

PAPER - II (COMPUTER SCIENCE AND APPLICATION)

51. The I/O methods in which memory addresses and I/O addresses are distinct, is called :

- ☒ A. Isolated I/O
- B. Memory-Mapped I/O
- C. Strobe Control
- D. Handshaking
- E. Interrupt

mistake

Choose the most appropriate answer from the options given below :

- ☒ (1) A, B Only
- (2) C, D Only
- (3) C, E Only
- ☒ (4) B, E Only

52. Match List - I with List - II.

List - I

Boolean Expression

A. $x:(y+0)$

B. $\bar{x} \cdot 1 + (\bar{y} + z)$

C. $\bar{x} \cdot (\bar{y} + 0)$

D. $x \cdot 1 + (y + \bar{z})$

List - II

Dual of Boolean Expression

I. $(\bar{x}+0) \cdot (\bar{y} \cdot z)$

II. $x + y \cdot 1$

III. $\bar{x} + \bar{y} \cdot 1$

IV. $(x+0) \cdot (y \cdot \bar{z})$

Choose the correct answer from the options given below :

☒ (1) A-III, B-IV, C-II, D-I

☒ (2) A-III, B-IV, C-I, D-II

☒ (3) A-II, B-I, C-III, D-IV

(4) A-II, B-I, C-IV, D-III

53. Which of the following is the function of the semantic analysis phase of compilation process ?

- ☒ (1) Type conversion
- (2) Tokenization
- (3) Loop optimization
- (4) Data flow Analysis

54. Z is set of integers, $\langle Z, * \rangle$ forms group if * is :

- ☒ (1) $*(a, b) = a + b + 2$
- (2) $*(a, b) = 2a + b$
- (3) $*(a, b) = (a + b)/2$
- (4) $*(a, b) = a^2 + b$

closure, identity, inverse

55. Which of the following control problem does not exist, when processes unaware of each other during interaction ?

- ☒ (1) Mutual exclusion
- ☒ (2) Data coherence
- (3) Starvation
- ☒ (4) Deadlock

56. The techniques used to handle the phantom problem are _____.

- A. Time stamping
- B. Index locking
- C. Predicate locking
- D. Execution indexing

Choose the correct answer from the options given below :

- (1) A and B Only
- (2) B and C Only
- (3) A and D Only
- (4) C and D Only

Some Phantom locking - arises when two transactions logically conflict even though they do not lock a common data item

57. Techniques for performing I/O :

- A. Programmed I/O
- B. Interrupt-driven I/O
- C. Rotational I/O
- D. Direct memory access
- E. Channelized I/O

Choose the correct answer from the options given below :

- (1) A and C Only
- (2) A, B and D Only
- (3) A, D and E Only
- (4) B and E Only

58. Arrange the following from fastest to slowest in speed.

- A. DRAM
- B. SRAM
- C. CPU Registers
- D. Magnetic tapes
- E. Hard disk

Choose the correct answer from the options given below :

- (1) A, B, C, D, E
- (2) C, B, A, D, E
- (3) C, D, B, A, E
- (4) B, C, D, A, E

CPU > SRAM > DRAM > Hdd > Magnetic Tapes

59. The ratio of error found before s/w delivery and to the total errors (before and after) is called :

- (1) Accuracy
- (2) Specificity
- (3) Defect Removal efficiency
- (4) Through put

mistake

60. The chairs of an auditorium are to be labelled with a letter followed by a positive two digits integer where labelling is starting with A01. How many maximum possible chair could be labelled in this way ?

- (1) 2600
- (2) 2574
- (3) 2340
- (4) 2366

61. The output of the following C++ Program is :

```
#include <stdio.h>
```

```
int main (void)
```

```
{
```

```
    int x, *p;
```

```
    x = 30;
```

```
    p = x;
```

```
    print f ("%d", *p);
```

```
    return 0;
```

```
}
```

(1) 30

(2) value of x

(3) address of x

(4) Error

62. For the fuzzy sets $A = \{(x_1, 0.3), (x_2, 0.7), (x_3, 0.4)\}$ and $B = \{(x_1, 0.5), (x_2, 0.2), (x_3, 0.5)\}$, the $A \cap B$ would be :

(1) $\{(x_1, 0.3), (x_2, 0.7), (x_3, 0.4)\}$

(2) $\{(x_1, 0.5), (x_2, 0.2), (x_3, 0.5)\}$

(3) $\{(x_1, 0.5), (x_2, 0.7), (x_3, 0.5)\}$

(4) $\{(x_1, 0.3), (x_2, 0.2), (x_3, 0.4)\}$

63. The Cardinality of a fuzzy set is :

(1) 0

(2) finite

(3) infinite

(4) not known

64. An ambiguous grammar is one which has :

A. More than one derivations

B. More than one left most derivations

C. More than one right most derivations

D. More than one Parse tree

E. More than one syntax tree

Choose the correct answer from the options given below :

(1) A and D Only

(2) B and C Only

(3) D and E Only

(4) A and E Only

65. Arrange the steps of Mathematical Modeling :

A. Solution fitting with data

B. Formulation Mathematically

C. Solve Mathematically

D. Repeat formulation if it fit worst with data

E. Interpretation results

Choose the correct answer from the options given below :

(1) B, C, A, D, E

(2) B, A, D, C, E

(3) D, A, B, C, E

(4) E, D, C, A, B

66. An IPv4 packet has arrived with the first few hexadecimal digits as shown below. How many hops can this packet travel before being dropped? The data belong to what upper-layer protocol?

(5 4 0 0 0 0 18 0 0 1 0 0 1 1 0 0 4 0 6 0 1)₁₆

- (1) 01 hops, TCP (2) 02 hops, UDP (3) 03 hops, ICMP (4) 4 hops, TCP

67. The sequence of fields in an IP datagram will be :

- A. flags B. options C. Protocol
D. Identification E. Service type

Choose the correct answer from the options given below :

- (1) E, D, A, C, B (2) D, A, B, C, E
(3) D, E, C, B, A (4) E, C, D, A, B

68. Match List-I with List-II :

List - I

A. Channelization protocol

B. Bit-oriented protocol

C. Random-access protocol

D. Controlled-access protocol

List - II

I. ALOHA

II. TDMA Time division multiplexing

III. Reservation

IV. HDLC Link control

Choose the correct answer from the options given below :

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

69. For line drawing, which of the following algorithms are used ?

- A. DDA algorithm B. Bresenham algorithm
C. Mid point algorithm D. Curve algorithm

Choose the most appropriate answer from the options given below :

- (1) B and C Only (2) C and D Only
(3) A and B Only (4) D and A Only

70. Which of the following structures of knowledge representation are the most purely syntactic ?

- A. Conceptual dependency B. predicate logic
C. slot-and-filler D. nonmonotonic systems

Choose the correct answer from the options given below :

- (1) A and B Only (2) B and C Only
(3) B and D Only (4) C and D Only

CFL ISC - not closed

71. For the regular languages and context free languages which is not correct?

- A. both are closed under union operation T
- B. both are closed under concatenation operation T
- C. both are closed under intersection operation F
- D. both are closed under complementation operation F
- E. both are closed under kleen star operation T

Choose the most appropriate answer from the options given below :

- (1) A and B Only (2) B and C Only (3) C and D Only (4) D and E only

72. The number of tokens in the following line :

for i in range (begin : end : step) :
is :

- (1) 4 (2) 7 (3) 8 (4) 12

73. The sequence of steps for a page replacement algorithm will be :

- A. find a frame that is not currently being used
- B. change the page table
- C. use freed frame
- D. no frame is free
- E. free a frame

Choose the correct answer from the options given below :

- (1) D, A, E, B, C (2) E, B, A, C, D (3) B, E, A, D, C (4) D, E, B, A, C

74. Match List-I with List-II :

List - I

- A. Back Tracking
- B. Infinite languages with matching numbers
- C. Canonical LR Parser
- D. Post Correspondence Problem

List - II

- I. Automata
- II. Undecidable Problem
- III. Predictive Parser
- IV. Large number of states

Choose the correct answer from the options given below :

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

Advantage of Virtual Memory $\rightarrow$ based on non-contiguous memory allocation

75. Which of the following is not correct about the virtual memory segmentation?

(1) It is not necessary to load all of the segments of a process. **T**

(2) It has no internal fragmentation. **T False**

(3) It has large virtual address space. **T It creates an illusion of memory that is larger than real memory**

(4) It provides lower degree of multiprogramming. **T** **Impⁿ $\rightarrow$ Demand paging / segmentation**

76. Match List-I with List-II:

List - I

A. $A \rightarrow aB \mid a, a \in T, A, B \in V$

B. $A \rightarrow BC \mid a, a \in T, A, B, C \in V$

C. LL (1) grammar

D. Halting problem

List - II

I. Recursive Descent Parser

II. Turing Machine

III. Chomsky Normal Form

IV. Finite Automate

Choose the **correct** answer from the options given below:

(1) A-IV, B-III, C-I, D-II

(2) A-III, B-I, C-II, D-IV

(3) A-II, B-IV, C-III, D-I

(4) A-IV, B-III, C-II, D-I

77. Multiple Inheritance is permitted directly in.....

A. C++

B. Java

C. Python

D. VB.NET

E. BASIC (Visual basic)

Choose the **most appropriate** answer from the options given below:

(1) A and B Only

(2) A and C Only

(3) B and D Only

(4) A, C and E Only

78. Arrange the following in **correct** order, so that they can follow a proper run time environment:

A. Programming statement **I**

B. Compilation **III**

C. Memory allocation **IV**

D. Type of variable **II**

E. Memory deallocation **V**

Choose the **correct** answer from the options given below:

(1) A, B, C, D, E

(2) A, B, D, C, E

(3) B, A, D, C, E

(4) C, D, B, E, A

79. Which of the following genetic algorithm operation is computationally most expensive?

(1) Convergence testing

(2) Initial population creation

(3) Selection of sub-population for mating

(4) Reproduction to produce next generation

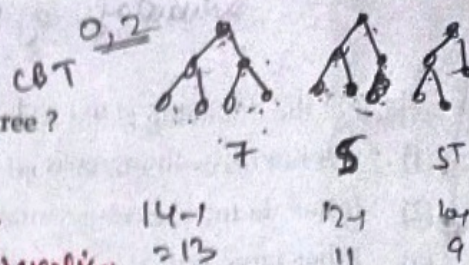
Crace

80. Which of the followings are true for a complete binary tree?

- A. It has always odd number of vertices. False
 B. With i internal vertices, it has $i + 1$ leaves. True
 C. With l leaves it has $l - 1$ vertices. F $(2l-1)$ vertices
 D. With $2n - 1$ vertices, it has n leaves. T

Choose the correct answer from the options given below:

- (1) A, B, C Only (2) B, C Only (3) A, D Only



4 leaves $2 \times 4 - 1 = 8 - 1 = 7$
 3 leaves $2 \times 3 - 1 = 6 - 1 = 5$
 (4) A, B, C, D $2 \times 6 - 1 = 12 - 1 = 11$
 $= 5$

81. How much time does an algorithm using 2^{50} bit operations need if each bit operation takes 2^{-38} second of time?

- (1) 1 hour (2) 10 minutes (3) 30 minutes (4) 1.5 hour

82. Which of the following statements is/are false?

- A. A user can assign privileges to any user on any relation. F
 B. A user can assign privileges to any user on its own relations only. F
 C. System error that leads to accessibility to the portion of database is an example of malicious attack. T
 D. Passwords itself need to be secured from unauthorized access. T update

Choose the correct answer from the options given below:

- (1) A and C Only (2) A and B Only (3) B and D Only (4) B and C Only

83. Lower-triangular sparse matrix is one:

- (1) in which all the non-zero elements lie only on the leading diagonal. dia - 0
 (2) in which all the non-zero elements lie above leading diagonal.
 (3) in which all the non-zero elements lie below leading diagonal.
 (4) which is not defined for sparse matrix.

84. Arrange in appropriate order, the construction of a finite automata:

- A. Minimum State DFA B. Regular Expression
 C. NFA- ϵ D. Problem Statement
 E. DFA

Choose the correct answer from the options given below:

- (1) B, C, E, A, D (2) D, B, C, E, A (3) C, E, B, A, D (4) A, D, C, B, E

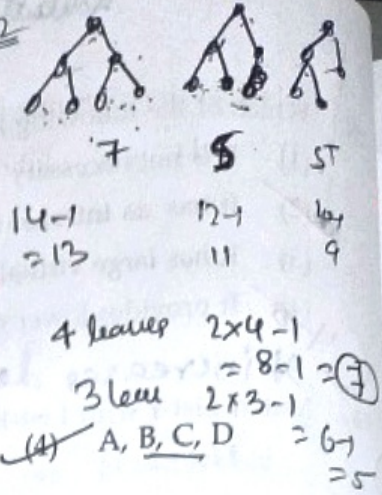
Crace

80. Which of the followings are true for a complete binary tree?

- A. It has always odd number of vertices. **False**
 B. With i internal vertices, it has $i+1$ leaves. **True**
 C. With l leaves it has $l-1$ vertices. **F** $(2l-1)$ vertices
 D. With $2n-1$ vertices, it has n leaves. **T**

Choose the correct answer from the options given below:

- (1) A, B, C Only (2) B, C Only (3) A, D Only



81. How much time does an algorithm using 2^{50} bit operations need if each bit operation takes 2^{-38} second of time?

- (1) 1 hour (2) 10 minutes (3) 30 minutes (4) 1.5 hour

Total time = No. of bit operation $\times$ time per bit operation
 $= 2^{50} \times 2^{-38} = 2^{12}$ second
 $= 4096$ second

82. Which of the following statements is/are false?

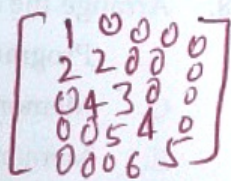
- A. A user can assign privileges to any user on any relation. **F**
 B. A user can assign privileges to any user on its own relations only. **F**
 C. System error that leads to accessibility to the portion of database is an example of malicious attack. **T** **False**
 D. Passwords itself need to be secured from unauthorized access. **T** **update**

Choose the correct answer from the options given below:

- (1) A and C Only (2) A and B Only (3) B and D Only (4) B and C Only

83. Lower-triangular sparse matrix is one: **Useful in numerical analysis, scientific computing & so on**

- (1) in which all the non-zero elements lie only on the leading diagonal.
 (2) in which all the non-zero elements lie above leading diagonal.
 (3) in which all the non-zero elements lie below leading diagonal.
 (4) which is not defined for sparse matrix.



84. Arrange in appropriate order, the construction of a finite automata:

- A. Minimum State DFA B. Regular Expression
 C. NFA- ϵ D. Problem Statement
 E. DFA

Choose the correct answer from the options given below:

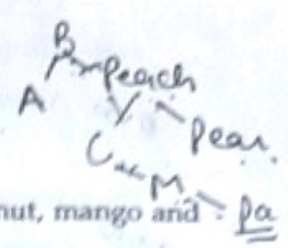
- (1) B, C, E, A, D (2) D, B, C, E, A (3) C, E, B, A, D (4) A, D, C, B, E

85. Which of the following is not a characteristics of a specialized embedded OS?
- (1) real time scheduling policy. $\checkmark$
 - (2) responds to external interrupts $\checkmark$
 - (3) provides special non-sequential files. $\checkmark$
 - (4) provides fixed or variable sized partitions. $\checkmark$

mnop

86. The height of a binary search tree for the words banana, peach, apple, pear, coconut, mango and papaya using alphabetical order is :
- (1) 2
 - (2) 3
 - (3) 4
 - (4) 5

BST



87. Match List-I with List-II :

- List - I
- A. RAID level-2 ~~not~~
 - B. RAID level-3 ~~not~~
 - C. RAID level-4 ~~not~~
 - D. RAID level-6 ~~not~~

- List - II
- I. block-interleaved
 - II. error-correcting-code
 - III. reed-solomon codes
 - IV. bit-interleaved

Redundant array of independent disks

Choose the correct answer from the options given below :

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

need to check

88. Arrange the following examples of Artificial Intelligence (AI) in the order of increasing complexity :
- A. Spam email detection using rule-based systems.
 - B. Handwritten digit recognition using shallow neural networks.
 - C. Image classification using convolutional neural networks.
 - D. Autonomous driving using reinforcement learning algorithms.

this order reflects rule-based systems to complex deep learning models.

Choose the correct answer from the options given below :

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

89. What is the total delay (latency) for a frame size of 10 million bits that is being set up on a link with 20 routers, each having a queuing time of $2 \mu s$ and a processing time of $1 \mu s$? The length of link 5000 km. The speed of light inside the link is 2×10^8 m/s. The link has bandwidth of 6 Mbps.

- (1) 0.624050 s.
- (2) 1.691726 s.
- (3) 2.425080 s.
- (4) 1.714030 s.

90. The following code :

stmt $\rightarrow$ if expr then stmt else stmt
| if expr then stmt

suffers from :

(1) Ambiguity

(2) Left factoring

(3) Left Recursion

(4) λ -moves

S $\rightarrow$ salt

91. The parameter Actual count is used in Genetic Algorithm (GA) for :

(1) Crossover

(2) Mutation

(3) Selecting population

(4) Encoding the Genetic Algorithm

92. For making a memory of size 2048×8 bytes, by using the chips of size 128×4 bytes, the number of chips required is :

(1) 8

(2) 16

(3) 32

(4) 64

*32
256
2048
2048 $\times$ 8
128 $\times$ 4
64
32
16
8*

93. Which of the following is not the most common property in social network ?

(1) Degree distribution follows scale free.

(2) Average shortest path lengths are shorten in connected network.

(3) Most of them are directed network.

(4) Follows small world property.

*SR Bottom up - LR
- connect two parties*

94. Shift-Reduce conflicts are resolved by :

(1) Left recursion

(2) Left factoring

(3) Ambiguity

(4) Associativity and Precedence

95. Regarding the subroutines, see the following sequence of tasks to be performed :

A. Turn on the interrupt facility on.

B. Service the device whose flag is set.

C. Save the contents of processor registers.

D. Check which flag is set.

E. Restore the contents of processor registers.

Choose the correct answer from the options given below :

(1) A, D, C, B, E

(2) D, A, B, C, E

(3) C, D, B, E, A

(4) B, D, A, C, E

Match List-I with List-II :

List - I

- A. Union
- B. Function
- C. Interactive Environment
- D. Output device

List - II

- I. Virtual Reality
- II. Shadow mask
- III. Subroutine
- IV. User defined data type

technology produce color image on CRT

Choose the correct answer from the options given below :

- (1) A-IV, B-III, C-I, D-II
(2) A-II, B-IV, C-I, D-III

- (3) A-IV, B-II, C-III, D-I
(4) A-I, B-III, C-IV, D-II

2x4

97. Which of the followings are sequential circuit ? *input → o/p*

- A. Flip flop ✓
- B. Multiplexer
- C. Counter ✓
- D. Decoder
- E. Adder

Combinational

Choose the correct answer from the options given below :

- (1) B, D Only
(2) A, C Only
(3) C, E Only
(4) D, A Only

pip-flop counter Register Clock

98. In Genetic Algorithm's cross over operation, mask is used in ?

- (1) Three parent crossover
- (2) Two parent crossover
- (3) Uniform crossover
- (4) N point crossover

0, 1, F

99. Arrange the following sets in increasing order, on the basis of their cardinality :

- A. $A_1 = \{\{1, 2\}, \{3\}\}$ 2
- B. $A_2 = \{\{1\}, \{2\}, \{3\}, \{4\}\}$ 4
- C. $A_3 = \{\{1, 2, 3, 4, 5\}\}$ 1
- D. $A_4 = \{\{1, 2\}, \{2, 3, 4\}, \{5\}\}$ 3
- E. $A_5 = \{\{1\}, \{2\}, \{3\}, \{4\}, \{5\}\}$ 5

Choose the correct answer from the options given below :

- (1) A, B, D, E, C
(2) A, B, E, D, C
(3) A, C, D, B, E
(4) C, A, D, B, E

100. Which of the followings are tautology ?

- A. $(p \vee r) \rightarrow p$ T
- B. $p \rightarrow (p \wedge r)$
- C. $\sim p \rightarrow (p \rightarrow r)$
- D. $(p \wedge r) \rightarrow (p \rightarrow r)$
- E. $\sim(p \rightarrow r) \rightarrow p$

Choose the correct answer from the options given below :

- (1) A, E Only
(2) A, B, C Only
(3) C, D Only
(4) C, D, E Only

T F → F

p	r	$p \vee r$	$p \rightarrow (p \wedge r)$	$\sim p \rightarrow (p \rightarrow r)$	$(p \wedge r) \rightarrow (p \rightarrow r)$	$\sim(p \rightarrow r) \rightarrow p$
T	T	T	T	T	T	T
T	F	T	F	T	F	T
F	T	T	T	T	T	T
F	F	F	T	T	T	T

101. If $f(n) = 5f(n/2) + 3$ and $f(1) = 7$ is a recurrence relation where K is positive integer, then $f(2^K) =$
- (1) $5^K (31/4) - 3/4$ (2) $5^K (29/4)$
 (3) $2^K (31/4) - 3/4$ (4) $2^K (29/4)$

102. For the software quality assurance, which of the followings are correct ?

- A. Execution of code
 B. No execution of code
 C. Preventive technique
 D. A corrective technique

Choose the correct answer from the options given below :

- (1) A, B Only (2) B, C Only (3) C, D Only (4) D, A Only

103. Match List - I with List - II. $f(n) = af(n/b) + g(n)$ is a divide-and-conquer recurrence relation for the Listed-I algorithms, match their recurrence in Listed-II.

List - I

Divide-and-conquer based algorithms

- A. Binary Search
 B. Find maximum and minimum of a sequence
 C. Merge Sort
 D. Fast Matrix Multiplication

List - II

Recurrence Relation

- I. $f(n) = 7f(n/2) + 15n^2/4$
 II. $f(n) = 2f(n/2) + n$
 III. $f(n) = 2f(n/2) + 2$
 IV. $f(n) = f(n/2) + 2$

Choose the correct answer from the options given below :

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

104. Which of the followings sequence $\{a_n\}$ are the solution of recurrence relation $a_n = 8a_{n-1} - 16a_{n-2}$?

- A. $a_n = 1$ B. $a_n = 2^n$ C. $a_n = 4^n$
 D. $a_n = n4^n$ E. $a_n = (-4)^n$

Choose the most appropriate answer from the options given below :

- (1) A, B, C Only (2) B, C, D Only (3) C, D Only (4) C, D, E Only

105. The instructions

ADD R₁, A, B

ADD R₂, C, D

MUL X, R₁, R₂

evaluates the $X = (A + B) * (C + D)$ in which of the following ?

(1) 3 - Address instructions

(3) 1 - Address instructions

(2) 2 - Address instructions

(4) RISC instructions

106. Which of the following is **not** the goal of reverse Engineering ?

(1) Cope with complexity

(3) Detect side effect

(2) Recover lost information

(4) Data flow

107. Arrange the following so that they can be placed in perfect/appropriate order.

A. Planning

C. Modeling

E. Deployment

B. Construction

D. Communication

Choose the **correct** answer from the options given below :

(1) A, B, C, D, E

(2) D, A, C, B, E

(3) A, D, B, C, E

(4) B, C, D, A, E

108. Match List-I with List-II :

List - I

A. Batch Multiprogramming

B. Time sharing

C. Monitor

D. Reentrant Procedures

List - II

I. allows more efficient use of main memory

II. user no longer has direct access to the processor

III. Maximize processor use

IV. minimize response time

Choose the **correct** answer from the options given below :

(1) A-III, B-II, C-IV, D-I

(3) A-I, B-III, C-IV, D-II

(2) A-III, B-IV, C-II, D-I

(4) A-II, B-I, C-IV, D-III

109. Which of the following is **not** an object Oriented Programming language ?

(1) Pearl

(2) Python

(3) Small talk

(4) SQL Plus

110. The order of steps of Address Translation in Linux Virtual Memory Scheme will be :

A. register

B. offset (Address)

C. Page directory

D. Page table

E. Page middle directory

Choose the **correct** answer from the options given below :

(1) B, A, D, E, C

(2) A, C, E, D, B

(3) D, C, A, B, E

(4) C, A, D, E, B

111. Services provided by point-to-point protocol (PPP) :

- A. frame format
- B. establishment of the link
- C. flow control
- D. sequence numbering
- E. authentication

Choose the correct answer from the options given below :

- (1) A, B and E Only
- (2) A, C and D Only
- (3) D, E and B Only
- (4) B, C and D Only

112. What is a perceptron in ANN ? *single, multi* *It does not have feedback*

- (1) A double layer auto-associative neural network.
- (2) A neural network that contains feedback.
- (3) An auto-associative neural network.
- (4) A single layer feed-forward neural network with pre-processing.

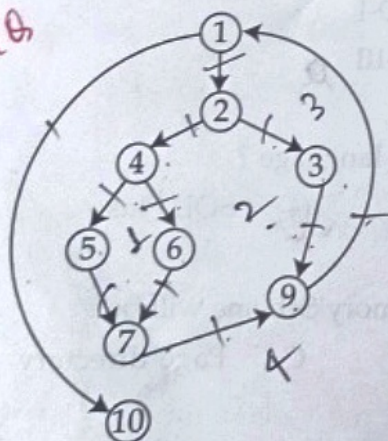
113. A least integer n such that $f(x)$ is $O(x^n)$ for each of the following functions. Arrange following according to the value of n in increasing order :

- A. $f(x) = 3x^3 + (\log x)^4$ *$O(n^3)$*
- B. $f(x) = (x^5 + x^2 + 1)/(x^3 + 1)$ *$O(n^2)$*
- C. $f(x) = (x^3 + x^2 + 1)/(x^2 + 1)$ *$O(n)$*
- D. $f(x) = (x^2 + 5 \log x)/(x^2 + 1)$ *$O(1)$*

Choose the correct answer from the options given below :

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

114. The cyclomatic complexity of the following flow graph is :



(1) 3

(2) 4

(3) 10

(4) 2

*P+1
bounded + unbounded*

E-V+2

11-10+2

= 10+2 = 12

2+2=4

115. Arrange the following simple graphs based on number of spanning tree they have :
- A. K_3 [Complete Graph with 3 nodes]
 B. K_4 [Complete Graph with 4 nodes]
 C. $K_{2,2}$ (Complete bipartite graph of the 2 nodes in each partition)
 D. C_5 (Cycle graph of 5 nodes)

Choose the correct answer from the options given below :

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

116. The least values of a signed and unsigned data type variables requiring 8 bits, would be.....
- (1) 0, 128 (2) -128, 127 (3) 0, 0 (4) -128, 0

117. Match List-I with List-II :

List - I

Line coding scheme

- A. NRZ-L
 B. 2B1Q
 C. 4D-PAM 5
 D. MLT-3

List - II

Bandwidth (average)

- I. $B = N/4$
 II. $B = N/8$
 III. $B = N/3$
 IV. $B = N/2$

Choose the correct answer from the options given below :

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

118. The language of the following PDA would be :

$$\delta(q_0, a, z_0) = (q_0, aaaz_0)$$

$$\delta(q_0, a, a) = (q_0, aaaa)$$

$$\delta(q_0, b, a) = (q_1, \lambda)$$

$$\delta(q_1, b, a) = (q_1, \lambda)$$

$$\delta(q_1, \epsilon, z_0) = (q_f, z_0), \text{ where } q_f \text{ is a final state.}$$

- (1) $\{a^n b^n | n > 0\}$ (2) $\{a^n b^{2n} | n > 0\}$ (3) $\{a^n b^{3n} | n > 0\}$ (4) $\{a^n b^{4n} | n > 0\}$

119. A computer system with cache access time of 100 ns, a main memory access time of 1100 ns, and a hit ratio of 0.9, then average access time would be :

- (1) 200 ns (2) 190 ns (3) 210 ns (4) 120 ns

120. The instruction LD ADR(X) which is equivalent to $AC \leftarrow M[ADR + XR]$ is in : In

- (1) Direct Addressing Mode (2) Indirect Addressing Mode
(3) Index Addressing Mode (4) Immediate Addressing Mode

121. Which of the followings are White box Testing ? BCD

- A. Path Testing B. Loop Testing
C. Regression Testing D. Non functional Testing

Choose the correct answer from the options given below :

- (1) A and B Only (2) B and C Only (3) C and D Only (4) A and D Only

122. IP is responsible for _____ communication while TCP is responsible for _____ communication. B-B

- (1) Node-to-node, Host-to-host (2) Process-to-process, Host-to-host
(3) Socket-to-socket, Host-to-node (4) Host-to-Host, Process-to-process

123. According to the Nyquist theorem, to produce the original analog signal, one necessary condition is :

- (1) Sampling rate must be at least 2 times the highest frequency contained in the signal.
(2) Sampling rate must be at least 2 times the lowest frequency contained in the signal.
(3) Sampling rate must be at least $\frac{1}{2}$ times the highest frequency contained in the signal.
(4) Sampling rate must be at least $\frac{1}{2}$ times the lowest frequency contained in the signal.

124. For the following Parents in figure (1) and (2) :

Parent ₁	10110	010
Parent ₂	10101	111

figure (1)

Cross over points

Parent ₁	10110	111
Parent ₂	10101	010

figure (2)

Which is correct ?

- (1) figure (2) is the two point crossover of figure (1)
(2) figure (2) is one point crossover of figure (1)
(3) figure (2) is N'point crossover of figure (1)
(4) figure (2) is uniform crossover of figure (1)

125. Match List-I with List-II :

- List - I**
- A. Thread spawn
 - B. Block thread
 - C. Jacketing
 - D. Flush

- List - II**
- I. to convert a blocking system call into a nonblocking call.
 - II. to reclaim pages
 - III. processor turn to the execution of another ready thread.
 - IV. thread is provided with its own register context.

Choose the correct answer from the options given below :

(1) A-I, B-III, C-IV, D-II

(3) A-IV, B-III, C-I, D-II

(2) A-IV, B-III, C-II, D-I

(4) A-II, B-I, C-IV, D-III

126. In windows scheduling, which of the following option is correct ?

(1) 4 non-real-time priorities

(2) 8 non-real-time priorities

(3) 12 non-real-time priorities

(4) 16 non-real-time priorities

127. What will be the order of the following fields in a frame relay 'frame format' ?

A. Flag

B. FCS

C. address

D. information

Choose the correct answer from the options given below :

(1) A, C, D, B

(2) D, A, C, D

(3) C, B, A, D

(4) A, B, D, C

128. What will be the ordering of typical steps when processing a high-level query ?

A. Query optimizer

B. Runtime database processor

C. Scanning, passing and validating

D. Query code generator

Choose the correct answer from the options given below :

(1) D, A, C, B

(2) C, A, D, B

(3) C, D, B, A

(4) D, C, B, A

129. Which of the following is/are true in case of tree locking ?

A. It ensures shorter waiting times.

B. It ensures freedom from deadlock.

C. Transaction can lock data items earlier.

D. It does not ensure greater amount of concurrency.

Choose the correct answer from the options given below :

(1) A and B Only

(2) C and D Only

(3) B and C Only

(4) A and D Only

Asynchronous Transfer Mode

130. Which of the followings are type of interface in an ATM network ?

- A. user-to-user B. user-to-network C. network-to-network
D. host-to-network E. user-to-host

Choose the correct answer from the options given below :

- (1) A and B Only (2) B and C Only (3) C and D Only (4) D and E Only

131. A bit string of length four is generated at random. What is probability that it contains at least two consecutive 0's given that first bit is 0 ?

- (1) $\frac{1}{2}$ (2) $\frac{5}{16}$ (3) $\frac{5}{8}$ (4) $\frac{1}{4}$

132. Match List - I with List - II.

List - I

- A. Complement
B. Ex-OR
C. Accumulator
D. Control Unit

List - II

- I. Adder
II. Instruction decoding
III. Negative number representation
IV. Arithmetic and Logic operations

Choose the correct answer from the options given below :

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

xor

ALU
CU

133. Back propagation is a learning technique that adjusts weights in the neural network by propagating weight changes :

- (1) Forward from source to hidden nodes
(2) Backward from sink to source
(3) Forward from source to sink
(4) Backward from sink to hidden nodes

sink to source

134. Match List-I with List-II :

List - I

- A. Verification
B. Validation
C. Internal logic exercise
D. Software requirement exercise

List - II

- I. White box Testing
II. Black box Testing
III. Quality Control
IV. Quality Assurance

Choose the correct answer from the options given below :

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

135. For the fuzzy set $A = \{(x_1, 0.3), (x_2, 0.7), (x_3, 0.4)\}$, the complement of A would be represented as :

- (1) $\{(x_1, 0.4), (x_2, 0.3), (x_3, 0.1)\}$ (2) $\{(x_1, 0.3), (x_2, 0.7), (x_3, 0.4)\}$
 (3) $\{(x_1, 0.7), (x_2, 0.3), (x_3, 0.6)\}$ (4) $\{(x_1, 0.21), (x_2, 0.28), (x_3, 0.12)\}$

136. Which of the following is the Markup language ?

- A. HTML B. XML C. DHTML D. LML E. PML

Choose the correct answer from the options given below :

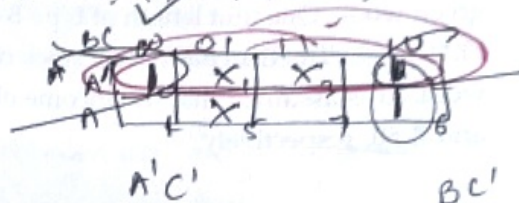
- (1) B, C, D Only (2) A, C, D Only (3) A, C, D, E Only (4) A, B, C Only

137. The Boolean expression for the following would be :

$F(A, B, C) = \Sigma(0, 2, 6)$

$d(A, B, C) = \Sigma(1, 3, 5)$

- (1) $A'C' + BC'$ (2) $B + AC'$ (3) $A + BC'$ (4) $A' + BC'$



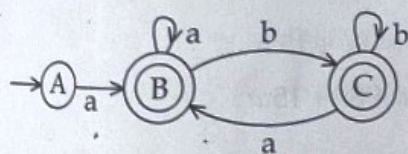
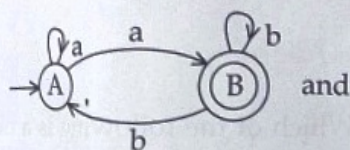
138. Which of the following have truth values if universe of discourse consists of all integers ?

- A. $\forall n \exists m (n^2 < m)$ B. $\exists n m (n < m^2)$
 C. $\exists n \exists m (n^2 + m^2 = 5)$ D. $\exists n \exists m (n^2 + m^2 = 6)$
 E. $\exists n \exists m (m + n = 4 \wedge n - m = 1)$

Choose the correct answer from the options given below :

- (1) A, B, C Only (2) B, C, E Only (3) C, D, E Only (4) B, D Only

139. For the given two machines which of the following is correct ?



Handwritten notes for machine 1: a^*a , $a^*ab^*ba^*ab^*$, a^*a , aa^*b , aa^*bb^* , a^*ab^* , a^*a , ba^*ab^*

Handwritten note for machine 2: $aa^*bb^*aa^*bb^*$

- (1) both Machines are DFAs (2) both are non-equivalent Machines
 (3) both are equivalent Machines (4) cannot be determined

140. Arrange the following prefix expressions based on their values in increasing order :

A. $+ - * 2 / 8 4 3 2$ 3

B. $\uparrow - * 3 3 * 4 2 5$ 1

C. $+ - \uparrow 3 2 \uparrow 2 3 / 6 - 4 2$ 4

D. $* + 3 + 3 \uparrow 3 + 1 1 3$ 96

$\frac{4}{16} = \frac{1}{4}$

Choose the correct answer from the options given below :

(1) A, B, C, D

(2) B, A, C, D

(3) D, C, B, A

(4) C, D, A, B

Answer the following 5 questions based on the passage. (141-145)

A firm can produce two type of cloth say A and B. Three kind of wool are required for it, say red wool, green wool and blue wool. One unit length of type A cloth needs 2 yards of red and 3 yards of green wool. One unit length of type B cloth needs 3 yards of red wool, 2 yards of green wool and 2 yards blue wool. The firm has only a stock of 8 yards of red wool, 10 yards of green wool and 15 yards of blue wool. It is assumed that the income obtained from one unit length of type A and type B cloths are ₹ 30 and ₹ 50, respectively.

141. On the basis of available material, maximum total income is :

(1) ₹ 133.3

(2) ₹ 124

(3) ₹ 100

(4) ₹ 153.3

$\begin{matrix} R & G & B \\ 8 & 10 & 15 \end{matrix}$

142. If x unit length of type A cloths and y unit length of type B cloths, then constraints formulate for the LPP, is :

(1) $y \leq 7.5, 2x + 3y \leq 8, 3y + 2x \leq 10$

(2) $y \leq 7.5, 2x + 3y \leq 8, 3x + 2y \leq 10$

(3) $2x + 3y \leq 8, 3x + 2y + 2z \leq 15$

(4) $2x + 3y \leq 10, 3x + 2y \leq 10, 2y \leq 15$

$\begin{matrix} 1x + 2R + 3G \\ 1y + 3R + 2G + 2B \end{matrix}$

143. Which of the following will be appropriate objectives function for the given problem ?

(1) $2x + 3y$

(2) $3x + 2y + 2z$

(3) $30x + 50y$

(4) $3x + 2y$

144. When we formulate the LPP from the above given passage. Which of the following is a objective function for its dual problem ?

(1) $\text{Min } P = 5u + 8v + 15w$

(2) $\text{Min } P = 8u + 10v + 15w$

(3) $\text{Min } P = 15u + 5v + 8w$

(4) $\text{Max } P = 10u + 8v + 15w$

145. How many unit length used for cloth A when income is maximized ?

(1) 0.8 unit

(2) 2.4 unit

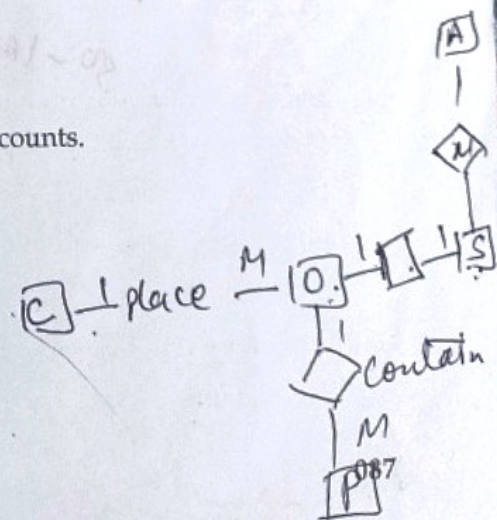
(3) 2.8 unit

(4) 3.0 unit

Answer the following 5 questions based on the passage. (146-150)

A company is implementing a new database system to manage its customer information. The database contains tables for customers, orders, products and sales representatives. Each customer can place multiple orders and each order can contain multiple products. Each customer can have specific sales representatives who manages the account. The database is designed to improve efficiency in tracking sales and customer interactions.

146. Which SQL query retrieves the total number of distinct customers who have placed orders ?
 (1) ☒ Select COUNT (DISTINCT customer_id) As total_customers From orders;
 (2) ☐ Select COUNT (*) As total_customers From customers;
 (3) ☐ Select COUNT (DISTINCT order_id) As total_customers from orders;
 (4) ☐ Select COUNT (DISTINCT customer_id) As total_customers from customers;
147. Which of the following best describes the relationship between the "orders" table and the "Customers" table in the company's database system ?
 (1) ☐ One-to-One (2) ☒ One-to-Many (3) ☐ Many-to-One (4) ☐ Many-to-Many
148. Which of the following tables is likely to have a foreign key referencing another table in the database system implemented by the company ?
 (1) ☐ Customers (2) ☒ Orders (3) ☒ Products (4) ☐ Sales representatives
149. Which SQL query retrieves the total ^{sum} number of orders placed by a specific customer ?
 (1) ☐ Select COUNT (*) As total_orders from orders where customer_id = [Customer_ID];
 (2) ☒ Select COUNT (order_id) As total_orders from orders where customer_id = [Customer_ID];
 (3) ☐ Select COUNT (DISTINCT order_id) As total_orders from orders Where customer_id = [Customer_ID];
 (4) ☒ Select SUM (order_id) As total_orders from orders where customer_id = [Customer_ID];
150. Based on the passage, which of the following statements is true ?
 (1) ☐ Each customer can place only one order. ✓
 (2) ☒ Each sales representative can manage multiple customer accounts.
 (3) ☐ Each order can be associated with only one product. ✓
 (4) ☐ The database does not include a table for products. ✓



- o o o -