COMPUTER SCIENCE AND APPLICATIONS

Name & Signature of the Invigilator

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PAPER-II
DEC-19/19

OMR Answer Sheet No. : | | | | | |

Roll No. : | | | | | |

(in figures as in Hall Ticket)

Roll Number in words : .....

.....

Time : 2 Hours] **No. of Printed Pages : 28** **[Maximum Marks : 200**

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of **one hundred (100)** multiple choice type of questions. **All** questions are compulsory.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (*i*) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker seal and do not accept an open booklet.
   (*ii*) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
   (*iii*) After this verification is over, the Test Booklet Number should be entered on the OMR Answer Sheet and the OMR Answer Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.

   Example : (A) ● (C) (D) where (B) is the correct response.
5. Your responses to the items are to be indicated on the OMR Answer Sheet under Paper – II only. If you mark your response at any place other than in the oval in the OMR Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the original OMR Answer Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet and duplicate copy of OMR Answer Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or any electronic devices or log table etc., are prohibited.
12. There shall be no negative marking.
13. In case of any discrepancy in the English and Gujarati versions of questions, English version will be taken as final.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

1. આ પાનાની ટોચ પર દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.
2. આ પ્રશ્નપત્રમાં બહુવૈકલ્પિક ઉત્તરો ધરાવતા **સો (૧૦૦)** પ્રશ્નો આપેલા છે. **બધા** જ પ્રશ્નો ફરજિયાત છે.
3. પરીક્ષાની શરૂઆતમાં આપને પ્રશ્નપુસ્તિકા આપવામાં આવશે. પ્રથમ પાંચ (૫) મિનિટ દરમ્યાન તમારે પ્રશ્નપુસ્તિકા ખોલી અને ફરજિયાતપણે નીચે મુજબ પરીક્ષણ કરવું :
   (*i*) પ્રશ્નપુસ્તિકાનો વપરાશ કરવા માટે આ કવર પૃષ્ઠની ધાર પર આપેલ સીલ સ્ટીકર ફાડી નાખો. કોઈપણ સંજોગોમાં સીલ સ્ટીકર વગરની કે ખુલ્લી પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં.
   (*ii*) કવર પૃષ્ઠ પર છપાયેલ નિર્દેશાનુસાર પ્રશ્નપુસ્તિકાના પ્રશ્નો, પૃષ્ઠો અને સંખ્યાને બરાબર ચકાસી લો. ખામીયુક્ત પ્રશ્નપુસ્તિકા કે જેમાં પ્રશ્નો/પૃષ્ઠો ઓછાં હોય, બે વાર છપાયા હોય, અનુક્રમમાં અથવા અન્ય કોઈ ફરક હોય અર્થાત કોઈપણ સંજોગોમાં ખામીયુક્ત પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં. અને જો ખામીયુક્ત પ્રશ્નપુસ્તિકા મળી હોય તો નિરીક્ષક પાસેથી તુરંત જ બીજી સારી પ્રશ્નપુસ્તિકા મેળવી લેવી. આ માટે ઉમેદવારને પાંચ (૫) મિનિટનો સમયગાળો આપવામાં આવશે. પછીથી, પ્રશ્નપુસ્તિકા બદલવામાં આવશે નહીં કે કોઈ વધારાનો સમયગાળો આપવામાં આવશે નહીં.
   (*iii*) આ ચકાસણી સમાપ્ત થાય પછી, પ્રશ્નપુસ્તિકાનો નંબર OMR જવાબ પત્રક પર લખવો અને OMR જવાબ પત્રકનો નંબર પ્રશ્નપુસ્તિકા પર લખવો.
4. પ્રત્યેક પ્રશ્ન માટે ચાર જવાબ વિકલ્પ (A), (B), (C) અને (D) આપવામાં આવેલ છે. તમારે સાચા જવાબના ઓવલ (oval) ને નીચે આપેલ ઉદાહરણ મુજબ પેનથી ભરીને સંપૂર્ણ કાળું કરવાનું રહેશે.

   ઉદાહરણ : (A) ● (C) (D) કે જ્યાં (B) સાચો જવાબ છે.
5. આ પ્રશ્નપુસ્તિકાના પ્રશ્નો ના જવાબ અલગથી આપવામાં આવેલ OMR જવાબ પત્રકમાં પેપર–II લખેલ વિભાગમાં જ અંકિત કરવા. જો આપ OMR જવાબ પત્રકમાં આપેલ ઓવલ (oval) સિવાય અન્ય સ્થાને જવાબ અંકિત કરશો તો તે જવાબનું મૂલ્યાંકન કરવામાં આવશે નહીં
6. અંદર આપેલ સૂચનાઓ ધ્યાનપૂર્વક વાંચો.
7. કાચું કામ (Rough Work) પ્રશ્નપુસ્તિકાના અન્તિમ પૃષ્ઠ પર કરવું.
8. જો આપ OMR જવાબ પત્રક નિયત જગ્યા સિવાય અન્ય કોઈપણ સ્થાને, આપનું નામ, રોલ નંબર, ફોન નંબર અથવા એવું કોઈ ચિહ્નકે જેનાથી તમારી ઓળખ થઈ શકે, અંકિત કરશો અથવા અભદ્ર ભાષાનો પ્રયોગ કરો, અથવા અન્ય કોઈ અનુચિત સાધનોનો ઉપયોગ કરો, જેમ કે અંકિત કરી દીધેલ જવાબ ભૂંસી નાખવો કે સફેદ શાહીનો ઉપયોગ કરી બદલશો તો આપને પરીક્ષા માટે અયોગ્ય જાહેર થઈ શકો છો.
9. પરીક્ષા સમય પૂરો થઈ ગયા બાદ ઓરીજીનલ OMR જવાબ પત્રક જે તે નિરીક્ષકને ફરજિયાત સોંપી દેવું અને કોઈ પણ સંજોગોમાં તે પરીક્ષાખંડની બહાર લઈ જવું નહીં. પરીક્ષા પૂર્ણ થયા બાદ ઉમેદવાર ઓરીજીનલ પ્રશ્નપુસ્તિકા અને OMR જવાબ પત્રકની ડુપ્લિકેટ કોપી પોતાની સાથે લઈ જઈ શકે છે.
10. માત્ર કાળી/ભૂરી બોલ પોઈન્ટ પેન વાપરવી.
11. કેલ્કયુલેટર, લોગ ટેબલ અને અન્ય ઈલેકટ્રોનિક યંત્રોનો ઉપયોગ કરવાની મનાઈ છે.
12. ખોટા જવાબ માટે નકારાત્મક ગુણાંકન પ્રથા નથી.
13. પ્રશ્નપુસ્તિકાના કોઈ પ્રશ્નમાં અનુવાદ અંગે કોઈ વિવાદ/મતભેદ જણાય તો અંગ્રેજી વર્ઝન યોગ્ય ગણાશે.

COMPUTER SCIENCE AND APPLICATIONS

PAPER-II

Note : This paper contains **One Hundred (100)** multiple-choice, matching questions, each question carrying **TWO (2)** marks. Attempt **All** the questions.

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1. If P and Q are two propositional variables, which of the following is *not* a tautology ?

   (A) $P \Rightarrow (P \wedge Q)$ (B) $P \Rightarrow (P \vee Q)$

   (C) $(P \wedge Q) \Rightarrow P$ (D) $(P \wedge Q) \Rightarrow (P \vee Q)$

2. Consider the Universe to be the set of natural numbers and let the predicate E(x) denote "x is even " and the predicate P(x) denote "x is a prime". Which of the following is the *correct* form for the assertion "2 is the only even prime" ?

   (A) $\exists x[E(x) \wedge P(x)]$

   (B) $\exists x[E(x) \wedge P(x) \Rightarrow (x = 2)]$

   (C) $\forall x[E(x) \wedge P(x) \Rightarrow (x = 2)]$

   (D) $\exists x[E(x) \wedge P(x) \wedge (x = 2)]$

3. If a binary relation between two sets is reflexive and transitive, it will be a partial order if it also has the following property :

   (A) Asymmetry (B) Antisymmetry

   (C) Symmetry (D) Axisymmetry

4. In any group of 100 persons, what is the minimum number of people who can be sure to have born in the same month ?

   (A) 8 (B) 9

   (C) 10 (D) 12

5. A homomorphism between two groups is an isomorphism, if it has the following additional property :

(A) Injective (B) Surjective

(C) Bijective (D) Conjuctive

6. In a Hamiltonian graph of n vertices, what is the number of edges present in a Hamiltonian circuit of the graph ?

(A) n (B) n – 1

(C) n + 1 (D) 2n

7. In a simple connected graph of 10 vertices and 15 edges, how many fundamental circuits exist with respect to any spanning tree of the graph ?

(A) 10 (B) 15

(C) 5 (D) 6

8. In Boolean algebra with the + and . binary operators and x, y, z are Boolean variables, which of the following represents a distributive law ?

(A) $x.(x+y) = x$ (B) $x.(y.z) = (x.y).z$

(C) $x+(y.z) = (x+y).(x+z)$ (D) $x + (x.y) = x$

9. Consider the LPP : Minimize $4x + 6y$

Subject to constraints : $x - 2y \leq 1$;

$2x + 3y \geq 6$;

$y - 2x \leq 1$;

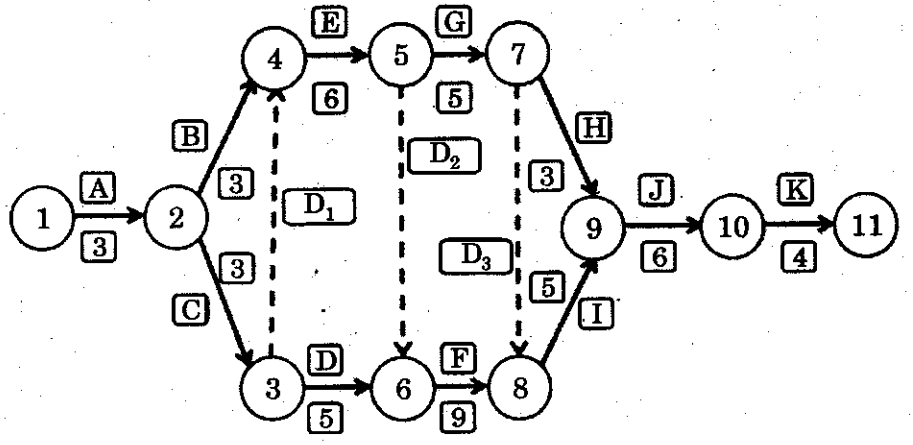
$x, y \geq 0$.

Then the LPP has .....

(A) No feasible solution (B) Unbounded solution

(C) Unique solution (D) Infinitely many solutions

10. Consider a project represented by the following network, in which numbers in the circles indicate event numbers, arrows indicate activities, letters along the arrows indicate activity name and numbers along the arrows represent the time required for the activity.



Then which of activities C and H are critical ?

(A) C is critical but H is not

(B) H is critical but C is not

(C) Both C and H are critical

(D) Neither of C and H is critical

11. If an Octet of 1's occurs in the Karnaugh map of a boolean function, how many variables are eliminated from the function during simplification ?

(A) 8 (B) 4

(C) 2 (D) 3

12. In an SR latch made up of a pair of cross-connected NAND gates, which of the following inputs at the S and R terminals is prohibited (avoided) ?

(A) 0-0 (B) 0-1

(C) 1-0 (D) 1-1

13. If a digital device represents signed integers in 6-bits using the 2's complement storage convention, how is the value -21 represented ?

(A) 010101 (B) 101010

(C) 101011 (D) 100011

14. In the IEEE-754, 32-bit representation of floating point numbers, how many bits are used to represent the normalized mantissa ?

(A) 26 (B) 23

(C) 24 (D) 8

15. If a CPU register contains an 8-bit unsigned integer with MSB 0, which of the following operations will be equivalent to doubling the value in the register ?

(A) SHIFT-RIGHT (B) SHIFT-LEFT

(C) INCREMENT (D) COMPLEMENT

16. In a bus-organized CPU, the Memory Address Register receives the memory address of the next instruction to be executed from which register ?

(A) Accumulator (B) Instruction Register

(C) Program Counter (D) RAM

17. If a Microprocessor has a 16-bit address bus that can address individual bytes in RAM, what is the maximum size of RAM that can be accommodated ?

(A) 1 MB (B) 16 KB

(C) 64 KB (D) 256 KB

18. Which register is responsible to hold temporarily results of ALU (Arithmetic and Logic Unit) operations ?

(A) Memory Buffer Register (B) Instruction Register

(C) Accumulator (D) Program Counter

19. Consider following statements with respect to Access time of computer system.

(I) For non-random access memory, access time is the time it takes to position the readwrite head at the desired location.

(II) For random access memory, access time is the time it takes to perform a read or write operation.

(III) Access time is the time which data can be transferred into or out of Memory Unit.

Which one from the following is *true* for above statements ?

(A) (I) and (III) are true

(B) (II) and (III) are true

(C) Only (II) is true

(D) (I) and (II) are true

20. Accessing the elements sequentially of one-dimensional array is associated with :

(A) Principle of Locality - Spatial

(B) Principle of Locality - Temporal

(C) Unit of Transfer

(D) Hit Ratio

21. Consider the following program :

```
#define Swap(a,b) temp=(a);(a)=(b);(b)=temp; temp=0;
void main(void)
{
int i,j,temp; i = 5; j = 10; temp = 0;
if (i > j) Swap(i,j);
printf("i=%d j=%d", i,j);
i=10; j=5;
if (i > j) Swap(i,j);
printf("i=%d j=%d\n", i,j);
}
```

The output is :

(A) 10 0 5 10

(B) 5 10 5 10

(C) 10 5 10 5

(D) 5 0 5 10

22. Consider the following C statements :

(*i*) i=3; do printf("%d\n",i); while(++i<5);

(*ii*) i=3; while(++i<5) printf("%d\n",i);

(*iii*) for(i=3; i<5; ++i) printf("%d\n", i);

(*iv*) i=3; if(++i<5) printf("%d\n",i);

In how many of the above statements the output changes when ++i is replaced with i++ ?

(A) 1 (B) 2

(C) 3 (D) 4

23. Usually a pure virtual function :

(A) has complete function body

(B) will never be called

(C) will be called only to delete an object

(D) is defined only in derived class

24. Run Time Polymorphism in C++ is achieved by ..... .

(A) friend function (B) virtual function

(C) operator overloading (D) function overloading

25. When a Java applet is terminated which of the following sequence of method calls take place ?

(A) stop(),paint(),destroy()

(B) destroy(),stop(),paint()

(C) destroy(),stop()

(D) stop(),destroy()

26. Which of the following statement(s) is/are *true* ?

(*i*) Bresenham algorithm is faster than DDA algorithm.

(*ii*) The DDA algorithm involves floating point values while in Bresenham algorithm only integer values are used.

(*iii*) DDA uses multiplication and division operations while Bresenham algorithm uses addition and subtraction.

(A) Only (*i*) is true

(B) Only (*i*) and (*ii*) are true

(C) Only (*i*) and (*iii*) are true

(D) All three are true

27. Which of the following homogeneous coordinates represents a 2D point at infinity ?

(A) (10, 10, 10)

(B) (0, 10, 10)

(C) (10, 0, 10)

(D) (10, 10, 0)

28. Consider a triangle with the corners P (1, 1), Q (2, –1) and R (4, 2). What are the new coordinates of triangle after rotation of 90 degrees about the corner P ?

(A) (1, 1), (4, 2) and (2, 4)

(B) (1, 1), (3, 4) and (2, 6)

(C) (1, 1), (3, 2) and (0, 4)

(D) (1, 1), (4, 3) and (1, 3)

29. Consider a raster system with resolution of 1280 × 1024. What is the size of frame buffer to store 24 bit pixels ?

(A) 4608 KB (B) 3840 KB

(C) 1920 KB (D) 1280 KB

30. Which of the following is *not* a property of perspective transformations ?

(A) Parallel lines appear to converge in a vanishing point

(B) Object size reduces as distance from the centre of projection increases

(C) Foreshortening of lines depends on both orientation and distance

(D) The shape of the object is preserved

31. A relationship linking a weak entity set to a strong entity set :

(A) Is to be converted to a single table

(B) Is to be considered as part of the strong entity

(C) Is redundant and does not need to be converted to a table

(D) Is to be converted to an attribute

32. Which of the following commands cannot be used in a Database Trigger:

(A) SELECT (B) DELETE

(C) ROLLBACK (D) INSERT

33. If a relation R is decomposed into R1 and R2, we say the decomposition is lossless, if :

(A) The intersection of R1 and R2 is a null set

(B) R1 and R2 have no common attributes

(C) The intersection of R1 and R2 is a key of either of them

(D) The intersection of R1 and R2 is not a key of either of them

34. Consider two tables Dept(dno, floorno) - containing details about departments located on which floors, and Floor(floorno) - all possible floors. Which Relational Algebraic operator would be used to find departments which are located on all the floors ?

(A) DIVISION
(B) PROJECTION
(C) NATURAL JOIN
(D) SELECTION

35. The Shared Intention Exclusive lock of the multiple granularity protocol is compatible with which of the following locks ?

(A) Exclusive
(B) Shared
(C) Intention Shared
(D) Intention Exclusive

36. A relation with three attributes having one prime and two non-prime attribute will definitely be in :

(A) 2NF
(B) 3NF
(C) BCNF
(D) 4NF

37. A data model for a Data Warehouse which has more than one fact table and many dimension tables is called :

(A) Snowflake Schema
(B) Galaxy Schema
(C) Star Schema
(D) Cloud Schema

38. Which of the following metric is called the true positive rate in evaluating a classifier's performance ?

(A) Accuracy
(B) Sensitivity
(C) Specificity
(D) Precision

39. The k-Means Clustering method is an iterative method which stops when :

(A) Clusters formed in the current and previous iteration are same

(B) k iterations are completed

(C) Each cluster contains approximately k objects

(D) All noise points have been removed from the clusters

40. In the Market Basket Analysis, the measure Support for rule interestingness is given by :

Support($A \rightarrow B$) where A and B are itemsets. It is same as :

(A) P(B/A)

(B) P(A/B)

(C) $P(A \cup B)$

(D) $P(A \cap B)$

41. Consider the following statements for CPU scheduling algorithms :

(*i*) FCFS Scheduling suffers from convoy effect.

(*ii*) Priority Scheduling can suffer from deadlock.

(*iii*) If the time quantum is large, Round Robin reduces to the FCFS scheduling algorithm.

Which one from the following is *true* ?

(A) (*i*) and (*ii*) are true but (*iii*) is false

(B) (*iii*) is true but (*i*) and (*ii*) are false

(C) (*ii*) and (*iii*) are true but (*i*) is false

(D) (*i*) and (*iii*) are true but (*ii*) is false

42. Which of the following conditions is *not* responsible for a deadlock to occur ?

(A) Hold and wait

(B) Circular wait

(C) Preemption

(D) Mutual exclusion

43. Which of the following is *not* a Linux system ?

(A) Cassandra

(B) Debian

(C) Red Hat

(D) SuSE

44. Which scheduler controls the degree of multiprogramming ?

(A) Short Term Scheduler

(B) CPU Scheduler

(C) Long Term Scheduler

(D) Medium Term Scheduler

45. Dispatch latency is the time taken by the dispatcher to :

(A) Stop the running process

(B) Stop one process and start running another

(C) Select a victim process

(D) Select a victim process and a ready process

46. Which of the following techniques can be used to prevent starvation of a process ?

(A) Thread scheduling

(B) Process Prioritization

(C) Process Balancing

(D) Aging

47. A distributed system is a collection of processors that :

(A) do not share clock but share memory

(B) do not share memory but share clock

(C) do not share memory or clock

(D) share both memory and clock

48. Which one of the following is *not* a method of allocating disk space ?

(A) Contiguous allocation (B) Virtual allocation

(C) Linked allocation (D) Indexed allocation

49. A memory management scheme that supports user view of memory is :

(A) First fit (B) Paging

(C) Segmentation (D) Swapping

50. Which one of the following is *not* a requirement to solve the critical section problem ?

(A) No Preemption (B) Progress

(C) Bounded Waiting (D) Mutual Exclusion

51. Phase containment of errors in Software Engineering refers to the :

(A) Debugging defects during development

(B) Detecting and removing defects early in the process of development

(C) Predicting defects before development

(D) Detecting and removing defects during testing

52. A balanced DFD is obtained by :

(A) Inspection (B) Validation

(C) Organization (D) Refactoring

53. For the development of a data entry project for office staff who have never used computers before (user interface and user friendliness are extremely important), one will use :

(A) Spiral model (B) Component based model

(C) Prototyping model (D) Waterfall model

54. Which of the following statements is *true* about UML stereotypes ?

(A) A stereotyped class must be abstract

(B) The stereotype {frozen} indicates that the UML element cannot be changed

(C) UML profiles can be stereotyped for backward compatibility

(D) A stereotype is used for extending the UML language

55. When a single task/function triggers other data flow along one of the many paths of a data flow diagram, ... characterizes the information flow.

(A) High coupling (B) Poor modularity

(C) Transaction flow (D) Transform flow

56. Validation is performed to ensure that :

(A) The product conforms to its specification

(B) The product conforms to its design

(C) The product possesses quality attributes

(D) The product passed all tests

57. Which of the following features is incorporated in feature point metric but not in the function point metric ?

(A) Number of inputs
(B) Number of outputs
(C) Algorithmic complexity
(D) Number of interfaces

58. McCabe cyclomatic metric C of a graph G with p predicates is :

(A) p + 1
(B) p + 2
(C) p + 3
(D) p + 4

59. What is the intention of designing a set of test cases for testing ?

(A) To increase reliability of the product
(B) To produce an operational system
(C) To prove that the program under test is correct
(D) To prove that the program under test is incorrect

60. ..... is the reuse of reusable components without any modification such as standardization, wrapping techniques etc.

(A) White-box reuse
(B) Black-box reuse
(C) Adoptive reuse
(D) Generative reuse

61. The running times to remove the first, last and middle elements of a circular linked list are :

(A) O(1), O(1), O(n)
(B) O(n), O(1), O(n)
(C) O(1), O(n), O(n)
(D) O(1), O(1), O(log n)

62. Which of the following sorting algorithms has the fastest-possible best-case time ?

(A) Quick sort

(B) Insertion sort

(C) Merge-sort

(D) Selection sort

63. Let T be a binary search tree on 24 distinct keys; the left subtree T1 has 7 keys and the right subtree T2 has 16 keys. Which of the following is *true* of the 13th smallest of the keys in T ?

(A) It is the 13th smallest key in T2.

(B) It is the 8th smallest key in T2.

(C) It is the 5th smallest key in T2.

(D) It is the 6th smallest key in T2.

64. The searching technique/data structure that is designed to take O(1) time to find a data is :

(A) B* Tree

(B) Binary Search

(C) Hashing

(D) AVL Tree

65. The most appropriate data structure for implementation of Breadth First Traversal on a graph is :

(A) Queue

(B) Stack

(C) Singly linked list

(D) B+ Tree

66. The following three are known to be the preorder, inorder and postorder sequences of a binary tree. But it is not known which is which.

I. MBCAFHPYK

II. KAMCBYPFH

III. MABCKYFPH

Pick the *true* statement from the following :

(A) I and II are preorder and inorder sequences respectively.

(B) I and III are preorder and postorder sequences respectively.

(C) II is the inorder sequence, but nothing more can be said about the other two sequences.

(D) II and III are the preorder and inorder sequences respectively

67. Consider a weighted undirected graph with positive edge weights and let (u, v) be an edge in the graph. It is known that the shortest path from source vertex s to u has weight 55 and shortest path from s to v has weight 65. Which statement is always *true* ?

(A) Weight (u, v) < 10

(B) Weight (u, v) >= 10

(C) Weight (u, v) = 10

(D) Weight (u, v) > 10

68. Which is optimal value in the case of fractional knapsack problem for knapsack with capacity of 5 and following 3 items :

Weight : 2 3 4

Profit : 60 75 90

(A) 135

(B) 270

(C) 150

(D) 165

69. Which of the following algorithm design technique breaks problems down into smaller overlapping subproblems that are solved recursively, but stores the solutions to subproblems for possible reuse ?

(A) Greedy Method
(B) Dynamic Programming
(C) Divide & Conquer
(D) Backtracking

70. Which of the following problems does *not* belong to class P ?

(A) Finding Shortest path between any node pairs in a graph
(B) Finding Minimum Spanning Tree
(C) 0/1 Knapsack problem
(D) Fractional Knapsack problem

71. Context Free Grammar is :

(A) Type 2 Grammar
(B) Type 3 Grammar
(C) Type 4 Grammar
(D) Type 5 Grammar

72. How many of the following languages are regular for $\Sigma = \{0, 1\}$?

- Set of all words which have an equal number of 0's and 1's.
- $W = \{0^P \mid p \text{ is not a prime number}\}$
- The binary encodings of numbers divisible by 3 {$\in$, 11, 110, 1001, 1100, 1111, etc.}
- Set of all strings whose length is neither divisible by 2 nor by 5

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

73. How many of the following statements are *true* for Universal Turing Machine ?

- It is capable of imitating any Turing Machine.
- It is a single machine used to compute any computable sequence.
- It has an ability to manipulate an unbounded amount of data.
- It can accept any recursively enumerable language.

(A) 1 (B) 2

(C) 3 (D) 4

74. Which of the following statements about closure properties of formal languages is *not* True ?

(A) If K and L are regular languages then so are the languages $K \cup L$, $K \cap L$, and complement of L

(B) If K and L are context-free languages, so are $K \cup L$, concatenation of K and L, and Kleene star of L

(C) If K and L are context-sensitive languages then so are their union, intersection, concatenation.

(D) If K and L are recursively enumerable languages then so are their union, set difference and complement of L

75. Which of the following Formal language and Abstract Machine correspondence is *not* correct ?

(A) Recursively enumerable and Turing Machine

(B) Context sensitive and Deterministic Pushdown Automata

(C) Context free and Non-Deterministic Pushdown Automata

(D) Regular and Deterministic Finite Automata

76. What is the instruction cost of the following instruction : SUB 3 (R0), * 16 (R1) ?

(A) 2 (B) 3

(C) 4 (D) 5

77. Which among the following methods uses temporary names to store the values of three address codes into symbol table ?

(A) Indirect triples (B) Triples

(C) Syntax tree (D) Quadruples

78. The intersection of regular languages (a+b)*a and b(a+b)* is given as :

(A) b(a+b)*a (B) (a+b)*ab(a+b)*

(C) a(a+b)*b (D) ab(a+b)*

79. Which among the following data structures is used in non-recursive predictive parsing to store grammar symbols ?

(A) Array (B) Queue

(C) Linked list (D) Stack

80. Type checking in source program is performed to ensure that :

(A) Lexical and semantic conventions are followed

(B) Syntactic and semantic conventions are followed

(C) Lexical, syntactic and semantic conventions are followed

(D) Code optimization conventions are followed

81. A system is designed to convert analog signals to digital signals with a 4-bit converter and transmit them. What bit rate is required if the analog signal consists of frequencies between 400Hz to 3400 Hz ?

(A) 14 kbps

(B) 10 kbps

(C) 13 kbps

(D) 12 kbps

82. What is the Hamming code for ASCII character 'u' = 1010101 ? Assume even parity for the Hamming code.

(A) 11110100101

(B) 10100101111

(C) 10010101111

(D) 10101001111

83. Which of the following is a measure of the loss of strength in the signal while passing through a medium ?

(A) Amplification

(B) Attenuation

(C) Modulation

(D) Bandwidth

84. Interface Message Processors (IMPs) are used :

(A) to connect two or more transmission lines

(B) to connect two or more hosts

(C) to connect two or more subnets

(D) to connect two or more gateways

85. ..... is a device that moves all packets from one network segment to another by regenerating, retiming and amplifying the electrical signals.

(A) Bridge (B) Router

(C) Repeater (D) Hub

86. Which one of the following aspects is *not* considered in distance vector routing algorithm at network layer ?

(A) Information sharing at regular interval

(B) Congestion control

(C) Routing only to neighbours

(D) Knowledge about the whole network

87. Which one of the following is *not* an operation of FTP ?

(A) Connecting to a remote host

(B) Navigating the directory structure

(C) Storing files

(D) Transferring files

88. Using the RSA public key crypto system with p = 13, q = 31 and d = 7, what is the value of e ?

(A) 360 (B) 361

(C) 102 (D) 103

89. Which one of the following is *not* an element of Internet of Things (IoT) ?

(A) Process (B) Security

(C) Things (D) People

90. CDMA systems exhibit soft handover due to :

(A) Auto-correlation codes used in each cell

(B) Each cell using same spread frequency spectrum

(C) Negligible narrow-band interference and co-channel interference of the signal

(D) Each cell having a distinct pseudo-noise code offset

91. To infer logically $E_1 \vee E_3$ by inference resolution rules, which pair of axioms from the following are appropriate ?

(A) $E_1 \vee E_2$ and $\neg E_2 \wedge E_3$

(B) $E_1 \vee E_3$ and $E_2 \vee \neg E_3$

(C) $E_1 \wedge E_2$ and $\neg E_2 \wedge E_3$

(D) $E_1 \vee E_2$ and $\neg E_2 \vee E_3$

92. Which of the following converts a given input word into its root (i.e. base) form as output ?

(A) Lemmatizer
(B) POS tagger
(C) Tokenizer
(D) Levenshtein method

93. The Linguistic variable (qualifier) used in diluting fuzzy membership function is :

(A) usually
(B) close to
(C) very
(D) quite

94. Which Supervised Learning algorithm considers all initial weights as zero ?

(A) Hebbian learning
(B) Delta learning
(C) Least Mean Square (i.e. Widrow-Hoff) learning
(D) Correlation learning

95. The data structure used in Crossover operation of genetic algorithms is :

(A) Tree
(B) Graph
(C) Linked List
(D) Queue

96. The Grammar based text parsing technique used for noun and verb phrase as well as subject and object detection is :

(A) Bag of Words (BOW)
(B) N-Gram and CFG
(C) Syntactic (i.e. Dependency) and Constituency
(D) CFG and BOW

97. Which one of the following is FALSE for STRIPS - an approach to planning ?

(A) It is feature-centric representation.

(B) It deals with objects, actions, preconditions, and effects.

(C) It uses First order logic notation to state objects and actions.

(D) PDDL is one of the commonly used language for writing STRIPS domain and problem sets.

98. A 4 input neuron has weights 4, 3, 2 and 1. The transfer function is linear with the constant of proportionality equal to 2. If inputs are 5, 4, 10 and 50 respectively then output of the neuron will be :

(A) 102 (B) 204

(C) 69 (D) 138

99. The Genetic operator which randomly flips individual bits of a chromosome in the next generation is called :

(A) Selection operator (B) Crossover operator

(C) Mutation operator (D) Recombination operator

100. The rule of simplex reflex agent in AI is :

(A) Simple - Action (B) Simple - Condition

(C) Condition - Action (D) Both (A) and (B)

ROUGH WORK

SEAL