy servers. The proxy server reduces the load on the original server, decreases traffic and improves latency.

   S2 : To use the proxy server, the client must be configured to access the proxy instead of the target server.

   (A)   S1 is true and S2 is false

   (B)   S1 is false and S2 is true

   (C) ✓ Both S1 and S2 are true

   (D)   Both S1 and S2 are false

   (E)   Answer not known

132. In HTTP, —————— server is a computer that keeps copies of responses to recent request.

   (A)   A regular   (B) ✓ A proxy

   (C)   An auxiliary   (D)   A remote

   (E)   Answer not known

133. The purpose of Soap in a web service is to —————.

   (A)   Tag and format the data

   (B) ✓ Transfer a message

   (C)   Describe the availability of a service

   (D)   None of the above

   (E)   Answer not known

134. ———————— protocol is used to download messages from the server in application layer.

(A) SMTP   (B) MIME

(C)✓POP3   (D) MTA

(E) Answer not known

135. The Fourth generation cellular phones uses a ————————

(A) Hardware defined radio

(B)✓Software defined radio

(C) Hardware and Software defined radio

(D) None of the choices are correct

(E) Answer not known

136. Which among the following is NOT a function of Transport Layer?

(A) Flow-Control

(B)✓Routing

(C) Congestion Control

(D) Process to process delivery

(E) Answer not known

137. The temporary address used by a mobile node while moving away from its home network

(A) Home Address   (B)✓Care of Address

(C) Foreign Address   (D) Co-located Address

(E) Answer not known

138. The UDP provides ————————— services in transport layer.

    (A) Connection oriented   (B) ✓ Connection less
    (C) Remote procedure call   (D) Connection link
    (E) Answer not known

139. Consider the following two statements and choose the correct option:

    S1 : A SYN segment carry data, but it consumes one sequence
         number

    S2 : A SYN + Ack segment cannot carry data, but it does consume
         one sequence number

    (A) S1 is true and S2 is false
    (B) ✓ S1 is False and S2 is true
    (C) Both S1 and S2 are true
    (D) Both S1 and S2 are false
    (E) Answer not known

140. If the sender decides not to include the check sum in the UDP
     header. What value is set for the checksum field?

    (A) ✓ A11 16 bits 0 (zero)
    (B) A11 16 bits 1 (one)
    (C) First Byte 0 Next byte 1
    (D) 0 and 1 in alternate bit position
    (E) Answer not known

141. Assertion [A] : Applets are not allowed to run programs on browser computer.

Reason [R] : Applets damage the files and spread viruses

(A) [A] is true but [R] is false

(B)✓ Both [A] and [R] are true; [R] is correct explanation of [A]

(C) Both [A] and [R] are true; [R] is not the correct explanation of [A]

(D) [A] is false, [R] is true

(E) Answer not known

142. The draw Arc () method in java.awt. Graphics class draws an arc conceived as part of

(A)✓ Oval bounded by rectangle specified by parameters x, y, w and h

(B) Polygon bounded by rectangle specified by parameter x, y, w and h

(C) Oval bounded by square specified by parameter x, y, w and h

(D) None of the above

(E) Answer not known

143. Which method is called only once during the run time of java applet?

(A) stop ()   (B) paint ()

(C)✓ init ()   (D) destroy ()

(E) Answer not known

144. A ——————— address is used when a computer already migrated to version 6 wants to send an address to a computer still using version 4.

(A) Compatible address

(B) ✓ Mapped address

(C) Global unicast address

(D) Special address

(E) Answer not known

145. A mouseout event occurs when

(A) The mouse cursor moves into an element

(B) ✓ The mouse cursor leaves the element

(C) The mouse button is clicked

(D) The mouse button is released

(E) Answer not known

146. What does the method get parameter () return if a parameter that is not included in an HTML file is retrieved?

(A) 0

(B) 1

(C) ✓ Null

(D) None of the above

(E) Answer not known

147. In 1990, HTML was initially developed by

(A) Marck Andreesen

(B) ✓ Tim Berners – Lee

(C) Eric Bina

(D) John Smith

(E) Answer not known

148. The ——————— frame can be used to create actual floating boxes to text on your page, filled with any content you want.

(A) Head
(B) Special
(C) Body
(D) Inline
(E) Answer not known

149. How are scripting languages typically executed in computer systems?

(A) They are compiled directly into machine code before execution

(B) ✓ They are interpreted at runtime by an interpreter or virtual machine

(C) They are optimized using Just In Time (JIT) Compilation

(D) They are executed using specialized hardware accelerators

(E) Answer not known

150. Which java script syntax is used to access the current browser window object in the Browser Object Model (BOM)?

(A) 'Document'
(B) ✓ 'Window'
(C) 'Navigator'
(D) 'History'
(E) Answer not known

151. Flutter can be used to develop application for

(A) iOS
(B) Android
(C) ✓ Both
(D) Windows
(E) Answer not known

152. In which MongoDB CRUD operation, the documents to be removed from the collection are specified by a Boolean condition on some of the fields in the collection documents?

(A) CREATE   (B) READ
(C) UPDATE   (D) DELETE
(E) Answer not known

153. The typical way of handling UI events can be implemented using a robust

(A) Handle Event () method
(B) Action Performed () method
(C) Window Activated () method
(D) Component Added () method
(E) Answer not known

154. Which among the following is not a type of layout for an applet?

(A) Flow Layout   (B) Grid Bag Layout
(C) Card Layout   (D) Position Layout
(E) Answer not known

155. The unique identifier that a web server assigns to a user for the duration of the current session is known as

(A) Token   (B) Session ID
(C) Passcode   (D) URL
(E) Answer not known

156. Write the output of following java code.

Class A extends Thread
{
    public   void   run()
    {
        for (int i=1; i<=5; i++)
        {
            system.out. print ln ("ln from thread: i="+)

        }   }
}
Class Thread Test
{
    public static void main (string argses)
    {
    (new A().run 1);
    }
}

(A) From Thread : i=1
     From Thread : i=2
     From Thread : i=3

(B) ✓ From Thread : i=1
     From Thread : i=2
     From Thread : i=3
     From Thread : i=4
     From Thread : i=5

(C) From Thread : i=5

(D) From Thread : i=1

(E) Answer not known

157. Consider the following two statements and choose the correct option for processing arrays.

S1 : All of the elements in an array of the same type. They are evenly processed in the same fashion by repeatedly using a loop

S2 : Printing arrays and finding the largest elements are some examples of processing arrays.

(A) S1 is true and S2 is false

(B) S1 is false and S2 is true

(C)✓ Both S1 and S2 are true

(D) Both S1 and S2 are false

(E) Answer not known

158. Identify the operator that has the highest precedence.

(A) && (AND)   (B) Binary addition (+)

(C)✓ – (unary minus)   (D) ! (NOT)

(E) Answer not known

159. ——————— method that returns positive (or) negative integer, depending on one string is equal to, greater than or less than another.

(A)✓ Compare to

(B) Equals

(C) Compare with

(D) None of the above

(E) Answer not known

160. A class is a

(i) Template for objects

(ii) Data type

(iii) Container for variables and methods

(iv) Instance of object

(A) (i) and (iii)

(B)✓ (i), (ii) and (iii)

(C) (i), (iii) and (iv)

(D) (i), (ii), (iii) and (iv)

(E) Answer not known

161. Match the following :

(a) Memory control signals   (1) IO bus to Address bus

(b) Address bus control   (2) Address bus to MAR
     signals

(c) Data bus control signals (3) Data bus to PC

(d) Program control signals   (4) ALU to data bus

	(a)	(b)	(c)	(d)
(A)	2	3	4	1
(B)	3	2	4	1
(C)✓	2	1	4	3
(D)	4	3	2	1

(E) Answer not known

162. A special hardware unit that keeps track of which parts of the virtual address space are in physical memory is known as

(A) CPU   (B) MMU

(C) DMA   (D) TLB

(E) Answer not known

163. A primary cache is always located on the

(A) External memory   (B) Processor chip

(C) Secondary memory   (D) RAM

(E) Answer not known

164. In a processor when it is impossible to implement pipelining without encountering the following one?

(A) Hazard   (B) Counter

(C) Branch   (D) Super scalar memory

(E) Answer not known

165. Select the following memory consists essentially of internal latches that store the binary information.

(a) Static RAM (SRAM)

(b) Dynamic RAM (DRAM)

(c) Read Only Memory (ROM)

(d) Programmable RAM (PRAM)

(A) Only (a)

(B) Only (b)

(C) Only (c)

(D) Only (d)

(E) Answer not known

166. The major security issue of RFID tag in IoT technology is

(A) Very tiny

(B) Offers simpler processing

(C) Uses short range RF transceivers

(D) ✓ Interacts with any reader and allows external monitoring

(E) Answer not known

167. Which among the following is not an example of cloud platform?

(A) Xively

(B) Nimbits

(C) Fog

(D) ✓ Gmail

(E) Answer not known

168. Arduino IDE is written in which language?

(A) Java

(B) Python

(C) ✓ C++

(D) PHP

(E) Answer not known

169. How many digital general purpose input/output pins are there in Arduino Uno?

(A) 6 pins

(B) 12 pins

(C) ✓ 14 pins

(D) 8 pins

(E) Answer not known

170. How many major communication models are used in IoT?

(A) 3

(B) ✓ 5

(C) 1

(D) 4

(E) Answer not known

171. The output of a Mealy machine depends on the

(A) Present state and a clock signal

(B)✓ Present state and the inputs to the machine

(C) State of the machine

(D) Input to the machine

(E) Answer not known

172. In a sequential circuit, consists of a combinational circuit to which memory elements are connected to form a

(A) Clock pulses   (B)✓ Feedback path

(C) Output   (D) State

(E) Answer not known

173. In what input condition makes the SR NOR latch into an indeterminate state? (Note: S and R inputs of the latch)

(A) S=0 ; R=0   (B) S=0 ; R=1

(C)✓ S=1 ; R=1   (D) S=1 ; R=0

(E) Answer not known

174. In full adder combinational circuit consists of three inputs and ————— outputs.

(A)✓ 2   (B) 4

(C) 1   (D) 3

(E) Answer not known

175. A —————— has n inputs lines with 2^n outputs.

(A) Encoder   (B) ✓Decoder

(C) Flipflop   (D) Adder

(E) Answer not known

176. How many Minterms are there in four-variable K-map?

(A) 32   (B) 8

(C) 64   (D) ✓16

(E) Answer not known

177. The binary equivalent of $43_{(10)}$ is given as

(A) ✓ $43_{(10)} = 101011_{(2)}$ (B) $43_{(10)} = 1111_{(2)}$

(C) $43_{(10)} = 11101_{(2)}$ (D) $43_{(10)} = 100111_{(2)}$

(E) Answer not known

178. Match the following four different binary codes for the decimal digits 6.

(a) BCD 8421 Code   (i) 1100

(b) BCD 2421 Code   (ii) 1010

(c) Excess-3 Code   (iii) 0110

(d) Decimal Code 8, 4, –2, –1   (iv) 1001

	(a)	(b)	(c)	(d)
(A)	(iii)	(iv)	(ii)	(i)
(B) ✓	(iii)	(i)	(iv)	(ii)
(C)	(iii)	(iv)	(i)	(ii)
(D)	(iii)	(i)	(ii)	(iv)

(E) Answer not known

179. Consider the following two statements and choose the correct option.

S1 : A Boolean function can be represented in a truth table.

S2 : The Number of rows in the truth table is 2^n. The binary combinations for the truth table are obtained from the binary number by counting from 0 through $2^n - 1$.

(A) S1 is true and S2 is false

(B) S1 is false and S2 is true

(C) ✓ Both S1 and S2 are true

(D) Both S1 and S2 are false

(E) Answer not known

180. Given the two binary numbers $X = 1010100$ and $Y = 1000011$. Perform the subtraction $X - Y$ by using 2's complements.

(A) ✓ 0010001

(B) 0001000

(C) 0001001

(D) 0101001

(E) Answer not known

181. FP – based estimation techniques require problem decomposition based on

(A) Information domain value

(B) Project Schedule

(C) ✓ Software Functions

(D) Process activities

(E) Answer not known

182. Match List I with List II

List I | List II
(a) End-user programmers | (i) Large Scale Systems
(b) Component integrators | (ii) Database queries
(c) System integrators | (iii) GUI builders
(d) Infrastructure developers | (iv) Domain - independent component

	(a)	(b)	(c)	(d)
(A)	(ii)	(iv)	(i)	(iii)
(B)	(ii)	(iii)	(iv)	(i)
(C)	(ii)	(iv)	(iii)	(i)
(D)	(ii)	(iii)	(i)	(iv)

(E) Answer not known

183. In Devops environment, Continuous Deployment (CD) can be implemented by using

(A) Package manager   (B) Feature flags

(C) Configuration manager   (D) CI server

(E) Answer not known

184. The SWOT analysis is used for

(A) risk identification   (B) risk assessment

(C) risk prevention   (D) risk analysis

(E) Answer not known

185. For which of the following threats to a project analysed by FMEA tool, the severity and Risk Priority Number (RPN) will be more?

(A) Tight schedule

(B)✓ Can't acquire tech knowledge

(C) Costs escalate

(D) Recession

(E) Answer not known

186. A software quality checkup after any changes are made is known as

(A) Unit Testing
(B)✓ Regression Testing
(C) Acceptance Testing
(D) Smoke Testing
(E) Answer not known

187. The objective of Testing is

(A) Debugging
(B)✓ To uncover errors
(C) To gain modularity
(D) To analyze system
(E) Answer not known

188. Which methodology is used to performed maintenance testing?

(A)✓ Breadth and depth test
(B) Confirmation testing
(C) Retesting
(D) Sanity testing
(E) Answer not known

189. Choose the right one for the Black Box testing:

(A) Testing done by understanding the internal structure of the software

(B) Testing that focuses on uncovering internal errors and flows

(C)✓ Testing where the internal workings of the software are not known to the tester

(D) Testing primarily focused on Simulating user Interactions

(E) Answer not known

190. A variation on beta testing is called as

(A) Alpha testing

(B) Security testing

(C) Performance testing

(D)✓ Customer acceptance testing

(E) Answer not known

191. The Basic COCOMO model estimates efforts based on

(A) Function Points

(B)✓ Lines of Code

(C) User stories

(D) Business requirements

(E) Answer not known

192. The software development model that avoids long term planning is

(A)✓ Agile model

(B) V – model

(C) Iterative model

(D) Spiral model

(E) Answer not known

193. The most important feature of spiral model is

    (A) Requirement Analysis   (B) Risk Management ✓

    (C) Quality Management   (D) Configuration Management

    (E) Answer not known

194. The compliers and Editors software come under the category of

    (A) ✓ System Software   (B) Application Software

    (C) Scientific Software   (D) None of the above

    (E) Answer not known

195. What is the purpose of the Petri Nets in classical analysis of software system?

    (A) To define use cases

    (B) ✓ To model concurrency and synchronization

    (C) To define user interface

    (D) To implement the data analysis

    (E) Answer not known

196. Design is the bridge between software ———— and an implementation.

    (A) Design   (B) Validation

    (C) Testing   (D) ✓ Requirements

    (E) Answer not known

197. Choose the odd one out regarding the roles of a component

    (A) Control   (B) Problem domain

    (C) ✓ Processing   (D) Infrastructure

    (E) Answer not known

198. To build an effective user Interface, all design should begin with an understanding of

(A) Clear idea   (B) Detailed design

(C) Data Identification   (D) ✓ User

(E) Answer not known

199. The diagram that includes all input, process and output is known as

(A) System diagram   (B) Class diagram

(C) ✓ Data flow diagram   (D) None of the above

(E) Answer not known

200. The coupling between modules ranked on scale of strongest to weakest is categorized as follows :

(i)   Content Coupling

(ii)   Common Coupling

(iii) Control Coupling

(iv)   Data Coupling

(v)   Stamp Coupling

(A)   (i), (ii), (iii), (iv), (v)

(B)   (v), (iv), (iii), (ii), (i)

(C)   (i), (iii), (v), (ii), (iv)

(D) ✓ (i), (ii), (iii), (v), (iv)

(E)   Answer not known