SECTION I [APPLIED SCIENCE (COMPUTER APPLICATIONS)]

1. If A is a finite set containing 3 different elements, then the number of relations on A is equal to
    A) 6
    B) 9
    C) 256
    D) 512

2. How many numbers must be selected from the set {1, 2, 3, 4, 5, 6} to guarantee that at least one pair of these numbers add up to 7?
    A) 4
    B) 5
    C) 9
    D) 14

3. What is the maximum number of edges in a bipartite graph having 12 vertices?
    A) 24
    B) 38
    C) 36
    D) 32

4. The graph in which, there is a closed trail which includes every edge of the graph is known as?
    A) Hamiltonian graph
    B) Euler graph
    C) Directed graph
    D) Planar graph

5. An assignment problem is a special case of transportation problem in which number of origins is
    A) Equal to the number of destinations
    B) Greater than number of destinations
    C) Less than number of destinations
    D) None of the above

6. The decimal value 0.25 is equivalent to binary
    A) 0.1
    B) 0.01
    C) 0.00111
    D) 0.11

7. Which of the following is called the Universal logic gate?
    A) AND
    B) NOT
    C) OR
    D) NAND

8. In computers, subtraction is generally carried out by:
    A) 1's complement
    B) 2's complement
    C) 9's complement
    D) 10's complement

9.   Which of the following is lowest in memory hierarchy?
        A) RAM
        B) Cache memory
        C) Secondary memory
        D) Registers

10.   Cache memory works on the principle of:
        A) Locality of reference
        B) Locality of data
        C) Locality of memory
        D) Locality of reference & memory

11.   When we pass an array as an argument to a function in C, what actually gets passed?
        A) Address of the array
        B) Values of the elements of the array
        C) Base address of the array
        D) Number of elements of the array

12.   A mechanism that binds together code and data it manipulates, and keeps both safe from outside interference and misuse, is called:
        A) Abstraction
        B) Polymorphism
        C) Inheritance
        D) Encapsulation

13.   A friend function can be used to:
        A) avoid arguments between classes
        B) allow access to classes whose source code is unavailable
        C) allow one class to access an unrelated class
        D) increases the versatility of an overload operator

14.   In graphical system, the array of pixels in the picture are stored in
        A) Memory
        B) Frame buffer
        C) Processor
        D) Cathode

15.   The process of positioning an object along a straight line path from one coordinate point to another is called:
        A) Reflection
        B) Shearing
        C) Transformation
        D) Translation

16.   Which one of the following is a direct benefit of database normalization?
        A) Reduced data redundancy
        B) Higher query processing efficiency
        C) Smaller number of tables
        D) Reduced I/O for most queries

17. Given the basic ER and relational models, which of the following is INCORRECT?
    A) An attribute of an entity can have more than one value
    B) In a row of a relational table, an attribute can have more than one value
    C) An attribute of an entity can be composite
    D) In a row of a relational table, an attribute can have exactly one value or a NULL value

18. The process of constructing a mathematical model or function that can be used to predict or determine one variable by another variable is called:
    A) Residual
    B) Correlation
    C) Regression
    D) Clustering

19. The cost parameter in the SVM means:
    A) The number of cross-validations to be made
    B) The kernel to be used
    C) The tradeoff between misclassification and simplicity of the model
    D) None of the above

20. Which of the following will be true about k in k-NN in terms of Bias?
    A) When you increase the k, the bias will increase
    B) When you decrease the k, the bias will increase
    C) Value of k has no effect on the bias
    D) None of these

21. Which of the following is NOT true of deadlock prevention and deadlock avoidance schemes?
    A) In deadlock prevention, the request for resources is always granted if the resulting state is safe
    B) In deadlock avoidance, the request for resources is always granted if the resulting state is safe
    C) Deadlock avoidance is less restrictive than deadlock prevention
    D) Deadlock avoidance requires knowledge of resource requirements a priori

22. Thrashing
    A) Reduces page I/O
    B) Decreases the degree of multiprogramming
    C) Implies excessive page I/O
    D) Improves the system performance

23. Which scheduling policy is most suitable for time-shared operating systems?
    A) Shortest Job First
    B) Round Robin
    C) First Come First Serve
    D) Priority scheduling

24. Which page replacement policy sometimes leads to more page faults when size of memory is increased?
    A) Optimal
    B) LRU
    C) FIFO
    D) None of these

25. A critical section is a program segment
    A) which should run in certain specified amount of time
    B) which avoids deadlocks
    C) which must be enclosed by a pair of semaphore operations, P and V
    D) where shared resources are accessed

26. Which one of the following is NOT a risk management technique for managing the risk due to unrealistic schedules and budgets?
    A) Information hiding
    B) Design cost
    C) Incremental development
    D) Detailed multi source cost and schedule estimation

27. In function point analysis, the number of complexity adjustment factors is
    A) 10
    B) 12
    C) 14
    D) 20

28. Regression testing is primarily related to
    A) Functional testing
    B) Development testing
    C) Data flow testing
    D) Maintenance testing

29. Which is NOT a software life cycle model?
    A) Waterfall Model
    B) Capability Maturity Model
    C) Spiral Model
    D) Prototype Model

30. A sorting technique is called stable if
    A) it takes O (n log n) time
    B) it maintains the relative order of occurrence of non-distinct elements
    C) it uses divide and conquer paradigm
    D) it takes O (n) space

31. Binary Search tree is a
    A) tree whose right and left sub-tree has value less than root
    B) tree whose right and left sub-tree has value more than root
    C) tree whose left sub-tree has value less than root and right sub-tree has value more than root
    D) All of the above

32. A binary tree T has n leaf nodes. The number of nodes of degree 2 in T is
    A) $\log_2 n$
    B) n
    C) 2^n
    D) n – 1

33. Kruskal's algorithm for finding a minimum spanning tree of a weighted graph G with n vertices and m edges has the time complexity of
    A) $O(m \log n)$
    B) $O(n^2)$
    C) $O(mn)$
    D) $O(m + n)$

34. Dynamic programming approach is used when
    A) We need an optimal solution
    B) The solution has optimal substructure
    C) The given problem can be reduced to the 3-SAT problem
    D) It is faster than Greedy algorithms

35. Which of the following is NOT a backtracking algorithm?
    A) Knight tour problem
    B) N queen problem
    C) Tower of Hanoi
    D) M coloring problem

36. Let X be a problem that belongs to the class NP. Then which one of the following is TRUE?
    A) There is no polynomial time algorithm for X
    B) If X can be solved deterministically in polynomial time, then $P = NP$
    C) If X is NP-hard, then it is NP-complete
    D) X may be undecidable

37. Which of the following statements about regular languages is NOT true?
    A) Every language has a regular superset
    B) Every language has a regular subset
    C) Every subset of a finite language is regular
    D) Every subset of a regular language is regular

38. Context free languages are closed under
    A) Union, intersection
    B) Union, kleene closure
    C) Intersection, complement
    D) Complement, kleene closure

39. In a compiler, keywords of a language are recognized during
    A) Parsing of the program
    B) The code generation
    C) The lexical analysis of the program
    D) Dataflow analysis

40. Which one of the following is NOT performed during compilation?
    A) Dynamic memory allocation
    B) Type checking
    C) Symbol table management
    D) Inline expansion

41.   Infrared signals can be used for short range communication in a closed area using _____
       propagation
       A) Ground
       B) Sky
       C) Line of sight
       D) Space

42.   Google Drive is an example of _____ cloud computing.
       A) Private
       B) Personal
       C) Public
       D) Special

43.   Which of the following layer of OSI Reference model is also called end-to-end layer?
       A) Network layer
       B) Data layer
       C) Session layer
       D) Transport layer

44.   A TCP segment consists of a fixed header of_____ bytes.
       A) 10
       B) 20
       C) 40
       D) 64

45.   What is state space?
       A) Representing your problem with variable and parameter
       B) A space where you know the solution
       C) Your definition to a problem
       D) The whole problem

46.   Which search is equal to minimax search but eliminates the branches that cannot influence the final
       decision?
       A) Depth-first search
       B) Breadth-first search
       C) Alpha-beta pruning
       D) Hill-climbing search

47.   A perceptron is
       A) an auto-associative neural network
       B) a double layer auto-associative neural network
       C) a neural network that contains feedback
       D) a single layer feed-forward neural network

48.   Which is NOT a property of representation of knowledge?
       A) Representational adequacy
       B) Representational verification
       C) Inferential adequacy
       D) Inferential efficiency

49.   In which of the following learning the teacher returns reward and punishment to learner?
        A) Supervised learning
        B) Unsupervised learning
        C) Reinforcement learning
        D) Active learning

50.   What was originally called the "imitation game" by its creator?
        A) The Turing Test
        B) LISP
        C) The Logic Theorist
        D) Cybernetics

SECTION II (RESEARCH METHODOLOGY)

51. Research is
   A) Producing available knowledge again and again
   B) Finding solution to any problem
   C) Working in a scientific way to search for truth of any problem.
   D) None of the above

52. Computed measure of how much scores vary around the mean score.
   A) range
   B) standard deviation
   C) normal curve
   D) skewed distribution

53. Which of the following statements is true?
   A) The mean is a continuous variable.
   B) The variance and standard deviation of a normal population are equal.
   C) For large samples, the distribution of scores is approximately normal.
   D) None of the above

54. Taking someone else's words or ideas and taking credit for them as your own.
   A) cite
   B) plagiarism
   C) paraphrase
   D) credit

55. What steps are involved in a central tendency test?
   A) Addition, subtraction, and division.
   B) Determination of mean, median, and mode.
   C) Addition, subtraction, multiplication, and division.
   D) None of the above

56. Random sampling is also called _____.
   A) Availability sampling
   B) Probation sampling
   C) Probability sampling
   D) Prospect sampling

57. What is the Median of the following data sample?
   2, 7, 4, 8, 9, 10, 6, 12, 13
   A) 8
   B) 11
   C) 9
   D) 10

58. Which of the following statements is CORRECT?
   A) Research is a hurried activity.
   B) Research starts with a problem and ends with a problem.
   C) Research is not a contributing factor of progress.
   D) Research is an investigation where you look for answers that are already there.
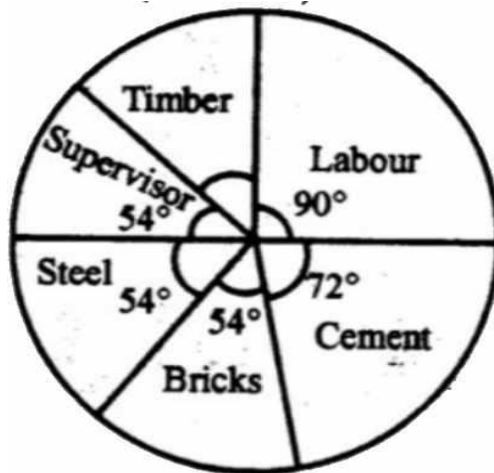
59. Which of the following has same mean median and mode?
   A) 6,5,2,4,3,4,1
   B) 4,2,2,1,3,2,3
   C) 2,3,7,3,8,3,2
   D) 4,3,4,3,4,6,4

60. Resource libraries, economic census, trade shows & associations would be examples of what kind of data sources?
   A) Tertiary
   B) Secondary
   C) Primary
   D) Unprofessional

61. The purpose of correlation research is to:
   A) study the relationship between two or more than two variables
   B) predict the criterion variable on the basis of predictor variable
   C) Both (1) and (ii)
   D) Neither (i) Nor(ii)

62. It is sometimes called "central location" or just "center". It is a way to describe what's typical for a set of data. It is called.
   A) Middle destination
   B) Center fold
   C) Central Tendency
   D) Mid frequency

63. Which is NOT a step of the scientific method?
   A) Hypothesis
   B) Analyse data
   C) Count items
   D) Report Findings

64. In order to pursue the research, which of the following is priorly required?
   A) Developing a research design
   B) Formulating a research question
   C) Deciding about the data analysis procedure
   D) Formulating a research hypothesis

65. Every person in the population has an equal chance of being selected -which sampling method
   A) Systematic sampling
   B) Quota sampling
   C) Volunteer sampling
   D) Random sampling

66. When a distribution of scores is skewed, which of the following is the most representative measure of central tendency?
    A) Inference
    B) Standard deviation
    C) Mean
    D) Median

67. An even spread of a variable that is symmetrical about the mean median and mode.
    A) bar graph
    B) histogram
    C) scatter graph
    D) normal distribution

68. A diagram with rectangles showing values or numbers.
    A) Pictogram
    B) Pie chart
    C) Bar chart
    D) Line graph

69. Type of research that solve practical issues is;
    A) Fundamental research
    B) Exploratory research
    C) Applied research.
    D) Empirical research

70. What should not be included in the conclusion?
    A) literature review
    B) summary
    C) implication
    D) major findings

71. A variable that is being manipulated is____
    A) Independent variable
    B) dependent variable
    C) confounding variable
    D) extraneous variable

72. What is qualitative research?
    A) Observation and description of activities, situations, attitudes, or behaviors of a specific group of people.
    B) Analysis of numerical data.
    C) Numerical comparisons and statistical inferences.
    D) None of above

73. A standard deviation can never be
    A) positive
    B) negative
    C) zero
    D) None

74. The sample standard deviation is denoted by:
   A) s
   B) p
   C) Σ
   D) σ

75. First step of an investigation is _____ .
   A) collection of data.
   B) presentation of data.
   C) analysis of data.
   D) explanation of data.

76. The sum of absolute deviations about median is _____.
   A) the least
   B) the greatest
   C) zero
   D) equal

77. When the value of r=0, it is said to be _____.
   A) no correlation.
   B) positive.
   C) perfect positive.
   D) perfect negative.

78. The straight-line trend is represented by the equation _____.
   A) y=a+bx
   B) y=mx
   C) y=ax/ay
   D) y=a*bx

79. In discrete and continuous frequency distributions N= ___ .
   A) the sum of frequency.
   B) number of observations.
   C) minimum value.
   D) maximum value.

80. _____ is used to compare the variability of two or more than two series.
   A) Mean.
   B) Standard deviation.
   C) Coefficient of variation.
   D) Mean deviation.

81. The simplest device for ascertaining whether two variables are related is to prepare a dot chart is called_____ .
   A) graphical method.
   B) scatter diagram method.
   C) method of least square.
   D) concurrent deviation method.

82. A bag contains 10 black and 20 white balls; a ball is drawn at random. What is the probability that it is black?
   A) 1/2
   B) 1/3
   C) 0
   D) 3

83. Diagrams are for _____
   A) the use of exports.
   B) better quantitative picture.
   C) better mental appeal
   D) the use of imports.

84. Which of the following is not a type of research design?
   A) Experimental design
   B) Descriptive design
   C) Correlational design
   D) Probability design

85. What is a research hypothesis?
   A) A tentative explanation for a phenomenon
   B) A statement that is proven to be true
   C) A prediction of what the researcher expects to find
   D) A statement of fact

86. What is the purpose of a pilot study?
   A) To test the feasibility of the research design
   B) To test the reliability and validity of the measures
   C) To determine the appropriate sample size
   D) To collect preliminary data

87. In five One-Day Internationals, a batsman has scored 31,97,112, 63, and 12 runs. the quality deviation of the info is-
   A) 21.78
   B) 23.79
   C) 25.79
   D) 26.77

88. Determine the mode of the decision received seven days in a row: 11,13,13,17,19,23,25
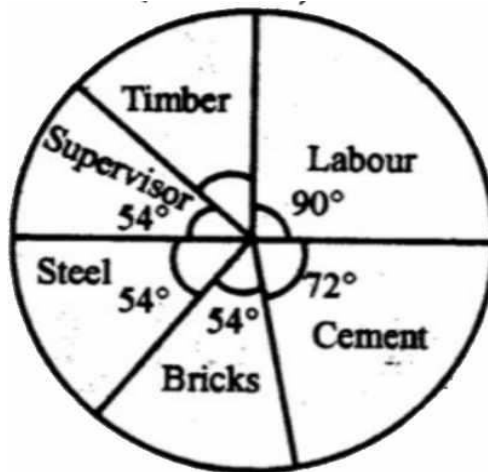   A) 11
   B) 13
   C) 17
   D) 23

89. The following pie chart comprises the cost of constructing one house. The total cost was Rs. 6 lakhs

The amount spent on cement is

    A) Rs.2,00,000
    B) Rs.1,60,000
    C) Rs.1,20,000
    D) Rs.1,00,000

90. Referring to chart below,

the amount spent on cement, steel and supervision is what percent of the total cost of construction?

    A) 40%
    B) 45%
    C) 50%
    D) 55%

91. Table shows the mobile phones sold on different days by different sellers. Read the table carefully and answer the questions.

Mobiles Phones Sellers	Day						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
P	40	45	48	28	50	24	20
Q	90	92	27	12	16	98	26
R	80	36	30	13	28	62	47
S	60	46	12	64	52	34	76
T	48	18	58	69	70	10	15

Find the difference of mobile phones sold by P and R together on Monday to the mobile phones sold by S and T on Wednesday.

A) 60
B) 50
C) 80
D) 20

92. Referring to above table, Find the ratio of mobile phones sold by Q on Tuesday and Saturday together to the mobile phones sold by R on Thursday and Sunday together.

A) 7 : 19
B) 19 : 5
C) 19 : 6
D) 2 : 5

93. The frequency distribution of a numerical data can be graphically represented by a _____
A) Histogram
B) Telegram
C) Monogram
D) Anagram

94. Which one of the following is not the graphical representation of statistical data:
A) Bar graph
B) Histogram
C) Frequency polygon
D) Cumulative frequency distribution

95. In a histogram, each class rectangle is constructed with base as
A) frequency
B) class-intervals
C) range
D) size of the class

96. What does the command \documentclass{article} do in LaTeX?
   A) It sets the document class as an article
   B) It creates a new section in the document
   C) It sets the font style of the document
   D) It creates a new document

97. What does the command \begin{center} do in LaTeX?
   A) It creates a new center-aligned section.
   B) It sets the font size to center aligned.
   C) It creates a new paragraph.
   D) It centers the text or content.

98. Which of the following procedures would not be included in a programme of qualitative research?
   A) Assessment of effect size.
   B) Development of appropriate research questions.
   C) Clarification of the logic linking the data to research propositions.
   D) Explanation of criteria for data interpretation.

99. What is the most common method of data collection in quantitative research?
   A) Interviews
   B) Focus groups
   C) Observation
   D) Surveys/questionnaires

100. Which statistical test is used to determine if there is a significant difference between the means of two or more groups in quantitative research?
   A) t-test
   B) ANOVA (Analysis of Variance)
   C) Chi-square test
   D) Regression analysis