[Time: 3 Hours]   **[Marks:100]**

Please check whether you have got the right question paper.

N.B: 1.   **Section I contains 40 Multiple Choice Questions. Attempt all. Each question carries 1 mark.**

2.   **Section II contains FIVE Questions. Attempt any THREE. Each question carries 10 mark.**

3.   **Section III contains THREE questions. Attempt any TWO. Each question carries 15 mark.**

1.   Which of the following is true about McCulloch – Pitts model of a neural network:
     A). Introduced model of a neuron
     B). Introduced logic operators in a neural network
     C). Both of these
     D). None of these

2.   Synthesized attributes can easily be simulated by a
     A).LL grammar
     B) Ambiguous Grammar
     C). LR Grammar
     D) None of the above

3.   What is DFT of x(n)={1,0,1,0}?
     A). X(k)={2,0,2,0}
     B). X(k)={1,0,1,0}
     C). X(k)={2,0,1,0}
     D). None of the above

4.   Consider a scenario where two simulation models of a complex system are constructed by two different competent individuals. What can be the best possible outcome?
     A)   Two models will exactly be the same
     B)   Two models will have similarities but unlikely to be the same
     C)   Two models will not have any similarity but will correctly model the system
     D)   None of these above

5.   The vertex coloring algorithm is
     A)   Dynamic programming algorithm
     B)   Backtracking algorithm
     C)   Greedy algorithm
     D)   Genetic algorithm

6.   The radius of micro cells is in the range of
     A)   20-22 km
     B)   B) 0.1-1km
     C)   C)0.5 - 1 km
     D)   D)10-20km

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7. Which of the following is a knowledge representation technique in artificial intelligence
   A) Semantic Network
   B) Neural Network
   C) Both of these
   D) None of these

8. Choose the correct statement.
   A) Sentence of a grammar is a sentential form without any terminals
   B) Sentence of a grammar should be derivable from the start state.
   C) Sentence of a grammar should be frontier of a deviation tree, in which the root node has the start state as the label.
   D) All of the above.

9. Travelling salesman problem is one of type
   A) NP Complete
   B)NP hard
   C)Nondeterministic polynomial
   D) Cannot decide the complexity

10. The response of an FIR filter with impulse response h(n)={1,2,4} to the input sequence x(n)={1,2} is given by
    A)Y(n)={1,4,8,8}
    B) y(n)={1,4,6,6}
    C) y(n)={1,2,8,8}
    D) None of these

11. Every relational algebra query can be written as a stratified Datalog program. The statement is
    A) True
    B) False
    C) May be True
    D) Can't say

12. In order to add a new contact to the address list in a mobile phone an appropriate algorithm is
    A) Selection sort
    B) B) Bubble sort
    C) C)Insertion sort
    D) D)Merge sort

13. Example of similarity approach in image segmentation is
    A) Edged based segmentation
    B) Boundary based segmentation
    C) Region based segmentation
    D) Both A) and B)

14. If timestamps of two events are same, then the events are
    A) Concurrent
    B) Non-concurrent

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C) Monotonic

D) Non-monotonic

15. A random number generator in C language generates
    A) Same sequence of random numbers when the same seed is used
    B) Different sequence of random numbers when the same seed is used
    C) True random numbers
    D) Random integers rather than floating numbers.

16. P, Q, R are non-terminals, and r, s, t are terminals, which of the following grammar rules violate the requirement of an operator grammar?
    i.   P->QR
    ii.   P->QsR
    iii.   P->λ
    iv.   P->QtRr
    A) (i)only
    B) (i)and (iii)only
    C) (ii)and (iii)only
    D) (iii)and (iv)only

17. Fuzzy systems follow
    A) Rule based approach
    B) Principle based approach
    C) Both Rule and Principle based approach
    D) Neither Rule nor Principle based approach

18. Phase factors in DSP is given by the formula
    A) $W = e^{-j(2\pi/N)}$
    B) B) $W = e^{j(2\pi/N)}$
    C) C) $W = e^{j(2/N)}$
    D) None of these.

19. In Object oriented data base, reference and structure types are
    A) Same
    B) Different
    C) Either A) or B)
    D) Cannot say

20. Consider following statements.
    1. Wavelength is related to power
    2. Wavelength is related with height of antenna
    3. Wavelength is equal to the ratio of distance power
    4. Wavelength of the signal does not matter

    Which of these statements are correct with respect to modulation?
    A)1 and 4
    B) 2 and 4

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C) 2 alone

D) 3 alone

21. Replication transparency
    A) Enables concealment of faults
    B) Allows movement of resources
    C) Enables multiple instances of resources
    D) Allows system and applications to expand

22. The quantifiers compulsorily required to represent the sentence 'no one person is great' in predicate calculus are
    A) Only Universal quantifier
    B) Only existential quantifier
    C) No quantifier is required
    D) Both existential and Universal quantifier

23. Which of the following symbol table implementation is based on the property of locality of reference?
    A) Harsh Table
    B) Search Tree
    C) Self Organizing List
    D) Linear List

24. In decision tree, a root must have
    A) Maximum information gain
    B) Minimum information gain
    C) Average information gain
    D) None of above

25. If replications of a relation in a database increase, then the cost
    A) Increase
    B) Decrease
    C) Remains the same
    D) Cannot say

26. Consider the grammar S-> ABSC|ABC BA->AB Bb-> bb Ab->ab Aa-> aa. Which of the following sentences can be derived by this grammar?
    A) abc
    B) aab
    C) abcc
    D) abbc

27. The purpose of mutation in genetic algorithm is to maintain
    A) Uniformity
    B) Diversity
    C) Homogeneity
    D) Heterogeneity

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28. The mask that is used in line detection is
    A) Gaussian
    B) Laplacian
    C) Ideal
    D) Butterworth

29. In distributed systems, election algorithms assumes that
    A) A unique priority number is associated with each active process in system
    B) There is no priority number associated with any process
    C) Priority of the processes is not required
    D) None of these

30. For the expression grammar
    E->E*FIF+EIF
    F->F-I id
    The statement , which holds true, is –
    A) + and – have same precedence
    B) Precedence of * is higher +
    C) Precedence of – is higher*
    D) Precedence of + is higher*

31. In practice, the zero-valued samples inserted by the up-sampler are replaced with appropriate nonzero values using some type of filtering process. Process is called_
    A) Interpolation
    B) Decimation
    C) Both A) and B)
    D) None of these

32. The most effective and powerful schema in a genetic algorithm with a population of strings of length 4 is_
    A) 1 bit schema
    B) 2 bit schema
    C) 3 bit schema
    D) 4 bit schema

33. Embedded middleware sits between_
    A) Embedded application and operating system
    B) Kernel and real time operating system
    C) Embedded application and real time operating system
    D) Kernel and real time operating system

34. CART algorithm uses
    A) Entropy
    B) Gini index
    C) Gini ratio
    D) None of these

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35. A DSP convolves each discrete sample with coefficients given by -0.25, -0.25, 1.0, -0.25 and -0.25. This must be a_____
   A) Low-pass filter
   B) High-pass filter
   C) Band-pass filter
   D) Band-stop filter
36. The best way to organize patient records in a hospital is_
   A) Red and Black trees
   B) Stack
   C) Threaded trees
   D) Slay trees
37. The process of assigning load addresses to the various parts of the program and adjusting the code and data in the program to reflect the assigned addresses is called_
   A) Assembly
   B) Parsing
   C) Relocation
   D) Symbol resolution

38. The GSA cellular mobile standard has following 'access type' and spacing between channel_
   A) FDMA, 55 MHz
   B) TDMA, 25 MHz
   C) FDMA, 25 MHz
   D) None of thees
39. Replication transparency
   A) Enables concealment of faults
   B) Allows movement of resources
   C) Enables multiple instances of resources
   D) Allows system and applications to expand

40. Support of an association rule{B,D}⇒{A} means
   A) Percentage of tuples that contains {B,D}
   B) Percentage of tuples that contains {A,B,D}
   C) Percentage of tuples that contains {A}
   D) None of these

SECTION-II
1. Remove left recursion from the following grammar and build the predictive parsing table
S?(L)?a
L?(L,S)?S

2. The duration of calls in minutes over a telephone line is
   2.058, 6.407, 0.565, 0.641, 5.989, 0.435, 0.278,
   3,447,11.461, 1.658, 2.913, 2.689, 4.747, 2.587
   Develop an input model for the call duration data.
   (You may assume additional data, if required)

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[P.T.O]

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3. Discuss various difficulties faced in code migration in distributed computing. What are the solutions to overcome these problems? Briefly explain.

4. Both 2G and 3G systems can transfer data. Compare these approaches with DAB / DVB and list reasons for and against the use of DAB / DVB.

5. Following is the fact-less fact table for a store chain application:

    Transaction(date_key, product_key, sales_key, store_key, grossProfit)

Draw a cube containing entities with four dimensions and locate dimension tables. Depict the relation between fact-less fact table and dimension tables using star schema.

SECTION-III

1. The daily expenditures on food (X_1) and clothing (X_2) of five persons are shown below:

Person	X_1	X_2
A	2	4
B	8	2
C	9	1
D	1	5
E	8.5	1

Use AGNES single linkage method to cluster the above data and compare with dendrogram.

2. Discuss implementation of cascade FIR filter with three arithmetic elements (AEs).

3. State one real world problem which can be solved using Fuzzy systems but not with Neural networks. Explain the features of the proposed methodology. Explain why the problem cannot be solved using neural networks.

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