S/SO/2013/03

COMPUTER APPLICATION

Roll No.	BOOKLET NO.	3101
Candidate should write his/her Roll No. in the box above. ↑		Total No. of Questions : **150**
Time : **2** Hours]	No. of Printed Pages : **40**	[Total Marks : **300**

INSTRUCTIONS FOR CANDIDATES

1. *All* questions are compulsory.

2. *All* questions carry equal marks.

3. The question paper contains **150** questions. The examinee should verify that the requisite number of questions are printed in the question paper, otherwise he should ask for another question paper.

4. The cover page indicates the number of printed pages in the question paper. The examinee should verify that the requisite number of pages are attached in the question paper otherwise he should ask for another question paper.

5. Read carefully the instructions given on the answer-sheet supplied and indicate your answers accordingly.

6. Kindly make necessary entries on the answer-sheet only at the places indicated and nowhere else.

7. Examinees should specially pay attention that **2** marks will be awarded for correct answer.

8. Examinees should do all rough work on the space meant for rough work on the last page of the question paper and nowhere else, not even on the answer-sheet.

1. Which of the following statements is *true* ?

   (A) ROM is a Read/Write memory

   (B) PC points to the last instruction that was executed

   (C) Stack works on the principle of LIFO

   (D) All instructions affect the flags

2. Merge sort uses :

   (A) Divide and conquer strategy

   (B) Backtracking approach

   (C) Heuristic search

   (D) Greedy approach

3. The principle of locality justifies the use of :

   (A) Interrupts (B) DMA

   (C) Polling (D) Cache memory

4. Which of the following page replacement algorithms suffers from Belady's anomaly ?

   (A) Optimal replacement (B) FIFO

   (C) LRU (D) Both (A) and (C)

5. What is the distance of the following code ?

   000000, 010101, 000111, 011001, 111111

   (A) 2 (B) 3

   (C) 4 (D) 1

6. Which scheduling policy is most suitable for a time shared operating system ?

(A) Shortest job first (B) Round Robin

(C) FCFS (D) Elevator

7. For merging two sorted lists of sizes m and n into a sorted list of size m + n, we requires comparisons of :

(A) O(m) (B) O(n)

(C) O(m + n) (D) O(log m + log n)

8. The minimum number of edges in a connected cyclic graph on n vertices is :

(A) n – 1 (B) n

(C) n + 1 (D) None of these

9. The number of elements in the power set P(S) of the set S = {ϕ, 1, (2, 3)} is :

(A) 2 (B) 4

(C) 8 (D) None of these

10. The capacity of a memory unit is defined by the number of words multiplied by the number of bits/word. How many address and data lines are needed for a memory of 4K × 16 :

(A) 12 Address, 16 Data lines (B) 10 Address, 16 Data lines

(C) 11 Address, 8 Data lines (D) 12 Address, 12 Data lines

11. The postfix expression for the infix expression :

$$A + B * (C + D)/F + D * E$$

is :

(A) AB + CD + * F/D + E *

(B) ABCD + * F/DE * ++

(C) A * B + CD/F * DE ++

(D) A + * BCD/F * DE ++

12. The speed imbalance between memory access and CPU operation can be reduced by :

(A) increasing the size of memory

(B) reducing the size of memory

(C) cache memory and paging

(D) cache memory and memory interleaving

13. From a given tautology, another tautology can be derived by interchanging :

(A) 0 and 1

(B) AND and OR

(C) 0 and 1j AND and OR

(D) Impossible to always derive

14. The recurrence relation $T(1) = 2$

$$T(n) = 3T\left(\frac{n}{4}\right) + n$$

has the solution T(n) equal to :

(A) O(n)

(B) O(log n)

(C) $O(n^{3/4})$

(D) None of these

15. A binary search tree is generated by inserting in order the following integer :

50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24.

The number nodes in the left subtree and right subtree of the root respectively is :

(A) (4, 7)

(B) (7, 4)

(C) (8, 3)

(D) (3, 8)

16. The *correct* matching for the following pairs is :

(*a*)	All pairs shortest paths	(1)	Greedy
(*b*)	Quick sort	(2)	Depth first search
(*c*)	Minimum weight spanning tree	(3)	Dynamic Programming
(*d*)	Connected component	(4)	Divide and Conquer

(A) (*a*)-(2), (*b*)-(4), (*c*)-(1), (*d*)-(3)

(B) (*a*)-(3), (*b*)-(4), (*c*)-(1), (*d*)-(2)

(C) (*a*)-(3), (*b*)-(4), (*c*)-(2), (*d*)-(1)

(D) (*a*)-(4), (*b*)-(1), (*c*)-(2), (*d*)-(3)

17. Given :

$$\sqrt{(224)_r} = (13)_r,$$

the value of the radix r is :

(A) 10

(B) 8

(C) 5

(D) 6

18. The period of signal is 100 ms. What is its frequency in kilohertz ?

(A) 10^{-1} kHz (B) 10^{-2} kHz

(C) 10^{-3} kHz (D) 10^{-4} kHz

19. A digital signal has sixteen levels. How many bits are needed per level ?

(A) 2 (B) 3

(C) 1 (D) 4

20. We have a channel with 1-MHz bandwidth. The SNR for this channel is 63. What are the appropriate bit rate ?

(A) 6 Mbps (B) 4 Mbps

(C) 2 Mbps (D) 1 Mbps

21. Find the degree of polynomial $x^6 + x + 1$:

(A) 1 (B) 4

(C) 6 (D) 2

22. Stop and wait protocol is used for :

(A) Noisy channel (B) Noiseless channel

(C) Both (A) and (B) (D) None of these

23. Gigabit Ethernet has a data rate of :

(A) 10 Mbps (B) 100 Mbps

(C) 1000 Mbps (D) None of these

24. Wireless LAN specification is :

(A) IEEE 802.3 (B) IEEE 802.4

(C) IEEE 802.5 (D) IEEE 802.11

25. Framing is a function of :

(A) Physical layer (B) Network layer

(C) Transport layer (D) Data link layer

26. Which addresses will change from Network to Network :

(A) IP Address (B) Port Address

(C) MAC Address (D) None of these

27. The depth of a complete binary tree with 'n' nodes is (log is to base two) :

(A) $\log(n - 1) + 1$ (B) $\log(n)$

(C) $\log(n + 1) - 1$ (D) $\log(n) + 1$

28. System calls are usually invoked by using :

(A) Software interrupt (B) Polling

(C) An indirect jump (D) A privileged instructions

29. Consider the regular expression (0 + 1) (0 + 1) ..... n times. The minimum state finite automation that recognizes the language represented by this regular expression contains.

(A) n states
(B) n + 1 states
(C) n + 2 states
(D) None of these

30. Which of the following is the most powerful parsing method ?

(A) LL(1)
(B) Canonical LR
(C) SLR
(D) LALR

31. Zero has two representations in :

(A) Sign magnitude
(B) 1's complement
(C) 2's complement
(D) None of these

32. RAID configurations of disks stands for :

(A) Random Access Integrated Disks
(B) Random Array Independent Disks
(C) Random Access Independent Disks
(D) None of the above

33. The Boolean function $x'y' + xy + x'y$ is equivalent to :

(A) $x' + y'$
(B) $x + y$
(C) $x + y'$
(D) $x' + y$

34. Software mistakes during coding are known as :

(A) Failures (B) Defects

(C) Bugs (D) All of these

35. A node with indegree = 0 and outdegree ≠ 0 is called :

(A) Source node (B) Destination node

(C) Transfer node (D) None of these

36. For a function of n variables robustness testing of boundary value analysis yields :

(A) 4n + 1 (B) 4n + 3

(C) 6n + 1 (D) None of these

37. Beta testing is carried out by :

(A) Users (B) Developers

(C) Testers (D) All of these

38. DD Path graph is called as :

(A) Design to Design Path graph

(B) Defect to Defect Path graph

(C) Destination to Destination Path graph

(D) Decision to Decision Path graph

39. Cyclomatic complexity is denoted by :

(A) $V(G) = e - n + 2P$

(B) $V(G) = \pi + 1$

(C) V(G) = Number of regions of the graph

(D) All of the above

40. Mutation testing is related to :

(A) Fault seeding (B) Functional testing

(C) Fault checking (D) None of these

41. Top down approach is used for :

(A) Development (B) Identification of faults

(C) Validation (D) Functional testing

42. Regression testing is known as :

(A) The process of retesting the modified parts of the software

(B) The process of testing the design documents

(C) The process of reviewing the SRS

(D) None of the above

43. CMM stands for :

(A) Capacity Maturity Model

(B) Capability Maturity Model

(C) Cost Management Model

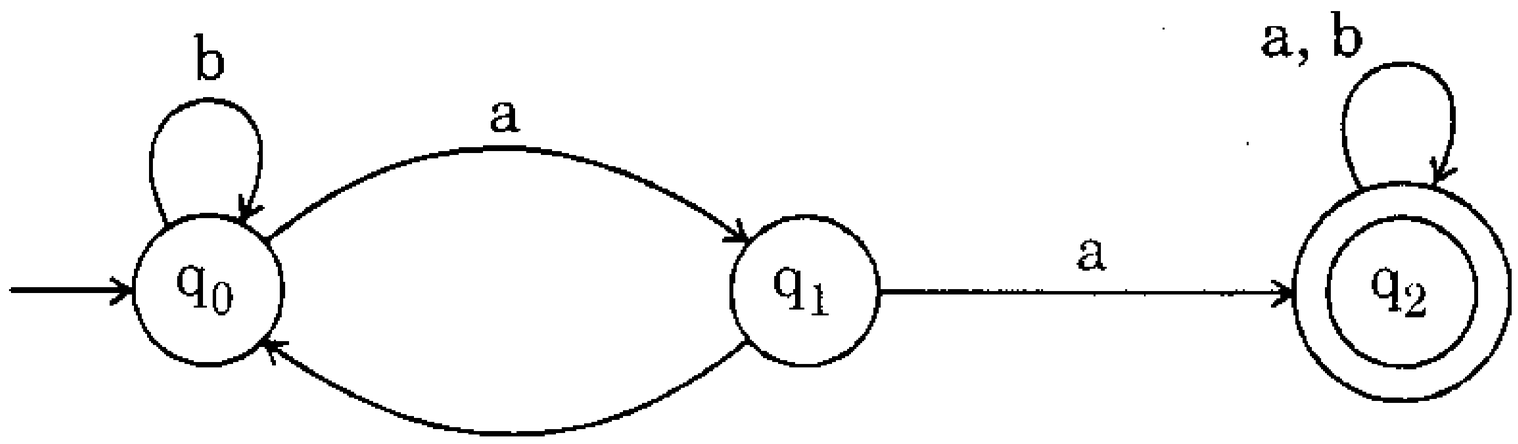
(D) Comprehensive Maintenance Model

44. FSM can recognize :

(A) any grammar (B) only CFG

(C) any unambiguous grammar (D) only regular grammar

45. Consider a DFA whose transition diagraph is shown below :



Find a regular grammar equivalent to the DFA machine.

(A) $A_0 \rightarrow bA_0 | aA_1$

$A_1 \rightarrow aA_2 | bA_0 | a$

$A_2 \rightarrow bA_2 | aA_2 | a | b$

(B) $A_0 \rightarrow aA_0 | bA_1$

$A_1 \rightarrow aA_2 | bA_0 | a$

$A_2 \rightarrow bA_2 | aA_1 | b$

(C) $A_0 \rightarrow bA_0$

$A_1 \rightarrow aA_2 | bA_0$

$A_2 \rightarrow bA_2 | aA_2 | a | b$

(D) None of these

46. Consider a grammar G = ({S, A}, {a, b}, P, S) where P consists of the following production rule :

$S \rightarrow A$

$A \rightarrow aAb$

$A \rightarrow ab$

Language generated by above grammar is :

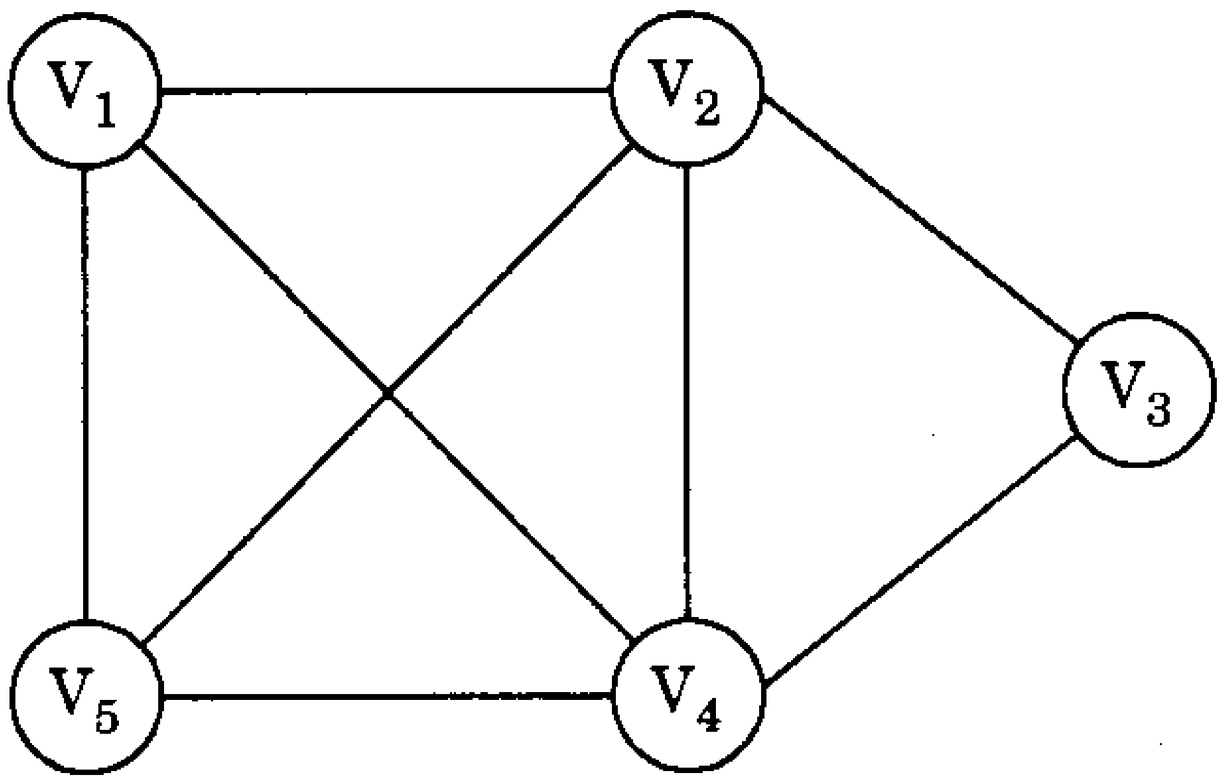
(A) $L(G) = \{a^n b^n | n \geq 1\}$

(B) $L(G) = \{a^n b^{n+1} | n > 1\}$

(C) $L(G) = \{a^{n-1} b^{n-1} | n \geq 1\}$

(D) None of the above

47. Given an undirected Graph G = (V, E) :



Find the maximal clique in the above graph :

(A) $\{V_1, V_2, V_3\}$ (B) $\{V_2, V_3, V_4\}$

(C) $\{V_1, V_2, V_4, V_5\}$ (D) $\{V_1, V_2, V_3, V_4, V_5\}$

48. Backtracking is equivalent to :

(A) depth-first search (DFS) (B) BFS (Breadth First Search)

(C) Prism algorithm (D) Spanning tree

49. What is the output of the following C function ?

```
main( )
{
int a = 5 :
do
{
        printf("%d|n", a);
        a = –1;
}
        while (a > 0);
}
```

(A) 4 (B) 3

(C) 6 (D) 5

50. What is the output of the following C-code ?

```
main( )
{
        int arr[ ] = {0, 1, 2, 3, 4};
        int i, * ptr;
        for(ptr = & arr[0], i = 0; i < = 4; i++)
        printf("%d", arr[i]);
}
```

(A) 0 1 2 3 4 (B) 1 2 3 4 5

(C) 0 1 2 3 (D) 2 3 4 5 6

51. To avoid race condition the number of processes that may be simultaneously inside their critical section :

(A) 0 (B) 1

(C) 2 (D) 3

52. If process values have 12 then 6V and 4P (Semaphore) operations the resultant value is :

(A) 12 (B) 10

(C) 14 (D) 8

53. Consider the following grammar :

$S \rightarrow (S)$

$S \rightarrow x$

Which of the following statements is (are) *true* ?

(I) The grammar is ambiguous.

(II) The grammar is suitable for top-down parsing.

(III) The grammar is suitable for bottom-up parsing.

(A) I only (B) II only

(C) III only (D) II and III only

54. Which of the following characteristics of a programming language is best specified using a context-free grammar ?

(A) Identifier length

(B) Maximum level of resting

(C) Operator precedence

(D) Type compatibility

55. The grammar $S \rightarrow aSa \mid bS \mid c$ is :

(A) LL(1) but not LR(1)

(B) LR(1) but not LR(1)

(C) Both LL(1) and LR(1)

(D) Neither LL(1) nor LR(1)

56. Let L_1 be recursive language. Let L_2 and L_3 be language that are recursively enumerable but not recursive. Which of the following statements is *not* necessarily *true* ?

(A) $L_2 - L_1$ is recursively enumerable

(B) $L_1 - L_3$ is recursively enumerable

(C) $L_2 \cap L_1$ is recursively enumerable

(D) $L_2 \cup L_1$ is recursively enumerable

57. The best data structure to check whether an arithmetic expression has balanced parenthese is a :

(A) Queue (B) Stack

(C) Tree (D) List

58. The purpose of the following program fragment :

```
b = s + b;

S = b – S;

b = b – S;
```

(A) transfer the contents of S to b

(B) swap the contents of S and b

(C) transfer the contents of b to S

(D) none of the above

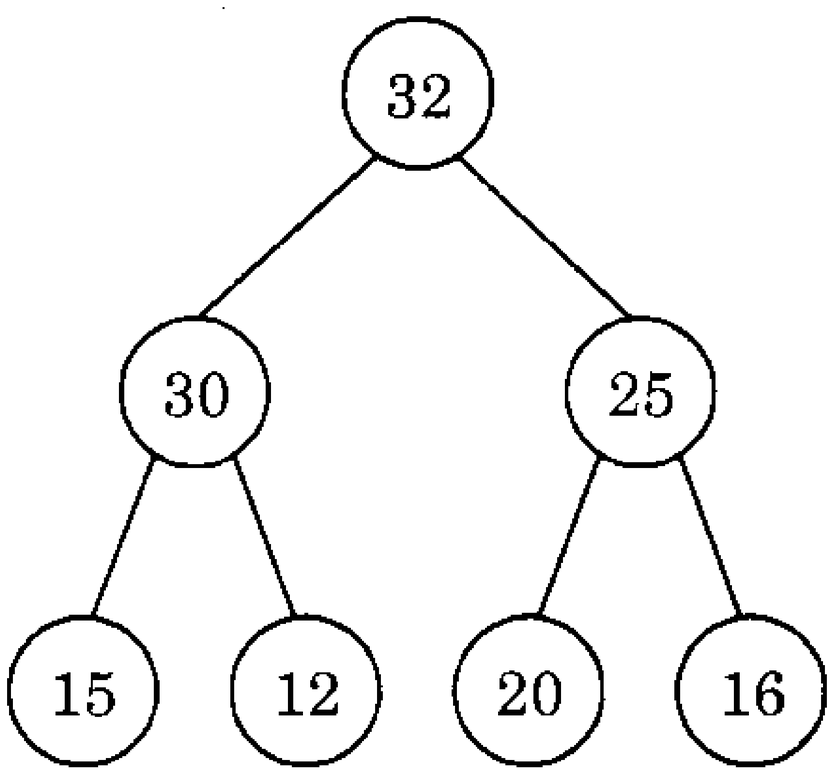
59. Which of the following traversing technique lists the nodes of a binary search tree ascending order ?

(A) Preorder (B) Postorder

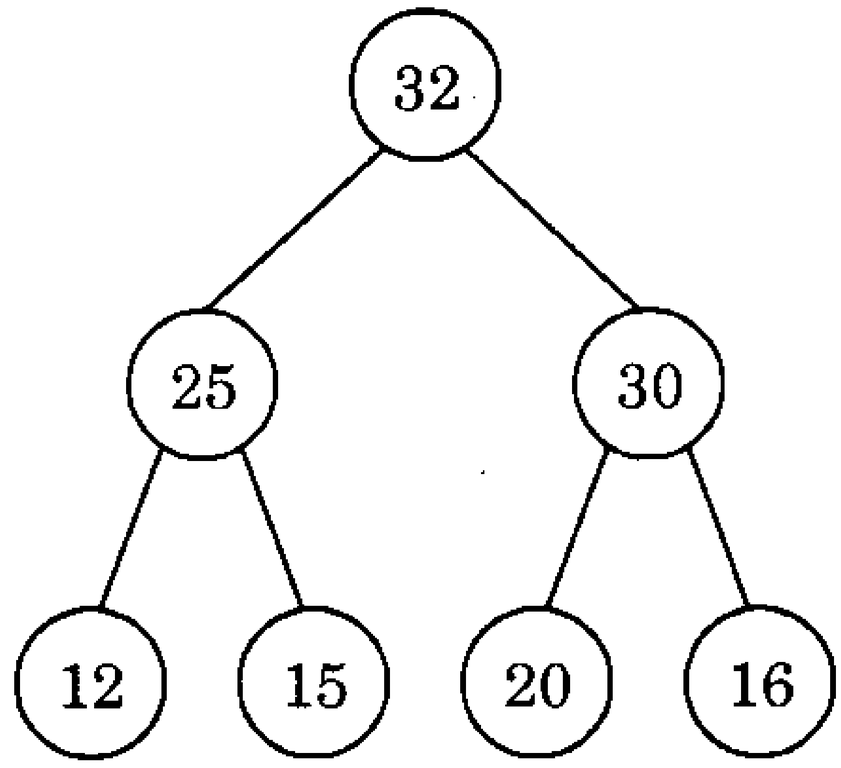
(C) Inorder (D) None of these

60. The elements 32, 15, 20, 30, 12, 25, 16 are inserted one by one in the given order into a max Heap. The resulting max Heap is :

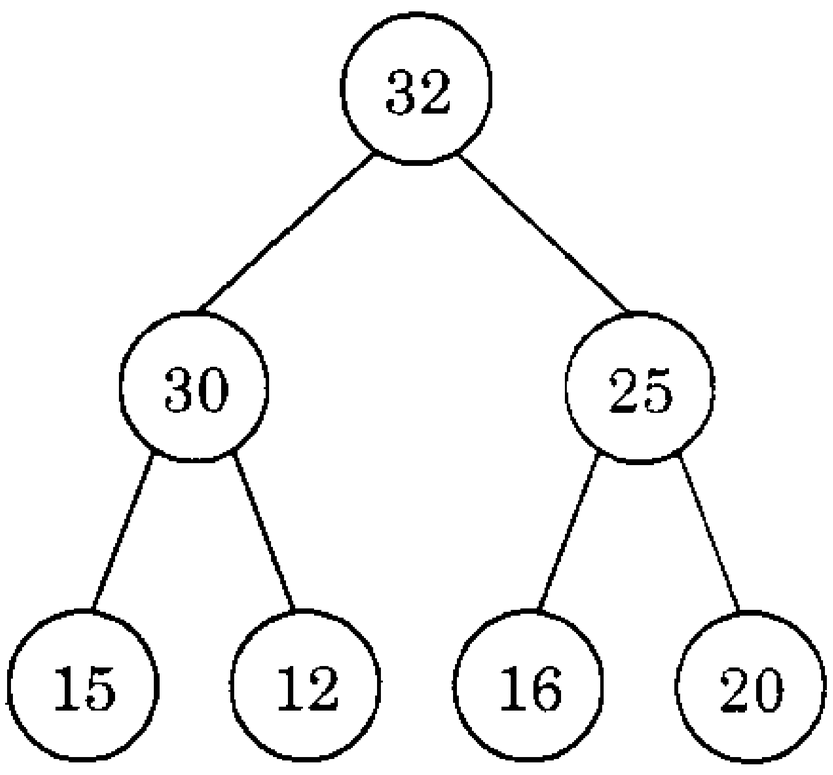
(A)



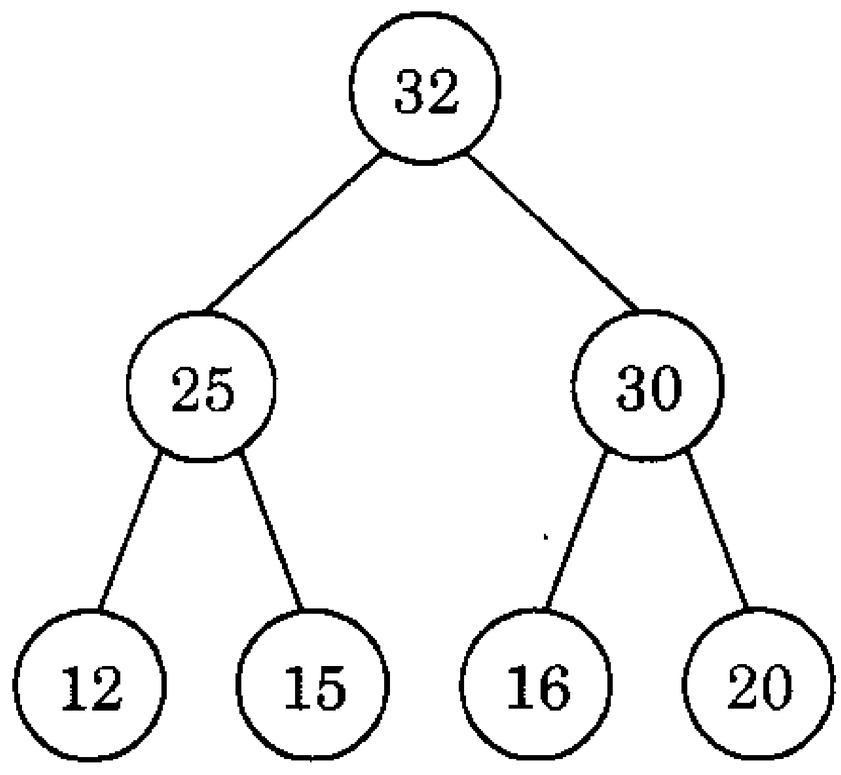
(B)



(C)



(D)



61. The most efficient algorithm for finding the number of connected components in an undirected graph of n vertices and m edges has time complexity :

(A) $\theta(n)$ (B) $\theta(m)$

(C) $\theta(m + n)$ (D) $\theta(mn)$

62. If $p \rightarrow q$ then :

(A) if p then q

(B) it is true if p is false

(C) it is false if p is true

(D) all of these

63. The average successful search time for sequential search on 'n' items is :

(A) n/2

(B) (n + 1)/2

(C) (n – 1)/2

(D) log(n) + 1

64. Find the gray code for decimal number 17 :

(A) 11001

(B) 111001

(C) 10001

(D) 111110

65. Whether a given pattern constitutes a token or not :

(A) depends on target language

(B) depends on source language

(C) depends on compiler

(D) all of the above

66. Which one of the following algorithm design techniques is used in finding all pair shortest distance in a graph ?

(A) Dynamic Programming

(B) Backtracking

(C) Greedy

(D) Divide and Conquer

67. Which of the following conflicts *cannot* arise in LR parsing ?

(A) Shift—Reduce

(B) Reduce—Shift

(C) Reduce—Reduce

(D) Shift—Shift

68. A garbage is :

(A) Allocated storage

(B) Unallocated storage

(C) Uninitialized storage

(D) Allocated storage with all access paths to it destroyed

69. DAG representation of a basic block allows :

(A) Automatic detection of loop invariant

(B) Automatic detection of induction variables

(C) Automatic detection of local common subexpressions

(D) None of the above

70. Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames of 1024 words each. Find out the number of bits in the logical address and the number of bits in the physical address.

(A) Logical Address = 13 bits
Physical Address = 15 bits

(B) Logical Address = 15 bits
Physical Address = 13 bits

(C) Logical Address = 3 bits
Physical Address = 5 bits

(D) None of the above

71. Fork( ) system call is used to :

(A) Create a subprocess (B) Create a child process

(C) Create a parent process (D) None of these

72. Related files grouped into one file using the extension :

(A) bat (B) txt

(C) dll (D) zip

73. Open source operating system is a :

(A) Windows XP (B) Macintosh

(C) Linux (D) None of these

74. Number of processes completed per time unit, is known as :

(A) Turnaround time (B) CPU utilization

(C) Throughput (D) None of these

75. Consider the following code, function draw is a :

```
class shape {
  public;
    virtual void draw( ) = 0;
};
```

(A) virtual function

(B) pure virtual function

(C) member function overloading

(D) none of the above

76. Type of an object is determined at runtime through the use of :

(A) typeid( ) (B) typecast( )

(C) datatype (D) none of these

77. What kinds of applications should consider using final classes and final member functions ?

(A) Performance sensitive applications that are I/O bound

(B) Performance sensitive applications that are CPU bound

(C) Applications that are system centric

(D) None of the above

78. Consider the following program fragment :

```
if(a = 0)
printf("a is zero");
else
printf("a is not zero");
```

results in the printing of :

(A) a is zero (B) a is not zero

(C) garbage (D) none of these

79. The size of virtual memory depends on :

(A) The size of the data bus

(B) The size of the main memory

(C) The size of the address bus

(D) None of the above

80. The addressing mode used in an instruction of the form ADD X, Y is :

(A) absolute (B) immediate

(C) indirect (D) index

81. Which of the following architecture is *not* suitable for SIMD ?

(A) Vector processor (B) Array processor

(C) Von Neumann (D) None of these

82. The postfix of the equivalent of the prefix :

* + ab – cd

is :

(A) ab + cd – * (B) abcd + – *

(C) ab + cd * – (D) None of these

83. The number of possible binary trees with 3 nodes is :

(A) 12 (B) 13

(C) 5 (D) 15

84. The output of the lexical analyser is a :

(A) Set of regular expression

(B) Syntax tree

(C) Set of tokens

(D) String of characters

85. If every non-key attribute is functionally dependent on the primary key, then the relation will be in :

(A) First normal form

(B) Second normal form

(C) Third normal form

(D) Fourth normal form

86. E-R modelling technique is a :

(A) top-down approach

(B) bottom-up approach

(C) left-right approach

(D) none of these

87. A trigger is :

(A) a statement that enables to start any DBMS

(B) a statement that is executed by the user when debugging an application program

(C) a condition the system tests for the validity of the database user

(D) a statement that is executed automatically by the system as a side effect of a modification to the database

88. Assume transaction A holds a shared lock R. If transaction B also requests for a shared lock on R :

(A) it will result in a deadlock situation

(B) it will immediately be granted

(C) it will immediately be rejected

(D) it will be granted as soon as it is released by A

89. Example of RDBMS is :

(A) Oracle (B) My-SQL

(C) MS-Access (D) None of these

90. The topology with highest reliability is :

(A) bus (B) star

(C) ring (D) mesh

91. Hop to Hop delivery is performed by :

(A) Physical Layer (B) Datalink Layer

(C) Network Layer (D) Transport Layer

92. A best effort delivery service is provided by :

(A) IP (B) TCP

(C) UDP (D) ARP

93. Logical Address is related to :

(A) Physical Layer (B) Datalink Layer

(C) Network Layer (D) Transport Layer

94. Most Local Area Network uses physical address of :

(A) 48 bit (B) 64 bit

(C) 128 bit (D) 256 bit

95. Distributed Coordination Function (DCF) in 802.11 uses a technique :

(A) CSMA/CD (B) CSMA/CA

(C) RTS-CTS (D) None of these

96. Router is normally implemented at which layer of OSI model ?

(A) Physical Layer (B) Datalink Layer

(C) Network Layer (D) Transport Layer

97. Find the class of the following IP address :

252.5.15.111

(A) A (B) B

(C) C (D) E

98. In an IPV_4 packet, the value of HLEN is 1000 in binary. How many bytes of options are being carried by this packet ?

(A) 12 Bytes (B) 16 Bytes

(C) 24 Bytes (D) 32 Bytes

99. HTTP uses the services of TCP on well known port :

(A) 80 (B) 78

(C) 18 (D) 48

100. Static web page is created by :

(A) HTML (B) DHTML

(C) XML (D) JSP

101. In network security, if we use private and public keys of the sender and receiver then the system is known as :

(A) Symmetric cryptosystem

(B) Asymmetric cryptosystem

(C) Non-uniform cryptosystem

(D) None of the above

102. Obtain the disjunctive normal forms of :

$$P \wedge (P \rightarrow Q)$$

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

(C) $(P \wedge \neg P) \wedge (P \vee Q)$ (D) None of these

103. Consider a grammar G, whose production rules are shown below :

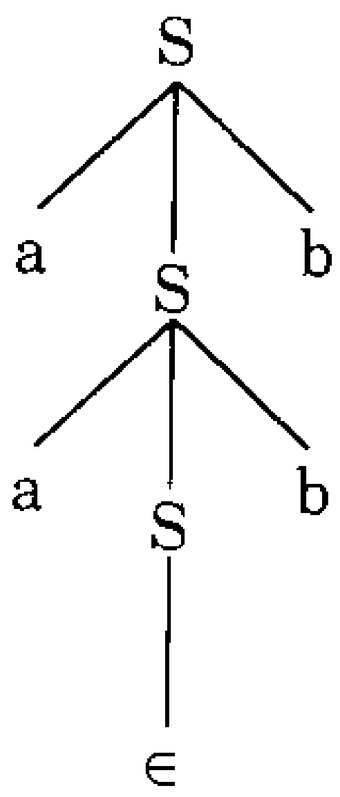
$S \rightarrow aSb$

$S \rightarrow SS$

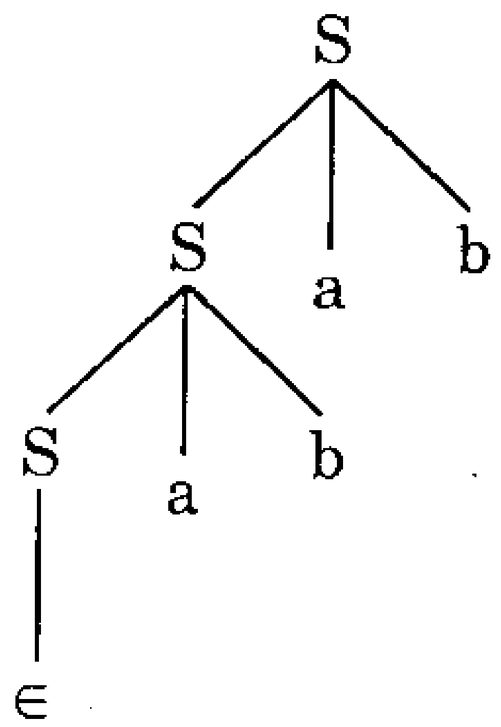
$S \rightarrow \in$

Select the *correct* parse tree :

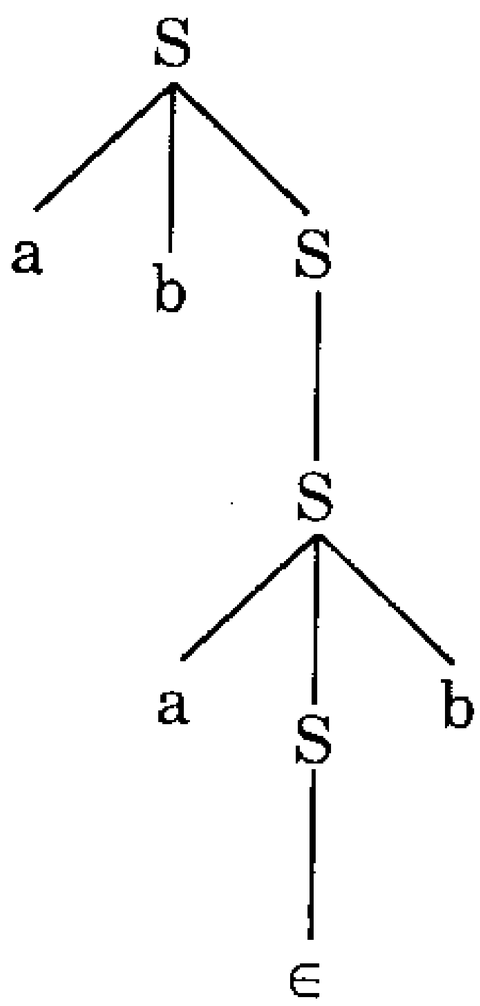
(A)



(B)



(C)



(D) None of these

104. Time complexity of algorithm T(n) with n as input size, is given by

$$T(n) = T(n-1) + \frac{1}{n}, \quad \text{if } n > 1$$

$$= 1, \quad \text{otherwise}$$

the order of this algorithm :

(A) n (B) log(n)

(C) n^n (D) None of these

105. Run time complexity of heapsort is :

(A) O(lg n) (B) O(n)

(C) O(n lg n) (D) None of these

106. Run time complexity of quick sort in most case is :

(A) θ(n) (B) $\theta(n^2)$

(C) θ(lg n) (D) None of these

107. A red-black tree with n internal nodes has height at most :

(A) 2log(n) (B) log(n)

(C) 2log(n + 1) (D) log(n + 1)

108. The intersection of regular language and context free language is :

(A) always a context free language

(B) always a regular language

(C) always a context sensitive language

(D) none of the above

109. Which of the following is *not true* about dynamic type checking ?

(A) this type checking is done during execution

(B) it increases the cost of execution

(C) all type errors are detected

(D) none of the above

110. A program that translate a high-level language program into a machine language program :

(A) Compiler (B) Assembler

(C) Linker (D) Debugger

111. A language that is suitable for AI :

(A) PROLOG (B) JAVA

(C) SIMULA (D) BASIC

108. The intersection of regular language and context free language is :

(A) always a context free language

(B) always a regular language

(C) always a context sensitive language

(D) none of the above

109. Which of the following is *not true* about dynamic type checking ?

(A) this type checking is done during execution

(B) it increases the cost of execution

(C) all type errors are detected

(D) none of the above

110. A program that translate a high-level language program into a machine language program :

(A) Compiler (B) Assembler

(C) Linker (D) Debugger

111. A language that is suitable for AI :

(A) PROLOG (B) JAVA

(C) SIMULA (D) BASIC

112. The highest and lowest priority interrupt in 8085 are :

(A) TRAP, RST 7.5 (B) TRAP, INTR

(C) INTR, RST (D) INTR, TRAP

113. A CPU scheduling algorithm determines an order for the execution of its scheduled processes. Given n processes to be scheduled on one processor, how many possible different schedules are there ? The formula in terms of n is :

(A) $n(n - 1)$ (B) n^2

(C) $n!$ (D) $n/2$

114. If the waiting time for a process is p and there are n processes in the memory, then the CPU utilization is given by :

(A) p/n (B) p^n (p raised to n)

(C) 1 – p^n (D) n – (p^n)

115. For what type of operations is DMA useful ?

(A) For large and fast data transfers between memory and I/O devices

(B) For large and slow data transfers between memory and I/O devices

(C) For slow and small data transfers between memory and I/O devices

(D) For small data transfers between memory and cache

116. Disk with geometrics exceeding the following maximum could *not* be handled by early DOS system :

Cylinders	1024
Heads	16
Sector per track	63

What is the maximum size disk these systems could use ?

(A) 562 Mb (B) 536 Mb

(C) 582 Mb (D) None of these

117. Consider a system with m resources of same type being shared by n processes. Resources can be requested and released by processes only on at a time. The system is deadlock free if and only if :

(A) The sum of all max need is < m + n

(B) The sum of all max need is > m + n

(C) Both of the above

(D) None of the above

118. When a process is rolled out of memory, it loses its ability to use the CPU (at least for a while). Describe another situation where a process loses its ability to use the CPU, but where the process does *not* get rolled out :

(A) When an interrupt occurs (B) When thrashing occurs

(C) When deadlock occurs (D) While swapping

119. Possible type of failure in a distributed system is :

(A) Address failure (B) Network Link failure

(C) Storage failure (D) None of these

120. The problems 3-SAT and 2-SAT are :

(A) Both in P

(B) Both NP complete

(C) NP-complete and in P respectively

(D) Undecidable and NP complete respectively

121. Consider the following scheme R = (A, B, C, D, E, H) on which the following functional dependencies hold :

$$(A \rightarrow B,\ BC \rightarrow D,\ E \rightarrow C,\ D \rightarrow A).$$

What are the candidate key of R ?

(A) AE, BE

(B) AE, BE, DE

(C) AEH, BEH, BCH

(D) AEH, BEH, DEH

122. The goal of structured programming is to :

(A) have well indented programs

(B) be able to infer the flow of control from the compiled code

(C) be able to infer the flow of control from the program text

(D) avoid the use of GOTO statements

123. The lower bound on the number of comparisons, in the worst case, for comparison-based sorting in the order of :

(A) n

(B) n^2

(C) n log n

(D) $n \log^2 n$

124. Page fault occurs when :

(A) the page is not in main memory

(B) the page is in main memory

(C) the page is corrupted by application software

(D) none of the above

125. Let G be a simple graph with 20 vertices and 100 edges. The size of the minimum vertex cover of G is 8. Then, the size of the maximum independent set of G is :

(A) 12 (B) 8

(C) Less than 8 (D) More than 12

126. An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask will be :

(A) 255.255.0.0 (B) 255.255.64.0

(C) 255.255.128.0 (D) 255.255.252.0

127. The minimum number of page frames that must be allocated to a running process in a virtual memory environment is determined by :

(A) The instruction set architecture

(B) Page size

(C) Physical memory size

(D) Number of processes in memory

128. Consider the following C-program :

```
main( )
{
        int x, y, m, n;
        scanf("%d%d", &x, &y);
                /*Assume x > 0 and y > 0*/
        m = x; n = y;
        while(m != n)
        {
                if(m > n)
                m = m - n;
                else
                n = n - m;
        }
                printf("%d", n);
```

The program computes :

(A) x + y, using repeated substraction

(B) x mod y using repeated substraction

(C) the greatest common divisor of x and y

(D) the least common multiple of x and y

129. Semaphores are used to solve the problem of :

(A) Mutual exclusion (B) Race condition

(C) Process asynchronization (D) None of these

130. What is the availability of a software with the following reliability figures ?

Mean Time Between Failure (MTBF) = 25 days

Mean Time To Repair (MTTR) = 6 hours

(A) 1% (B) 24%

(C) 99% (D) 99.99%

131. Which one of the following statements is *true* about CSMA/CD ?

(A) IEEE802.11 wireless LAN runs CSMA/CD protocol

(B) Ethernet is not based on CSMA/CD protocol

(C) CSMA/CD is not suitable for high propagation delay network like satellite network

(D) There is no contention in a CSMA/CD network

132. What does the following algorithm approximate ?

(Assume m > 1, $\in$ > 0)

```
x = m;
y = 1
while(x − y > ∈)
{
        x = (x + y)/2;
        y = m/x;
}
printf(x);
```

What will be the output ?

(A) log m (B) m^2

(C) $m^{1/2}$ (D) $m^{1/3}$

133. The only state transition that is initiated by the user process itself is :

(A) Dispatch (B) Block

(C) Wake-up (D) None of these

134. The Address Resolution Protocol (ARP) is used for :

(A) Finding the IP address from the DNS

(B) Finding the IP address of the default gateway

(C) Finding the IP address that corresponds to a MAC address

(D) Finding the MAC address that corresponds to an IP address

135. In the IEEE floating point representation the hexadecimal value 0×00000000 corresponds to :

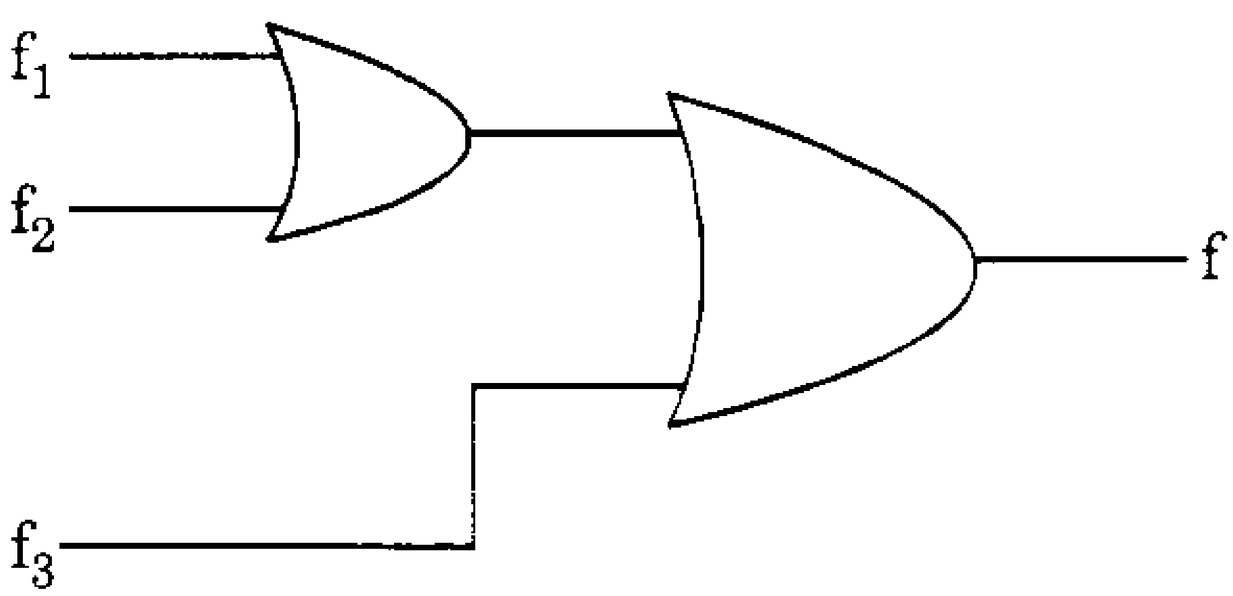
(A) the normalized value 2^{-127}

(B) the normalized value 2^{-126}

(C) the normalized value +0

(D) the special value +0

136. Given f_1, f_3 and f in canonical sum of product form (in decimal) for the circuit :



$f_1 = \Sigma\, m(4,\ 5,\ 6,\ 7,\ 8)$

$f_3 = \Sigma\, m(1,\ 6,\ 15)$

$f = \Sigma\, m(1,\ 6,\ 8,\ 15)$

then f_2 is :

(A) $\Sigma\, m(4,\ 6)$ (B) $\Sigma\, m(4,\ 8)$

(C) $\Sigma\, m(6,\ 8)$ (D) $\Sigma\, m(4,\ 6,\ 8)$

137. If X, Y, Z are Boolean variables, then :

$$\left(X + \bar{Y}\right)\left(X \cdot \bar{Y} + XZ\right)\left(\bar{X}\bar{Z} + \bar{Y}\right)$$

simplifies to :

(A) $X \cdot \bar{Y}$ (B) $X \cdot \bar{Z}$

(C) $X \cdot \bar{Y} + Z$ (D) $X\bar{Z} + Y$

138. An LALR(1) parser for a grammar G can have shift-reduce (S-R) conflicts if and only if :

(A) the SLR(1) parser G has S-R conflicts

(B) the LR(0) parser for G has S-R conflicts

(C) the LALR(1) parser for G has reduce-reduce conflicts

(D) none of the above

139. If a class B network on the Internet has a subnet mask of 255.255.248.0; what is the maximum number of hosts per subnet ?

(A) 1022 (B) 1023

(C) 2046 (D) 2047

140. Maximum data rate of a channel for a noiseless 3 kHz binary channel is :

(A) 3000 bps (B) 6000 bps

(C) 1500 bps (D) None of these

141. In a time-sharing operating system, when the time slot given to a process is completed, the process goes from RUNNING state to the :

(A) BLOCKED state (B) TERMINATED state

(C) READY state (D) SUSPENDED state

142. Let x be an integer which can take a value of 0 or 1. The statement

if (x == 0) x = 1; else x = 0;

is equivalent to which one of the following ?

(A) x = 1 + x; (B) x = 1 − x;

(C) x = x − 1; (D) x = 1%x;

143. Which network forwards packets according to host destination address ?

(A) Circuit switched Network (B) Datagram Network

(C) Virtual Circuit Network (D) None of these

144. Convection oriented service is provided by :

(A) TCP (B) UDP

(C) FTP (D) ARP

145. Which feature is *not* offered by TCP ?

(A) Reliable data transfer (B) Congestion control

(C) Constant bit rate (D) None of these

146. Data transfer between two neighbouring routers involve only :

(A) Physical layer

(B) Physical layer, link layer

(C) Physical layer, link layer, network layer

(D) Physical layer, link layer, network layer, transport layer

147. By default the elements of structure are :

(A) Private

(B) Protected

(C) Public

(D) None of these

148. For client-server type request reply query which protocol is widely used ?

(A) HTTP

(B) ARP

(C) WWW

(D) DNS

149. E-mail security is provided by :

(A) Digital Signature

(B) PGP

(C) Firewall

(D) None of these

150. Pure object-oriented programming language is a :

(A) C++

(B) PASCAL

(C) Java

(D) ORACLE