COMPUTER SCIENCE AND APPLICATIONS

Name & Signature of the Invigilator

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PAPER-III
OCT-14/19

ICR Answer Sheet No. : | | | | | |

Roll No. : | | | | | |

Roll Number in words : .....

.....

Time : 2.30 Hours] **No. of Printed Pages : 32** **[Maximum Marks : 150**

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of **Seventy five (75)** multiple choice type questions. **All** questions are compulsory.
3. At the commencement of examination, the question booklet will be given to candidate. In the first 5 minutes, candidate is 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 five 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 in the ICR answer sheet and the ICR Answer Sheet number should be entered on this test booklet.
4. Each item has upto four alternative responses marked (A), (B), (C) and (D). The answer should be a capital letter for the selected option. The answer letter should entirely be contained within the corresponding square.

   Correct method [A] Wrong method [A] OR [A]

5. Your responses to the items for this paper are to be indicated on the ICR Answer Sheet under Paper III only.
6. Read instructions given inside carefully.
7. Rough work is to be done in the end of the booklet only.
8. You have to return the original ICR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the examination hall. You are, however, allowed to carry duplicate copy of ICR sheet and test booklet on conclusion of the examination.
9. Use black ball point pen.
10. Use of any Calculators or log tables or any other electronic devices is prohibited.
11. There shall be no negative marking.
12. In case of any discrepancy in Gujarati and English version of questions the English version should be taken as final.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

1. આ પાનાની ટોચમાં દર્શાવેલી જગ્યામાં તમારો રોલનંબર લખો.
2. આ પ્રશ્નપત્રમાં બહુવૈકલ્પિક ઉત્તરો ધરાવતા કુલ **પંચોતેર (૭૫)** પ્રશ્નો આપેલા છે. **બધા જ** પ્રશ્નો ફરજિયાત છે.
3. પરીક્ષાની શરૂઆતમાં ઉમેદવારને પ્રશ્નપુસ્તિકા આપવામાં આવશે. પ્રથમ ૫ મિનિટ દરમ્યાન, ઉમેદવારે પ્રશ્નપુસ્તિકા ખોલી અને ફરજિયાતપણે નીચે મુજબ પરીક્ષણ કરવું.
   (*i*) પ્રશ્નપુસ્તિકાનો વપરાશ કરવા માટે આ કવર પેજની ધાર પર આપેલ સીલ 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 પૃષ્ઠો/પ્રશ્નો ઓછા હોય, બે વાર છપાયા હોય, અનુક્રમમાં અથવા કોઈ અન્ય ફરક હોય અર્થાત કોઈપણ કારણે ખામીયુક્ત પ્રશ્નપુસ્તિકા સ્વીકારવી નહીં. એને જો ખામીયુક્ત પ્રશ્નપુસ્તિકા મળી હોય તો નિરીક્ષક પાસેથી તુરંત જ બીજી સારી પ્રશ્નપુસ્તિકા મેળવી લેવી. આ માટે ઉમેદવારને પાંચ મિનિટનો સમયગાળો આપવામાં આવશે. પછીથી, પ્રશ્નપુસ્તિકા બદલવામાં આવશે નહીં કે કોઈ વધારાનો સમય પણ આપવામાં આવશે નહીં.
   (*iii*) આ ચકાસણી સમાપ્ત થાયપછી, ટેસ્ટ પુસ્તિકા નંબર ICR જવાબ પત્રકમાં લખવો અને ICR જવાબ પત્રક નંબર પ્રશ્નપુસ્તિકા પર લખવો.
4. પ્રત્યેક પ્રશ્ન માટે ચાર ઉત્તર વિકલ્પ (A), (B), (C) અને (D) આપવામાં આવેલ છે. પસંદગીનો જવાબ માત્ર અંગ્રેજી કેપીટલ મૂળાક્ષર દ્વારા જ આપવો. પસંદ કરેલ અંગ્રેજી કેપીટલ અક્ષર આપેલ ખાનામાં સંપૂર્ણ રીતે સમાઈ જાય તે રીતે લખવો.

   સાચી રીત : [A] ખોટી રીત : [A] અથવા [A]

5. આ પ્રશ્નપુસ્તિકાના પ્રશ્નોના જવાબ અલગથી આપવામાં આવેલ ICR જવાબ પત્રકમાં પેપર–૩ લખેલ વિભાગમાં જ લખવા.
6. અંદર આપેલ સૂચનાઓ ધ્યાનપૂર્વક વાંચો.
7. આ પ્રશ્નપુસ્તિકાની અંતે આપેલ પાનું રફ કામ માટે છે.
8. પરીક્ષા સમય પૂરો થઈ ગયા પછી ઓરીજીનલ ICR જવાબ પત્રક જે તે નિરીક્ષકને ફરજીયાત સોંપી દેવું અને કોઈપણ સંજોગોમાં પરીક્ષાખંડની બહાર જઈ શકશે નહીં. પરીક્ષા પૂર્ણ થયા બાદ ઉમેદવાર પ્રશ્નપુસ્તિકા તથા ICR જવાબવહીની ડુપ્લિકેટ કોપી પોતાની સાથે લઈ જઈ શકે છે.
9. માત્ર કાળી પેન/કાળી બૉલ પેન વાપરવી.
10. કેલ્કયુલેટર અને અન્ય ઈલેક્ટ્રોનિક યંત્રોનો ઉપયોગ કરવાની મનાઈ છે.
11. ખોટા જવાબ માટે નેગેટિવ ગુણાંકન પ્રથા નથી.
12. પ્રશ્નપુસ્તિકાના કોઈ પ્રશ્નમાં અનુવાદ અંગે કોઈ વિવાદ/મતભેદ જણાય તો અંગ્રેજી વર્ઝન યોગ્ય ગણાશે.

SEAL

COMPUTER SCIENCE AND APPLICATIONS

PAPER-III

Note : This paper contains **SEVENTY FIVE (75)** Multiple-choice questions, each question carrying **TWO (2)** marks. Attempt **All** questions.

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1. A computer system supports a virtual address of 64 bits length. What should be the length of the memory address register ?

   (*i*) 16 bits

   (*ii*) 32 bits

   (*iii*) 64 bits

   Which of the following is *correct* ?

   (A) (*i*) only

   (B) (*ii*) only

   (C) (*iii*) only

   (D) (*i*), (*ii*) *or* (*iii*)

2. 'Test and Set lock' or TSL kind of instructions in a microprocessor are used for :

   (A) Floating point operations support

   (B) Memory protection support

   (C) Logical operations support

   (D) Mutual exclusion support

3. In microprocessor interfacing a USART is generally used for which of these ?

(A) Interfacing between Laser printers and CRT

(B) Interfacing from modem to system bus

(C) Interfacing between RAM and CPU

(D) Interfacing between ALU and DMA

4. Virtual 8086 mode of operation of P-III processor is best used for :

(A) Parallel processing

(B) Minimizing number of ROM accesses

(C) Minimizing number of interrupts

(D) Memory protection within operating system

5. Consider the realization of XOR function with Boolean variables A, B using NOR gates alone. The minimum number of two input NOR gates required is :

(A) 2

(B) 5

(C) 4

(D) 3

6. Read the following in the context of a Relational DBMS :

(I) Potential integrity constraint violations are checked at the end of each SQL statement execution.

(II) Potential integrity constraint violations can be deferred until the end of the transaction executing the SQL statement.

Which of the following is *correct* ?

(A) Only (I) is true

(B) Only (II) is true

(C) Both (I) and (II) are not true

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

7. For optimising a query involving a *join* and a *select* :

(A) *join* should precede *select*

(B) *select* should precede *join*

(C) the order of *select* and *join* is irrelevant

(D) the order of *select* and *join* would depend on the cardinality of the relations involved

8. Ignoring outdated writes for concurrency control is known as :

(A) Thomas's Write Rule

(B) Codd's Write Rule

(C) Timestamp Control

(D) 2 Phase Locking

9. Given the relations :

SAILORS (sid: integer, sname: string, rating: integer, age: real)

BOATS (bid: integer, bname: string, colour: string)

RESERVES (sid: integer, bid: integer, rday: date)

and the query :

SELECT s. name FROM SAILORS s, RESERVES r, BOATS b

WHERE s.sid = r.sid AND r.bid = b.bid AND b.colour = 'RED' AND s.sid IN (SELECT s2.sid FROM SAILORS s2, BOATS b2, RESERVES r2 WHERE s2.sid = r2.sid AND r2.bid = b2.bid AND b2.colour = 'GREEN')

The output of the query is :

(A) syntax error

(B) NULL

(C) Names of the sailors who reserved either 'RED' or 'GREEN' boats

(D) Names of the sailors who reserved both 'RED' or 'GREEN' boats

10. Triggers in ORACLE can be defined on :

(I) Tables

(II) Views

(III) Database events

Which of the following is correct ?

(A) (I), (II) and (III)

(B) Only (I) and (II)

(C) Only (I) and (III)

(D) Only (II) and (III)

11. What is the RGB equivalent of the colour black ?

(A) 0, 255, 0

(B) 255, 0, 0

(C) 255, 255, 255

(D) 0, 0, 0

12. Assuming that one allows 256 depth value levels to be used, how much memory would a 512 × 512 pixel display require to store the z-buffer :

(A) 512K

(B) 256K

(C) 1024K

(D) 128K

13. The point at which a set of projected parallel lines appears to converge is called a :

(A) Convergence point

(B) Vanishing point

(C) Point of illusion

(D) Point of delusion

14. Which shading model interpolates the normals at all the vertices to compute the colour of each pixel ?

(A) Phong shading

(B) Gouraud shading

(C) Painter shading

(D) Buffer shading

15. When transforming a random Axis-Aligned Bounding Box defined by the points (nearx, neary, nearz) and (farx, fary, farz) to the standard orthographic viewing box, which affine transforms are used ?

(A) Shear and translation

(B) Rotation and scaling

(C) Scaling and shear

(D) Tanslation and scaling

16. Here is a prolog program :

father (rajpal, tejpal)

father (rajpal, sejpal)

mother (janki, rajpal)

mother (sarla, tejpal)

ancestor (X, Z) :- parent (X, Z)

ancestor (X, Z) :- grandparent (X, Z)

grandparent (X, Z) :- parent (X, Y), parent (Y, Z)

parent (X, Y) :- father (X, Y)

parent (X, Y) :- mother (X, Y)

What is the ouput of the following query ?

?- ancestor (X, sejpal)

(A) X = janki; X = rajpal;

(B) X = rajpal X = janki;

(C) X = rajpal; X = sarla; X = janki;

(D) X = janki; X = sarla; X = rajpal;

17. The language $\{a^m b^n c^p,\ m, n, p > 0\}$ can be recognised :

(A) Both by a finite state automaton and a pushdown automaton

(B) Neither by a finite state automaton nor by a pushdown automaton

(C) By a pushdown automaton but not by a finite state automaton

(D) Neither by a Turing machine nor by a pushdown automaton

18. Here are a few statements about an n-state NFA's conversion to a DFA :

(*i*) The corresponding DFA can have upto 2^n states

(*ii*) The conversion takes exponential time

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false

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

(C) (*i*) is true but (*ii*) is false

(D) (*i*) is false, but (*ii*) is true

19. Consider the following statements :

(*i*) The complement of a regular language is not regular

(*ii*) The union of context-free languages is context-free.

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false

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

(C) (*i*) is true, but (*ii*) is false

(D) (*i*) is false, but (*ii*) is true

20. Consider the following statements :

(*i*) The grammar $A \rightarrow Ab \mid a$ is left recursive.

(*ii*) The grammar $A \rightarrow aB$; $B \rightarrow bB \mid b$ is equivalent to the grammar in (*i*)

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false

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

(C) (*i*) is true, but (*ii*) is false

(D) (*i*) is false, but (*ii*) is true

21. FDDI stands for :

(A) Fiber Distributed Data Interchange

(B) Fiber Distributed Data Interface

(C) Federal Distributed Data Interface

(D) Fiber Distributed Device Interface

22. In CSMA when two frames collide, the medium remains unusable for the duration of transmission of ..... damaged frames.

(A) Both

(B) Larger

(C) Smaller

(D) None of the above

23. The number of nodes per segment in the 10BASE-FP is :

(A) 100

(B) 64

(C) 33

(D) 24

24. In an organization, a network proxy server is setup for all HTTP traffic. Which of the following will not be permitted in this organization ?

(A) Network address translation

(B) Use of private IP addresses

(C) Access to web mail services like hotmail.com, gmail.com etc

(D) A direct connection from a host in this organization to port 80 or port 8080 on to a server outside of this network

25. When a server is under a DDoS attack with a lot of requests for 'ECHO' service, the system administrator is advised to close down the response to which of these incoming packets ?

(A) TCP SYN

(B) TCP FIN

(C) IP Ping

(D) ICMP

26. Consider the following statements about sorting :

(*i*) Comparison-based sorting takes $\Omega(n \log n)$ operations

(*ii*) The average running time of shell-sort is $O(n^2)$.

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false

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

(C) (*i*) is true, but (*ii*) is false

(D) (*i*) is false, but (*ii*) is true

27. Consider the following statements :

(*i*) $f(n) = 4n^2 + 3n$ is $\Omega(n)$ and $O(n^2)$

(*ii*) $f(n) = 4n^2 + 3n$ is $\Omega(n^2)$ and $O(n^2)$

Which of the following is *correct* ?

(A) Both (*i*) and (*ii*) are false

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

(C) (*i*) is true, but (*ii*) is false

(D) (*i*) is false, but (*ii*) is true

28. Each step in an algorithm is chosen such that it is the best alternative among all feasible choices that are available. The choice of a step once made cannot be changed in subsequent steps. This algorithm design method is known as :

(A) Divide and conquer

(B) Greedy algorithm

(C) Dynamic programming

(D) Branch and bound

29. How many n node binary trees with items 1, 2, ..., n have identical postorder and inorder traversals ?

(A) 0

(B) 1

(C) n

(D) n!

30. Let G be a simple, undirected, connected graph with distinct edge weights. Let e_{max} be the edge with maximum weight and e_{min} be the edge with minimum weight. Which of the following statements is *false* ?

(A) Every minimum spanning tree of G must contain e_{min}

(B) If e_{max} is in a minimum spanning tree, then its removal may or may not disconnect G

(C) No minimum spanning tree can contain e_{max}

(D) G has a unique minimum spanning tree

31. Consider the following statements related to JavaScript :

(I) It is object oriented

(II) It is weakly typed

(III) It is case-sensitive

Which one of the following is *correct* ?

(A) (I) and (II) are true

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

(C) (I) and (III) are true

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

32. Consider the following JAVA code fragment :

```
String x = null;

int z = x.length( );
```

When this fragment is executed, the value of z will be :

(A) 0

(B) 1

(C) –1

(D) Exception is thrown

33. Can two or more applets appear on the same web page ?

(A) No, only one per web page

(B) No, applets can't appear on web pages

(C) Yes, put all the applets between a <applet> and </applet>

(D) Yes, but there must be <applet> and </applet> for each applet

34. If a class C is derived from class B, which is derived from class A, all through public inheritance, then a class C member function can access :

(A) protected and public data only in C and B

(B) protected and public data only in C

(C) private data in A and B

(D) protected data in A and B

35. Which of the following is NOT an advantage of using inheritance ?

(A) Code that is shared between classes needs to be written only once

(B) Similar classes can be made to behave consistently

(C) Enhancements to a base class will automatically be applied to derived classes

(D) One big superclass can be used instead of many little classes

36. During designing a system, the usual approach is to :

(A) Minimize cohesion and maximize coupling

(B) Minimize cohesion as well as coupling

(C) Maximize cohesion and minimize coupling

(D) Maximize coupling and minimize cohesion

37. Which one is *not* a non-functional requirement in software engineering ?

(A) Functionality

(B) Portability

(C) Correctness

(D) Reliability

38. Maintenance related to modification in the software due to changing environment is called :

(A) Perfective

(B) Preventive

(C) Corrective

(D) Adaptive

39. Which one is *not* a software quality attribute ?

(A) Functionality

(B) Accountability

(C) Maintainability

(D) Reliability

40. Which one is *not* a category of process metric in software engineering ?

(A) Cost

(B) Size

(C) Reliability

(D) Maintainability

41. Which of the following logic gates detects even parity of its inputs ?

(A) XOR

(B) XNOR

(C) NAND

(D) NOR

42. A directory under Windows NT is organized as a :

(A) B+ tree structure

(B) Acyclic structure

(C) Two level structure

(D) Hash table structure

43. How many page faults occur in executing LRU algorithm when page references occur in the order of 1, 2, 4, 5, 2, 1, 2 and 4 ? Assume that the main memory can accommodate 3 pages and already has pages 1 followed by 2, in the main memory :

(A) 3

(B) 4

(C) 5

(D) 6

44. Fence register is used for :

(A) Process protection

(B) File protection

(C) Memory protection

(D) CPU protection

45. Which of the following is *true* regarding a hard link ?

(A) It takes a few additional bytes of disk space for storage compared to a soft link

(B) It can be created only on the same physical hard disk

(C) It can be created for directories

(D) It can also be created on a remote hard disk

46. When searching a state space in breadth first manner, the states which are still to be explored are inserted into the search list in :

(A) Best first manner

(B) First in, first out manner

(C) Last in, first out manner

(D) Random order

47. A state space search method is said to be 'admissible', if it finds a solution with the least possible depth. Which of the following state space search methods is admissible ?

(A) Depth first search

(B) Breadth first search

(C) Best first search

(D) Beam search

48. Which of the following is *not* generally a core component of an expert system ?

(A) Knowledge base

(B) Inference engine

(C) Knowledge acquisition module

(D) Speech synthesis module

49. In propositional calculus, the statement :

$$((P \rightarrow Q) \wedge \neg Q) \Rightarrow \neg P.$$

(A) is a statement of Modus Ponens

(B) is a statement of Modus Tollens

(C) is a statement of Hypothetical Syllogism

(D) is a statement of Disjunctive Syllogism

50. The commutative rule of addition can be stated as :

(A) $\forall x \, \forall y(x + y = y + x)$

(B) $\forall x \, \exists y(x + y = y + x)$

(C) $\exists x \, \exists y(x + y = y + x)$

(D) $\exists x \, \forall y(x + y = y + x)$

51. The language $\{a^m b^m, m > 0\}$ can be recognised by :

(A) A non-deterministic finite state automaton, but not by a deterministic finite state automaton

(B) A deterministic pushdown automaton, but not by a non-deterministic finite state automaton

(C) A non-deterministic pushdown automaton but not by a deterministic pushdown automaton

(D) A non-deterministic Turing machine but not by deterministic Turing machine

52. Consider the following statements :

(*i*) A grammar in Greibach Normal Form (GNF) can be left recursive

(*ii*) Any context-free grammar can be converted to GNF.

(A) (*i*) and (*ii*) are false

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

(C) (*i*) is false, (*ii*) is true

(D) (*i*) is true, (*ii*) is false

53. Consider the following statements :

(*i*) The pumping lemma can be used to prove that a language is not regular

(*ii*) If a language satisfies the pumping lemma, then it must be regular

Which of the following is correct ?

(A) (*i*) and (*ii*) are false

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

(C) (*i*) is false, (*ii*) is true

(D) (*i*) is true, (*ii*) is false

54. Linear bounded automata (LBA) :

(*i*) can accept the language $L = \{a^m\ b^m\ c^m,\ m > 0\}$

(*ii*) are more powerful than deterministic Turing machines

(*iii*) are more powerful than non-deterministic pushdown automata

Which of the above statement(s) is/are *true* ?

(A) (*i*) only

(B) (*i*) and (*ii*) only

(C) (*i*) and (*iii*) only

(D) (*ii*) and (*iii*) only

55. Consider the statements :

(*i*) A 1-tape Turing machine can emulate a k-tape Turing machine.

(*ii*) A non-deterministic Turing machine can be converted to a deterministic Turing machine

(*iii*) The tape of the Turing machine is finite

(*iv*) The transition table (action table) of a Turing machine is finite.

Which of the following is correct ?

(A) (*i*), (*ii*), (*iii*) are true

(B) (*i*), (*ii*), (*iv*) are true

(C) (*i*), (*iii*), (*iv*) are true

(D) (*ii*), (*iii*), (*iv*) are true

56. The average gray level of an image after application of Fourier transform into the frequency domain (u, v) corresponds to :

(A) $u = v = +\infty$

(B) $u = v = 0$

(C) $u = v = 255$

(D) $u = v = -\infty$

57. 12-bit codeword is generated using Hamming code to detect 2-bit errors and correct 1-bit error in 8-bit data. The 12-bit codeword (generated) is corrupted to give 0110 0000 1010

Select from the following options the originally generated codeword :

(A) 0110 0000 0010

(B) 0110 0100 1010

(C) 0100 0000 1010

(D) 0110 0000 1011

58. The concept of "dictionary" is commonly associated with which of the following data compression methods ?

(A) Arithmetic coding

(B) LZ coding

(C) Run length coding

(D) Shift coding

59. Let X be a random variable taking on a finite number of values. What is the relation between H(X) and H(Y) (where H(X) is the entropy of X), if $Y = 2^X$?

(A) $H(X) \geq H(Y)$

(B) $H(X) \leq H(Y)$

(C) $H(X) = H(Y)$

(D) $H(X) \neq H(Y)$

60. Which layer performs routing in OSI reference model ?

(A) Data link

(B) Physical

(C) Network

(D) Transport

61. Consider an undirected bipartite graph G = (V, E) such that the vertex set V is partitioned into two subsets A and B, and all the edges are between A and B. Also $N(S_A)$ denotes the neighbours of a set $S_A \subseteq A$ ($N(S_B)$ is similarly defined). Hall's Theorem states that :

(A) The maximum cardinality of a matching in G is equal to the minimum cardinality of a vertex cover

(B) G contains a matching if $|N(S)| \geq |S|$ for all $S \subseteq A$

(C) G contains a matching if and only if $|N(S)| \geq |S|$ for all $S \subseteq A$

(D) G contains a matching if and only if $|N(S)| < |S|$ for all $S \subseteq A$

62. Let n denote the number of nodes in a graph, m, the number of edges, and U the capacity of the largest edge. The complexity of the Ford-Fulkerson algorithm is :

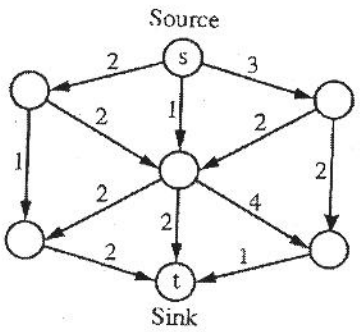
(A) $O(nm^2)$

(B) $O(n^3)$

(C) $O(n^2m \log m)$

(D) $O(nm\ U)$

63. Find the max-flow in the following graph :



(A) 6

(B) 2

(C) 4

(D) 5

64. Consider the following directed graph :

$$V = \{V0, V1, V2, V3, V4, V5, V6\}$$

There are the following eleven edges with edge costs listed as the third item in the triplet :

E = {(V0, V2 4), (V1, V0, 2), (V1, V3, 3), (V3, V2, 2), (V3, V5, 8), (V3, V6, 4), (V4, V1, 10), (V4, V3, 2), (V4, V6, 7), (V5, V2, 2) (V6, V5, 1)}.

The shortest weighted path from V4 to V5 has weight :

(A) 7

(B) 8

(C) 9

(D) 10

65. Consider the following LPP :

Minimize $3x + 5y$

Subject to : $x + y \leq 4$

$5x + 3y \geq 8$

$x, y \geq 0$

Its solution will be :

(A) $x = 4, y = 0$

(B) $x = 0, y = 4$

(C) $x = 0, y = 8/3$

(D) $x = 8/5, y = 0$

66. Which of the following properties need NOT be satisfied by a group ?

(A) Existence of an inverse

(B) Commutativity property

(C) Existence of an identity element

(D) Associativity property

67. The logistic activation function :

$$f(x) = \frac{1}{1 + e^{-x}} \text{ and } g(x) = \tanh x$$

are connected by the relation :

(A) $g(x) = 2f(2x) - 1$

(B) $g(x) = 2f(x) - 1$

(C) $g(x) = f(x) - 1$

(D) $g(x) = f(x) + 1$

68. Linear separability of patterns requires that the convex hulls built from the pattern sets of the classes are :

(A) overlapping

(B) unique

(C) touching only at the edges

(D) disjoint

69. In a rule based system that uses fuzzy logic, a defuzzyfication interface does the following :

(A) infers fuzzy outputs by rules of inference of fuzzy logic

(B) matches the categorical numeric or crisp input against the grade of membership in a fuzzy set for that variable

(C) produces a crisp answer using a fuzzy rule

(D) Yields a non-fuzzy control action on the outputs of the application of fuzzy inference rules on control actions

70. Which of the following is *true* regarding the type-2 fuzzy sets ?

(A) Each primary membership value is used to produce a secondary membership value by a random function

(B) Each primary membership value is dispersed by the secondary membership function which is bounded in [0, 1]

(C) The secondary membership value is orthogonal to the primary memership value

(D) The secondary membership value is orthonormal to the primary membership value

71. The Win32API command GetMessagePos function does the following :

(A) Gets the position of the message

(B) Gets the position of the cursor when a message was sent

(C) Gets the window position when the message was sent

(D) is not a window's function

72. The Win32API command ExitWindows function does the following :

(A) Closes the active window

(B) Closes all open windows on the desktop

(C) Shutdown the machine

(D) Logs of the current user

73. Which data structure of a compiler is responsible for managing information about variables and their attributes ?

(A) Semantic stack

(B) Symbol table

(C) Abstract syntax tree

(D) Parse table

74. Consider the following statements :

(*i*) Context-free grammars are closed under union

(*ii*) Context-free grammars are not closed under intersection.

Which of the following is correct ?

(A) (*i*) and (*ii*) are false

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

(C) (*i*) is false, (*ii*) is true

(D) (*i*) is true, (*ii*) is false

75. The lseek( ) system call in unix can be used to :

(A) search for a file

(B) search within a file

(C) set the position within a file

(D) look for an I/O device

ROUGH WORK

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