Roll No. ☐☐☐☐☐☐

(Write Roll Number from left side
exactly as in the Admit Card)

Signature of Invigilators

1. _____

2. _____

Question Booklet Series [**Y**]

2218

PAPER–II

Subject Code : 22

Question Booklet No.

(Identical with OMR
Answer Sheet Number)

COMPUTER SCIENCE & APPLICATIONS

Time : 2 Hours   *Maximum Marks:* 200

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page as well as on the OMR Sheet provided.

2. At the commencement of the examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and verify it:

    (i) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page.

    (ii) Faulty booklet, if detected, 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) Verify whether the Question Booklet No. is identical with OMR Answer Sheet No.; if not, the full set is to be replaced.

    (iv) After this verification is over, the Question Booklet Series and Question Booklet Number should be entered on the OMR Sheet.

3. This paper consists of One hundred (100) multiple-choice type questions. All the questions are compulsory. Each question carries *two* marks.

4. Each Question has four alternative responses marked: Ⓐ Ⓑ Ⓒ Ⓓ. You have to darken the circle as indicated below on the correct response against each question.

    Example: Ⓐ Ⓑ ● Ⓓ, where Ⓒ is the correct response.

5. Your responses to the questions are to be indicated correctly in the OMR Sheet. If you mark your response at any place other than in the circle in the OMR Sheet, it will not be evaluated.

6. Rough work is to be done at the end of this booklet.

7. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except in 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.

8. Do not tamper or fold the OMR Sheet in any way. If you do so, your OMR Sheet will not be evaluated.

9. You have to return the Original OMR 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 question booklet and duplicate copy of OMR Sheet after completion of examination.

10. **Use only Black Ball point pen.**

11. **Use of any calculator or mobile phone etc. is strictly prohibited.**

12. **There are no negative marks for incorrect answers.**

[Please Turn Over]

COMPUTER SCIENCE & APPLICATIONS

PAPER II

1. Maximum data rate of a channel for a noiseless 4 kHz binary channel is

(A) 2000 bps

(B) 4000 bps

(C) 8000 bps

(D) None of the above

2. 8257 DMA controller has 16 bits count register. How many maximum number of data bytes are to be transferred by a block DMA mode without software intervention?

(A) 64 K

(B) 16 K

(C) 32 K

(D) None of the above

3. Consider an algorithm for deciding whether a given string of length n is a palindrome or not. A string is a palindrome when it reads the same from the left and right ends. Which one of the following statements is correct?

(A) The best case time complexity is O(1) and the worst case time complexity is O(n^2).

(B) The best case time complexity is O(1) and the worst-case time complexity is $Ⓗ(n)$.

(C) The average case time complexity is $Ⓗ(n^2)$.

(D) The best case time complexity is $Ⓗ(n)$ and the average case time complexity is $Ⓗ(1)$.

4. What is X in the following Boolean circuit?
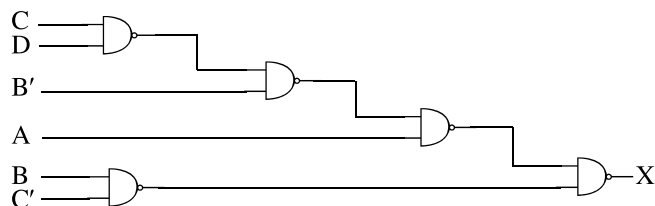
(A) $X = AB + CD + BC'$

(B) $X = A (B + CD) + BC$

(C) $X = A (B + CD) + BC'$

(D) $X = C (AB' + D) + BC$

5. Determine the type of following sentence S:

$$S : P \vee (Q \wedge \sim P) \vee (Q \wedge P)$$

(A) Satisfiable

(B) Contradictory

(C) Valid

(D) None of these

**6.** Match List 1 with List 2 and select the correct answer:

List 1	List 2
I Public	1. are accessible throughout the program.
II Friend	2. are accessible within the class.
III Private	3. are similar to private members but inheritable.
IV Protected	4. grants access to private members of the class to the non-member function.

	I	II	III	IV
(A)	1 →	4 →	2 →	3
(B)	4 →	3 →	2 →	1
(C)	2 →	3 →	4 →	1
(D)	3 →	4 →	1 →	2

7. Construct a B-tree of order 4 for the following search key values 2, 3, 5, 10, 18, 22, 28, 30. Search key value 31 will be placed at what level?

   (A) 1

   (B) 2

   (C) 3

   (D) 4

8. Observe the following diagram :
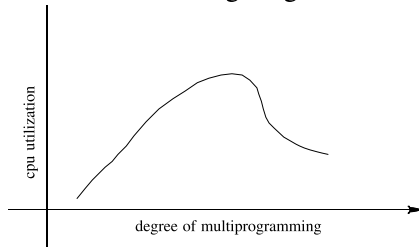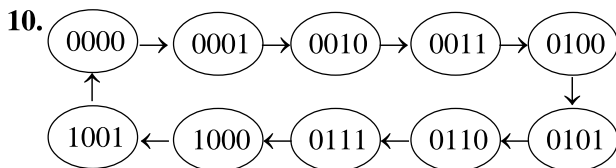

The above diagram represents the issues related to

   (A) Page replacement and thrashing

   (B) Thrashing

   (C) Page replacement

   (D) None of the above

9. Access rights to an object can be implemented

   (A) in O.S. level only.

   (B) in language level only.

   (C) in both (A) and (B)

   (D) None of these

10.

The above diagram represents

   (A) state diagram of a binary ripple counter.

   (B) state diagram of a decimal BCD counter.

   (C) state diagram of a binary up-down counter.

   (D) None of these

11. In microprocessor, the service routine of a certain interrupt starts from a fixed location of memory, which can not be externally set, but the interrupt can be delayed or rejected. Such interrupt is called

   (A) Non-maskable and Non-vectored

   (B) Maskable and Non-vectored

   (C) Maskable and Vectored

   (D) Non-maskable and Vectored

12. Let R be a binary relation on the set of all positive integers such that

$$R = \left\{ (a, b) \mid a - b \text{ is an odd positive integer} \right\}$$

Which one of the following is correct?

   (A) R is antisymmetric and transitive relation.

   (B) R is reflexive and partial ordering relation.

   (C) R is equivalence relation and partial ordering relation.

   (D) R is reflexive and symmetric relation.

13. Coupling is

   (A) an intramodule activity.

   (B) an inter-module activity.

   (C) a design-oriented activity.

   (D) a measurement oriented activity.

14. Which of the following option about ATM is wrong?

   (A) ATM is a connection oriented packet-switched network.

   (B) The cells in ATM network are variable length.

   (C) ATM is used in both WAN and LAN settings.

   (D) Different ATM AAL (ATM adaption layer) provides different services for network applications.

15. For two events h and e, the conditional probability of the event h, given that e has occured is defined as

(A) $P\left(e/h\right)=P\left(e\ \&\ h\right)/P(e)$

(B) $P\left(h/e\right)=P\left(e\ \&\ h\right)/P(e)$

(C) $P\left(h,e\right)=P\left(e\ \&\ h\right)/P(h)$

(D) None of the above

16. Consider the set of FDs F and G as follows:
$$F=\left\{A\rightarrow BC, B\rightarrow A, C\rightarrow A\right\}$$
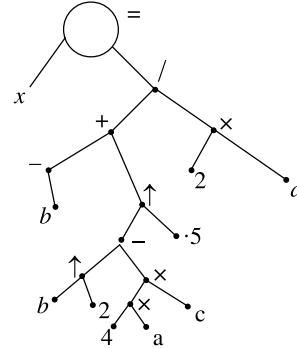$$G=\left\{A\rightarrow B, B\rightarrow C, C\rightarrow A\right\}$$
Then which of the following is true?

(A) F covers G.

(B) G covers F.

(C) Both (A) and (B)

(D) None of the above

17. Given $R\rightarrow R+R\,|\,RR\,|\,R^{*}\,|\,a\,|\,b\,|\,c$ and the string $W=a+bc$. What can you say about the ambiguity of the grammar?

(A) Ambiguous

(B) Unambiguous

(C) Can not be decided

(D) All of the above

18. For the given binary tree which formula is the best match?

(A) $x=\left(-b+\left(b^{2}-4ac\right)^{\frac{1}{2}}\right)/2a$

(B) $x=\left(-b+b^{2}-\left(4ac\right)^{\frac{1}{2}}\right)/2a$

(C) $x=\left(-b+b^{2}-4ac\right)^{\frac{1}{2}}/2a$

(D) $x=\left(-b+b^{2}-4ac*\cdot5/2a\right)$

19. The following table is given:

Process	Burst time (milli-seconds)
P_1	10
P_2	29
P_3	3
P_4	7
P_5	12

The average waiting time is

(A) 28 milli-seconds for FCFS.

(B) 13milli-seconds for SJF.

(C) 23 milli-seconds for RR (quantum=10 milli-seconds).

(D) All of these

20. Which one is best suited for learning algorithm pertaining to multilayer perceptron?

(A) Back propagation

(B) Hopfield Network

(C) Boltzmann machine

(D) None of these

21. The difference of $(115)_{16}$ and $(2 \cdot 54)_8$ is best approximated by

(A) $(275)_{10}$

(B) $(274 \cdot 3)_{10}$

(C) $(276)_8$

(D) $(270 \cdot 7)_8$

22. Let A and B be two arbitrary sets.

(i) $P(A \cap B) = P(A) \cap P(B)$, P is power set.

(ii) $P(A \cup B) = P(A) \cup P(B)$

Which one of the following is true?

(A) (i) and (ii) are both false.

(B) (i) is true but (ii) is false.

(C) Both (i) and (ii) are true.

(D) (i) is false but (ii) is true.

23. Which of the following is true for files?

(A) A file is an abstract data type defined and implemented by the O.S.

(B) The major task of the O.S. is to map the logical file concept onto physical storage devices.

(C) In a multilevel directory structure, we need to protect not only individual files but also collection of files in sub-directories.

(D) All of the above

24. Consider the following ordering of transactions:

T2 : R(x); T3 : W(x); T3 : Commit;

T1 : W(x); T1 : Commit; T2 : R(y); T2 : W(z);

T2 : Commit; T4 : R(x); T4 : R(y);T4 : Commit

Which of the following is true?

(A) S is not conflict serialisable and hence serialisable.

(B) S is conflict serialisable and hence serialisable.

(C) S is serialisable but not conflict serialisable.

(D) S is neither serialisable nor conflict serialisable.

25. What is the regular expression for the string starting and ending with different symbols 'a' and 'b'?

(A) $a*(a+b)b + b(a+b)*a$

(B) $a(a+b)*b + b(a+b)*a$

(C) $a(a+b)b* + b(a+b)a*$

(D) $a(a+b)b* + b*(a+b)a*$

26. 1677721 keys are stored in a completely balanced binary tree. What is the maximum number of accesses required to find a given key in such a tree?

(A) 19

(B) 21

(C) 20

(D) 22

27. Semantic Network supports inheritance in Artificial Intelligence through

(A) property inheritance

(B) Abstraction

(C) a form of cycle

(D) None of these

28. Access matrix is implemented by the following methods:

(A) global table

(B) access lists for objects

(C) capability lists for domains

(D) All of these

29. Which of the following command is used to update access and modification times of a file?

(A) *grep*

(B) *touch*

(C) *cat*

(D) *mesg*

30. Given $U = \{1, 2, 3, 4, 5, 6, 7\}$

Fuzzy set $K = \{(3, 0\cdot7), (5, 1), (6, 0\cdot8)\}$ then $\sim K$ will be: (where $\sim$ denotes fuzzy complement).

(A) $\{(4, 0\cdot7), (2, 1), (1, 0\cdot8)\}$

(B) $\{(4, 0\cdot3), (5, 0), (6, 0\cdot2)\}$

(C) $\{(1, 1), (2, 1), (3, 0\cdot3), (4, 1), (6, 0\cdot2), (7, 1)\}$

(D) $\{(3, 0\cdot3), (6, 0\cdot2)\}$

31. Coercion takes place

(A) across assignment operator.

(B) if an operator has operands of different data types.

(C) during 'casting'.

(D) for both (A) and (B).

32. Which of the following system resides always in main memory?

(A) Text Editor

(B) Assembler

(C) Linker

(D) Loader

33. Consider the relational schema R=(A,B,C,D) and the set of FDs $\{AB \to C, C \to D, D \to A\}$. The highest normal form of R is

(A) BCNF

(B) 3NF

(C) 2NF

(D) 1NF

34. Consider the following database schema:

Book (acc_no#, yr_pub, title)

User (card_no#, b_name)

Borrow (acc_no#, card_no#, doi)

Find the accession number of all books which are not currently available in the Library.

(A) $\Pi_{acc\_no\#}(\text{Book}) - \Pi_{acc\_no\#}(\text{Borrow})$

(B) $\Pi_{acc\_no\#}(\text{Borrow})$

(C) $\Pi_{acc\_no\#}(\text{Book})$

(D) None of the above

35. Which type of processor has the following attributes?

(i) Fixed and easily decoded instruction formats.

(ii) Fast, single-cycle instruction execution.

(iii) Hardwired rather than microprogrammed control.

(iv) Memory access limited mainly to load and store instructions.

(A) Array Processor

(B) Vector Processor

(C) RISC Processor

(D) CISC Processor

36. Which of the following is correct for .NET framework?

    (A) The core of .NET framework is CLR.

    (B) CLR is the implementation of the .NET virtual machine.

    (C) Both (A) and (B)

    (D) None of these

37. Consider the following database schema:

Book (acc_no#, yr_pub, title)

User (card_no#, b_name, b_address)

Supplier (s_name#, s_address)

Borrow (acc_no#, card_no#, doi)

Find out title of all books issued by Ajoy.

    (A) $\Pi_{\text{title}}\left(\left(\sigma_{\text{b\_name="Ajoy"}}(\text{User})\bowtie\text{Borrow}\right)\bowtie\text{Book}\right)$

    (B) $\Pi_{\text{title}}\left(\left(\sigma_{\text{b\_name="Ajoy"}}(\text{User}\bowtie\text{Borrow})\right)\bowtie\text{Book}\right)$

    (C) $\Pi_{\text{title}}\left(\left(\sigma_{\text{b\_name="Ajoy"}}\left((\text{User}\bowtie\text{Borrow})\bowtie\text{Book}\right)\right)\right)$

    (D) Both (A) and (B)

38. Software maintenance is done

    (A) before the delivery of the software.

    (B) after the delivery of the software.

    (C) during the development of the software.

    (D) during testing phase.

39. Match the following:

    (a) RAR   (i) Flag register

    (b) Signbit   (ii) Non-maskable

    (c) TRAP   (iii) Seven T-states

    (d) CMP M   (iv) Implicit addressing mode

Codes:

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

40. What is the minimum number of multiplications required for finding x^{23}?

    (A) 6

    (B) 5

    (C) 8

    (D) 7

41. A DFD does not contain

    (A) External entity

    (B) Data store

    (C) Process

    (D) Predicate

42. In Go-Back-N ARQ if header allows m bits of sequence number, then what will be the maximum window size of the sender and receiver?

    (A) 2^m, 1

    (B) $2^m - 1$, 1

    (C) 2^m, 2^m

    (D) 2^{m-1}, 1

43. The algorithm like Quick sort does not require extra memory for carrying out the sorting procedure. This technique is called

    (A) in-place

    (B) stable

    (C) unstable

    (D) in-partition

44. Suppose the letters a, b, c, d, e ,f have probabilities $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \frac{1}{32}$ and $\frac{1}{32}$ respectively. What is the average length of Huffman code?

    (A) 1·9375

    (B) 2·9486

    (C) 1·9486

    (D) 2·9375

45. Indicate which is a pre-emptive scheduling algorithm?

    (A) FIFO

    (B) Shortest job next

    (C) Round Robin

    (D) None of these

46. What is the cost of the following Knapsack problem instances if the number of items N=3, capacity of Knapsack M=20; Profits (P_1, P_2, P_3)=(35,24,15) and weights (W_1, W_2, W_3)=(18,15,11)?

    (A) 30·9

    (B) 28

    (C) 30

    (D) 28·9

47. Which of the following is a form of backbone of a knowledge driven learning content development?

    (A) Classification

    (B) Clustering

    (C) Ontology

    (D) Reasoning Development

48. In a B^+–tree of order n index file, each leaf node must contain

    (A) $\lceil n-1 \rceil$ values

    (B) $\left\lceil \dfrac{n(n-1)}{2} \right\rceil$ values

    (C) $\left\lceil \dfrac{(n-1)}{2} \right\rceil$ values

    (D) $\left\lceil \dfrac{n}{2} \right\rceil$ values

49. Which is not true about informed search?

    (A) Branch and Bound

    (B) Greedy Best First Search

    (C) Hill Climbing

    (D) Depth First Iterative Deep Search

50. The number of different relations from a set with m elements to a set with n elements is

    (A) mn

    (B) $m+n$

    (C) 2^{m+n}

    (D) 2^{mn}

51. Which of the following point lies on the same side as the origin with reference to the line $3x + 7y = 2$?

    (A) (3, 0)

    (B) (1, 0)

    (C) (0·5, 0·5)

    (D) (0·5, 0)

52. A biased die (3 appear twice as often as other number but other outcomes are equally likely) rolled once. What is the probability that an odd number appears?

   (A) 3/6

   (B) 1/6

   (C) 4/7

   (D) 2/7

53. Find the resolvant of $P \vee \sim (Q \wedge R)$ and $P \vee Q$.

   (A) $P \vee \sim R$

   (B) $\sim P \vee R$

   (C) $Q \vee \sim P$

   (D) None of these

54. 2-dimensional matrix A ($n \times n$) is to be stored in consecutive memory locations in a weird fashion as described below. The first element is stored at memory location 100. The first n elements are stored in increasing order of indices, the second n elements are stored in decreasing order of indices, the third n elements are stored in increasing order of indices and so on. Where would element A(6,7) be stored when $n=8$?

   (A) 146

   (B) 145

   (C) 144

   (D) 147

55. YACC builds

   (A) SLR parsing table

   (B) Canonical LR parsing table

   (C) LALR parsing table

   (D) None of the above

56. Which statement about Network Channels is wrong?

   (A) Request/reply (client/server) channel is used by the file transfer and digital library application.

   (B) Request/reply (client/server) channel has no need to guarantee that all messages are delivered.

   (C) Message stream channel could be used by both video-on-demand and video conferencing applications.

   (D) Message stream channel support both one or two-way traffic and delay properties.

57. Strassen's Matrix multiplication uses

   (A) Dynamic Programming Approach

   (B) Greedy Approach

   (C) Divide-and-Conquer Approach

   (D) Back-tracking Approach

58. The number of Flip-Flops required for Mod–18 counter is

   (A) 3

   (B) 5

   (C) 4

   (D) 6

59. Let $X = \{x_1, x_2, \ldots, x_n\}$ and $Y = \{y_1, y_2, \ldots, y_n\}$ be two item sets.

Let supp (X) denotes the support of item set X. Then the confidence of the rule $X \to Y$, denoted by conf$(X \to Y)$ is

   (A) supp $(X \cup Y)$ / supp (X)

   (B) supp (Y) / supp (X)

   (C) supp (X) / supp (Y)

   (D) supp $(X \cap Y)$ / supp (X)

60. Keys e, b, d, f, a, g, c are inserted to an empty binary tree B1. Similarly keys e, f, g, b, a, d, c and e, b, d, c, a, f, g are inserted to two empty binary trees B2 and B3 respectively. Then which of the following is correct?

(A) B2 and B3 are same.

(B) B1 and B2 are same.

(C) B1, B2 and B3 are same.

(D) B1, B2 and B3 are different.

61. In a two-pass assembler, the object code generation is done during

(A) second pass

(B) first pass

(C) before the code transformation

(D) None of the above

62. COCOMO deals with

(A) Cost estimation

(B) Effort estimation

(C) Project estimation

(D) All of the above

63. If h_1 and h_2 are two admissible heuristic functions, then which of the following may not be admissible?

(A) min (h_1, h_2)

(B) max (h_1, h_2)

(C) $(h_1 + h_2)/2$

(D) $(h_1 + h_2)$

64. Consider the statement: "Not everyone who plays is a footballer." If the predicate plays(x) is true if x plays and the predicate footballer(x) is true if x is a footballer, then which of the following predicate calculus expressions indicate the above statement.

(A) $\forall x$ footballer(x) $\Rightarrow$ plays(x).

(B) $\exists x$ plays(x) $\wedge \sim$footballer(x).

(C) $\exists x$ footballer(x) $\wedge \sim$plays(x).

(D) $\forall x$ plays(x) $\Rightarrow \sim$footballer(x).

65. In duality, if the primal has no feasible solution, then the dual

(A) must have no feasible solution.

(B) must have an unbounded solution.

(C) must have either no feasible solution or unbounded solution.

(D) no conclusion can be drawn.

66. Condition for the existence of a feasible solution to a transportation problem is

$$\sum_{i=1}^{m} a_i = \sum_{j=1}^{n} b_j$$

where a_i = quantity of commodity available at origin i.

b_j = quantity of commodity needed at destination j.
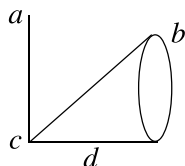
m = origins, n = destinations

The condition is

(A) necessary

(B) sufficient

(C) both necessary and sufficient

(D) None of the above

67. Which of the following are loop optimization techniques?

(A) Jamming

(B) Unrolling

(C) Induction variables elimination

(D) All of the above

68. Adjacency matrix representing the following graph is (vertices are listed in alphabetical order)

(A) $\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 2 \\ 1 & 1 & 0 & 1 \\ 0 & 2 & 1 & 0 \end{bmatrix}$

(B) $\begin{bmatrix} 0 & 1 & 0 & 1 \\ 0 & 0 & 2 & 1 \\ 1 & 2 & 0 & 1 \\ 0 & 0 & 2 & 0 \end{bmatrix}$

(C) $\begin{bmatrix} 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$

(D) $\begin{bmatrix} 0 & 2 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 1 & 1 & 0 \\ 0 & 2 & 0 & 1 \end{bmatrix}$

69.

x	y	z	B	D
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	1	0
1	0	0	0	1
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

The above truth table is for

(A) Full subtractor with D as difference and B as output borrow.

(B) Full subtractor with B as difference and D as output borrow.

(C) Full adder with B as carry and D as sum.

(D) Full adder with B as sum and D as carry.

70. In the poset given below what is the greatest lower bound and the least upper bound of {b, d, g}?
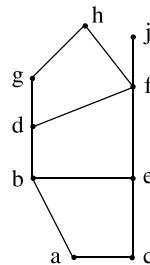
(A) b and g

(B) g and b

(C) b and d

(D) d and g

71. Which of the following is not true?

(A) As the memory management algorithm becomes more complex, the time required for mapping a logical address to a physical address increases.

(B) Swapping schemes allow less processes to be run than can be fit into memory at one time.

(C) A multiprogrammed system will generally perform more efficiently if it has a higher level of multiprogramming.

(D) Systems with variable-sized allocation units suffer from external fragmentation.

72. Consider a pipelined execution hardware. To identify hazards (RAW: read after write hazard; WAR: Write after read hazard; WAW: write after write hazard) we consider the sets of input and output operands (register or memory locations) associated with each instruction I_j entering the pipeline. The set of input operands I_j is defined as $D(I_j)$; the set of output operands of I_j as $R(I_j)$. Instruction I_2 follows I_1 in program order.

$$R(I_1) \cap D(I_2) \neq \phi \dots (i)$$

$$D(I_1) \cap R(I_2) \neq \phi \dots (ii)$$

$\cap$ denotes set intersection, ϕ denotes empty set. Which one of the following is correct?

(A) (i) is WAW.

(B) (ii) is WAR.

(C) (i) and (ii) both are RAW.

(D) (i) is RAW but (ii) is WAR.

73. Engineering Drawing commonly applies

(A) oblique projection

(B) orthographic projection

(C) perspective projection

(D) None of the above

74. Which of the following is not activity in the software process?

(A) Feasibility analysis

(B) Software marketing

(C) Software debugging

(D) Installation of software

75. Stress testing is included in

(A) Function testing

(B) Performance testing

(C) Black-box testing

(D) None of the above

76. Consider a hashing function that resolves collision by quadratic probing. Assume the address space is indexed from 1 to 8. Which of the following location will never be probed if a collision occurs at position 4?

(A) 4

(B) 7

(C) 5

(D) 2

77. The program design method to implement 0-0 programming—

(A) Bottom-up approach

(B) Top-down approach

(C) Declare-Define-Use

(D) Public function, Private Data

78. Consider $f(n) = g(n) + h^*(n)$, where the function g is a measure of the cost of getting from start node to the current node n, and h^* is an estimate of additional cost of getting from current node n to the goal node. Then $f(n) = h^*(n)$ is used in which of the following algorithm?

(A) A^* algorithm

(B) Greedy Best First

(C) Iterative A^*

(D) AO^*

79. Suppose a program contains 10% code to be executed serially. How does efficiency of processors change if the number of processors is increased from 4 to 8?

    (A)   0·697 to 0·858

    (B)   0·137 to 0·037

    (C)   0·769 to 0·588

    (D)   0·690 to 0·880

80. Regarding disk scheduling, which one is true?

    (A)   SSTF is better than FCFS.

    (B)   SSTF is not optimal in nature.

    (C)   The SCAN algorithm is sometimes called the elevator algorithm.

    (D)   All of the above

81.

	I_0	I_1	I_2	I_3
A'	0	①	2	③
B	4	⑤	⑥	7
	0	1	A	A'

The above table is for implementing the following with a multiplexer:

    (A) $F(A,B,C) = \sum(1,3,5,6)$

    (B) $F(A,B,C) = \sum(3,5,1,6)$

    (C) $F(A,B,C) = \sum(1,6,3,5)$

    (D) $F(A,B,C) = \sum(5,1,6,3)$

82. The mismatch in the speed of memory access and CPU speed can be reduced by

    (A)   Cache memory only.

    (B)   Memory inter-leaving.

    (C)   reducing the memory size.

    (D)   by both cache memory and memory interleaving.

83. The max-min composition *RoS* of the following fuzzy relations *R* and *S* which are given by

$$R = \begin{array}{c} x_1 \\ x_2 \end{array}\begin{pmatrix} y_1 & y_2 \\ 0.5 & 0.3 \\ 0.7 & 0.6 \end{pmatrix} \text{ and } S = \begin{array}{c} y_1 \\ y_2 \end{array}\begin{pmatrix} z_1 & z_2 & z_3 \\ 0.8 & 0.4 & 0.6 \\ 0.3 & 0.7 & 0.2 \end{pmatrix} \text{ is}$$

    (A) $RoS = \begin{array}{c} x_1 \\ x_2 \end{array}\begin{pmatrix} z_1 & z_2 & z_3 \\ 0.3 & 0.3 & 0.2 \\ 0.3 & 0.7 & 0.6 \end{pmatrix}$

    (B) $RoS = \begin{array}{c} x_1 \\ x_2 \end{array}\begin{pmatrix} z_1 & z_2 & z_3 \\ 0.5 & 0.4 & 0.5 \\ 0.7 & 0.4 & 0.6 \end{pmatrix}$

    (C) $RoS = \begin{array}{c} x_1 \\ x_2 \end{array}\begin{pmatrix} z_1 & z_2 & z_3 \\ 0.5 & 0.4 & 0.5 \\ 0.7 & 0.6 & 0.6 \end{pmatrix}$

    (D) $RoS = \begin{array}{c} x_1 \\ x_2 \end{array}\begin{pmatrix} z_1 & z_2 & z_3 \\ 0.3 & 0.4 & 0.2 \\ 0.7 & 0.6 & 0.6 \end{pmatrix}$

84. For a crisp set X = {x_1, x_2, . . ., x_n} the fuzzy Relation I on X × X defined by

$$\mu_I(x,y) = \begin{cases} 1, & \text{if } x = y \\ 0 & \text{if } x \neq y \end{cases}$$

is called

    (A) binary fuzzy function on X.

    (B) unit fuzzy function on X.

   (C) unit fuzzy function on Y.

    (D) None of the above

85. Consider the following statements:

S_1 : Super block contains the size of the inode list.

S_2 : Disk inode has a field for 'File Owner Identifier'.

    (A) S_1 is true and S_2 is false.

    (B) Both S_1 and S_2 are true.

    (C) S_1 is false and S_2 is true.

    (D) None of the above

86. A connected planar simple graph has 20 vertices, each of degree 3. Into how many regions does a representation of this planar graph split the plane?

    (A) 12

    (B) 20

    (C) 3

    (D) 60

87.
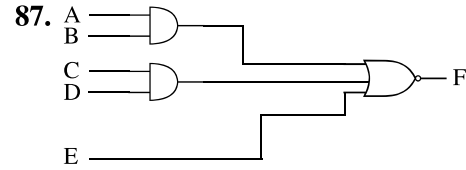
The diagram is for

    (A) $F = \left[(A+B)(C+D)E\right]'$

    (B) $F = (AB + CD + E)'$

    (C) $F = (AB + (C+D) + E)'$

    (D) $F = \left[(A+B) + CD + E\right]'$

88. A definite clause with no..., simply asserts a given proposition

    (A) Positive Literal

    (B) Negative Literal

    (C) Both (A) and (B)

    (D) Either (A) or (B)

89. Which statement is not true?

    (A) p/q is countable.

    (B) A string over $\sum = \{a,b\}*$ is countable.

    (C) Set of all turing machines are countable.

    (D) None of these

90. Suppose two strings S=ABAZDC and T=BACBAD are given. What would be the longest common subsequence for both the strings?

    (A) ABBD

    (B) ABCD

    (C) ABAD

    (D) None of the above

91. A 3-input neuron is trained to output a zero(0) when input is 110, and a one(1) when input is 111. After generalisation, the output will be zero when and only when the input is

    (A) 000│010│110│100

    (B) 010│100│110│101

    (C) 000│110│011│101

    (D) None of the above

92. Which of the following statements are true?

  (i) Function overloading is done at compile time.

 (ii) Protected members are accessible to the member of derived class.

(iii) A derived class inherits constructors and destructors.

(iv) A friend function can be called like a normal function.

 (v) Nested class is a derived class.

    (A) (i), (ii) and (iii)

    (B) (ii), (iii) and (v)

    (C) (iii), (iv) and (v)

    (D) (i), (ii) and (iv)
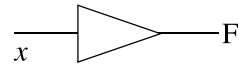
93. The data structure used by UNIX to maintain file identification is

    (A) itable

    (B) file table

    (C) master table

    (D) inode

94. Banker's algorithm for resource allocation deals with

    (A) Deadlock recovery

    (B) Deadlock avoidance

    (C) Deadlock prevention

    (D) Mutual exclusion

95. The truth table of the following :

	x	F
(A)	0	1
	1	0

	x	F
(B)	0	0
	1	1

	x	F
(C)	0	1
	1	1

	x	F
(D)	1	0
	0	0

96. Regarding a process deadlock, which one is correct?

    (A) All deadlock situations occur from unsafe states.

    (B) As long as the state is safe, the O.S. can avoid unsafe (and deadlocks) states.

    (C) An unsafe state must lead to a deadlock.

    (D) Both (A) and (B)

97. While initializing port A of 8255A in strobed bi-directional I/O mode, which pins of port C are used as handshake lines for port A?

(A) $PC_0 - PC_4$

(B) $PC_1 - PC_5$

(C) $PC_2 - PC_6$

(D) $PC_3 - PC_7$

99. Recursive languages are

(A) a proper subset of CFL.

(B) always recognizable by PDA.

(C) also called Type(O) Language.

(D) recognizable by TM.

98. A circle, if scaled in one dimension, becomes a/an

(A) parabola

(B) hyperbola

(C) ellipse

(D) new circle

100. Which one of the following are decidable?

(A) Is $L = \phi$ in CFL?

(B) Is $L_1 = L_2$ in CSL?

(C) Is $L_1 \cap L_2$ in CFL?

(D) None of these

ROUGH WORK

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