

TEACHERS RECRUITMENT BOARD, CHENNAI - 6
WRITTEN COMPETITIVE EXAMINATION FOR DIRECT RECRUITMENT OF
LECTURERS IN GOVERNMENT POLYTECHNIC COLLEGES — 2012

COMPUTER SCIENCE & ENGINEERING

Time Allowed : 3 Hours]

[Maximum Marks : 190

Each question carries four options namely A, B, C and D.
Choose one correct option and mark in appropriate place in the
OMR Answer Sheet.

SECTION - A

(1 mark each)

1. How many types of storage loops exist in magnetic bubble memory ?
A) 8
B) 4
C) 3
D) 2.
2. Serial access memories are useful applications where
A) data consists of numbers
B) short access time is required
C) each stored word is processed differently
D) data naturally needs to flow in and out in serial form.
3. Both the arithmetic logic unit (ALU) and control section of CPU employ special purpose of storage locations called
A) decoders
B) buffers
C) mutliplexers
D) registers.

4. In an 8085 microprocessor system with memory mapped I/O
- devices have 8 bit addresses
 - devices are accessed using IN and OUT instructions
 - there can be maximum of 256 input devices and 256 output devices
 - arithmetic and logic operations can be directly performed with the I/O data.
5. Which of the following computers is least powerful ?
- Mini
 - Micro
 - Mainframe
 - Super.
6. The technique which repeatedly uses the same block of internal storage during different stages of problem is called
- overlay
 - overlapping
 - swapping
 - reuse.
7. A system of letters, numbers, symbols adopted by computer manufacturer as an abbreviated form of instruction sets is called
- Mesh
 - Monitor
 - Modern Bus
 - Mnemonic.
8. The number of instructions needed to add n numbers and store the result in memory using only one address instruction is
- n
 - $n + 1$
 - $n - 1$
 - independent of n .
9. The most relevant addressing mode to write position independent code is
- direct mode
 - indirect mode
 - relative mode
 - indexed mode.

B

10. The CPU of a computer takes instruction from the memory and executes them. This process is called
- load cycle
 - time sequences
 - fetch-execute cycle
 - clock cycle
11. Logical expression $(A \wedge B) \rightarrow (C \vee A) \rightarrow (A = 1)$ is
- contradiction
 - tautology
 - well formed formula
 - none of these.
12. The negation of the statement $\exists x \forall y, P(x, y)$ is
- $\exists x \exists y, P(x, y)$
 - $\forall x \exists y, \neg P(x, y)$
 - $\exists x \exists y, \neg P(x, y)$
 - $\forall y \forall x, \exists x, \neg P(x, y, z)$
13. A five figure number is formed by the digits 0, 1, 2, 3, 4 without repetition. Then probability that the number formed is divisible by 4 is
- $\frac{3}{15}$
 - $\frac{5}{16}$
 - $\frac{7}{16}$
 - $\frac{9}{16}$
14. Let p be the probability that a man aged y will get into an accident in a year. What is the probability that a man among n man of all aged y will get into an accident first ?
- $\frac{1}{n} (1 - (1 + p)^n)$
 - $\frac{1}{n} (1 + (1 + p)^n)$
 - $n (1 - (1 + p)^n)$
 - None of these.
15. If A and B be sets with cardinalities m and n respectively, then number of one-one mappings (injections) from A to B , when $m < n$, is
- m^n
 - ${}^n P_m$
 - ${}^n C_m$
 - none of these.

B

(Turn over)

16. The set of all n^{th} roots of unity under multiplication of complex numbers form a/an
- A) semi-group with identity
 B) commutative semigroups with identity
 C) group
 D) Abelian group.
17. How many 10 digit numbers can be written by using the digits 1 and 2?
- A) $10 C_1 + 9 C_2$
 B) 2^{10}
 C) $10 C_2$
 D) $10!$
18. T is a graph with n vertices. T is connected and has exactly $n - 1$ edges. Then
- A) T is a tree
 B) T contains no cycles
 C) every pair of vertices in T is connected by exactly one path
 D) addition of a new edge will create a cycle.
19. Eigenvectors of a real symmetric matrix corresponding to different eigenvalues are
- A) orthogonal
 B) singular
 C) non-singular
 D) none of these.
20. Newton-Raphson iterative formula for finding $f(x) = x^2 - 1$ is
- A) $x_{i+1} = \frac{x_i^2 - 1}{2x_i}$
 B) $x_{i+1} = \frac{x_i^2 + 1}{2x_i}$
 C) $x_{i+1} = \frac{2x_i^2 + 1}{2x_i}$
 D) $x_{i+1} = \frac{2x_i}{2x_i^2 + 1}$

B

21. If L_1 and L_2 are context free language and R is a regular set. Which one of the languages below is not necessarily a context free language?
- A) $L_1 L_2$
 B) $L_1 \cap L_2$
 C) $L_1 \cup R$
 D) $L_1 \cup L_2$
22. CSG can be recognised by
- A) push-down automata
 B) 2 way linear bounded automata
 C) finite state automata
 D) none of these.
23. Consider the following grammar :
- $S \rightarrow Ax \mid By$
 $A \rightarrow By \mid Cw$
 $B \rightarrow x \mid Bu$
 $C \rightarrow y$
- Which of the regular expressions describes the same set of strings as the grammar?
- A) $xw + y + xw + yx + yux$
 B) $xwy + xw + xy + yux$
 C) $xw + y + xw + yx + yux$
 D) $xwxy + xuw + y + yux$
24. Recursively enumerable languages are not closed under
- A) union
 B) intersection
 C) complementation
 D) concatenation.
25. Turing machine is more powerful than FMs because
- A) tape movement is confined to one direction
 B) it has no finite state
 C) it has the capability to remember arbitrarily long sequences of input symbols
 D) none of these.

B

Turn over

26. Let $\Sigma = \{a, b, c, d, e\}$. The number of strings in Σ of length 4 such that no symbol is used more than once in a string is

- A) 35
B) 360
C) 49
D) 720

27. Which of the following statements is wrong?

- A) The language accepted by finite automata is the languages denoted by regular expressions.
B) For every DFA there is a regular expression denoting its language.
C) For a regular expression r , there does not exist any NFA with transit that accepts $L(r)$.
D) None of these.

28. Can a DFA simulate NFA?

- A) No
B) Yes
C) Sometimes
D) Depends on NFA.

29. Which of the following well formed formula is / are valid?

- A) $(P \rightarrow Q) \wedge (Q \rightarrow R) \rightarrow (P \rightarrow R)$
B) $(P \rightarrow Q) \rightarrow (P \rightarrow \neg Q)$
C) $(P \wedge (P \vee \neg Q)) \rightarrow Q$
D) Both (A) and (B).

30. Let a and b be the regular expressions, then $(a^* \cup b^*)^*$ is equivalent to

- A) $(a \cup b)^*$
B) $(b^* \cup a^*)^*$
C) $(b \cup a)^*$
D) $(a \cup b)$

B

31. FDDI is a

- A) ring network
B) star network
C) mesh network
D) bus based network

32. What is the main purpose of a data link content monitor?

- A) To detect problems in protocols
B) To determine the type of transmission used in data link
C) To determine the type of switching used in data link
D) To determine the flow of data.

33. Which one of the following is not a class of LAN?

- A) Broadband
B) CSMA/CD
C) Token bus
D) Token ring

34. Which of the following devices is used with an X-25 network to provide service to asynchronous terminals?

- A) Repeaters
B) Bridges
C) Gateway
D) Packet assembler

35. Which of the following TCP/IP protocols is used for file transfer with minimal capability and minimal overhead?

- A) RARP
B) FTP
C) TFTP
D) TELNET

36. ALOHA is used for

- A) channel allocation problem
B) data transfer
C) buffering
D) all of these

37. Error detection at the data link level is achieved by

- A) bit stuffing
B) cyclic redundancy codes
C) hamming codes
D) equalization

B

Turn over

38. Which topology requires a central controller or hub?

- A) Mesh
B) Star
C) Bus
D) Ring

39. Number of cross points needed for 10 lines in a cross point switch which is full duplex in nature and there are no self connection is

- A) 100
B) 45
C) 8
D) 28

40. Ether LAN uses

- A) polar encoding
B) differential Manchester encoding
C) Manchester encoding
D) NRZ

41. The Hollerith code is used in

- A) Floppy disk
B) Hard disk
C) Punched card
D) UDU

42. The parity of the binary number 100110011 is

- A) even
B) odd
C) 4
D) 5

43. A switching function

$f(A, B, C, D) = \bar{A} \bar{B} CD + \bar{A} B \bar{C} D + \bar{A} B C \bar{D} + \bar{A} B C D + A \bar{B} \bar{C} D + A \bar{B} C D$ can also be written as

- A) $\Sigma(1, 3, 5, 7, 9)$
B) $\Sigma(3, 5, 7, 9, 11)$
C) $\Sigma(3, 5, 9, 11, 13)$
D) $\Sigma(5, 7, 9, 11, 13)$

B

44. A differentiator is a

- A) high-pass RC circuit with a large time constant
B) low-pass RC circuit with a very small time constant
C) low-pass RC circuit with a large time constant
D) high-pass RC circuit with very small time constant

45. MOS logic gates have no current hogging problem because the gate terminal has

- A) low input impedance
B) zero impedance
C) high impedance
D) compensating effect

46. The main advantage of CMOS as compared to TTL is

- A) lower power consumption and better noise margins
B) lower power consumption with low fan out
C) higher speed operation with low power consumption
D) higher power consumption with high fan out

47. Standard TTL has a multiple emitter input transistor and a _____ output.

- A) totem-pole
B) bipolar
C) register
D) transistor

48. The clock signals are used in sequential logic circuits to

- A) tell the time of the day
B) tell how much time has elapsed since the system was turned on
C) carry serial data signals
D) synchronize events in various parts of system

49. For a memory system, the cycle time is

- A) same as the access time
B) longer than the access time
C) shorter than the access time
D) sub-multiple of the access time

B

| Turn over

50. For which of the following flip-flops, the output is clearly defined for all combinations of two inputs?

- A) Q-type flip-flop
 B) R-S flip-flop
 C) J-K flip-flop
 D) T flip-flop.

51. Auctional dependencies are a generalization of

- A) key dependencies
 B) relation dependencies
 C) database dependencies
 D) none of these.

52. ER modelling technique is a

- A) top-down approach
 B) bottom-up approach
 C) left-right approach
 D) none of these.

53. Let $R = (A, B, C, D, E, F)$ be a relation schema with the following dependencies:

$$C \rightarrow F, E \rightarrow a, EC \rightarrow D, A \rightarrow B,$$

Which of the following is a key for R?

- A) CD
 B) EC
 C) AE
 D) AC.

54. Any binary relation is in

- A) 1NF
 B) 2NF
 C) 3NF
 D) 3CNF.

55. The database environment has all of the following components except

- A) users
 B) separate files
 C) database
 D) database administration.

B

56. Which of the following is true of a network structure?

- A) It is a physical representation of the data
 B) It allows a many-to-many relationship
 C) It is conceptually simple
 D) It will be the dominant database of the structure.

57. Sort / Report generators

- A) are faster than index / report generators
 B) require more disk space than index / report generators
 C) do not need to sort before generating report
 D) both (A) and (B).

58. Which of the following is not a characteristic of a relational database model?

- A) Tables
 B) Treelike structure
 C) Complex logical relationships
 D) Records.

59. An access path is provided by

- A) file key
 B) physical record key
 C) both (A) and (B)
 D) none of these.

60. Given two union compatible $R_1(A, B)$ and $R_2(C, D)$. What is the result of the operations $R_1 A = C AB = DR_2$?

- A) $R_1 \cup R_2$
 B) $R_1 \times R_2$
 C) $R_1 - R_2$
 D) $R_1 \cap R_2$.

B

| Turn over

12PT-06

12

61. What is the output of the following C program?

```
main()
{
    int a[5] = {2, 3};
    printf("%d %d %d", a[2], a[3], a[4]);
}
```

A) Garbage values

B) 2 3 3

C) 3 2 2

D) 0 0 0

62. In the following C code:

#include <stdio.h>

main()

{

FILE *fp;

fp = fopen("trial", "r");

}

fp points to

A) first character in the file

B) a structure which contains a char pointer which points to the first character in the file

C) name of the file

D) 15.

63. In C language, $x = y + 1;$ meansA) $x = x - y + 1$ B) $x = -x - y - 1$ C) $x = -x + y + 1$ D) $x = x - y - 1.$ 64. If x is an array of integer, then the value of $\&x[i]$ is same asA) $\&x[i-1] + \text{size of } (int)$ B) $x + \text{size of } (int) * i.$ C) $x+i$ D) $x=5.$

B

13

12PT-06

65. How many values can be held by an array $A[-1 \dots m, 1, \dots m]$?A) m B) m^2 C) $m(m+1)$ D) $m(m+2).$ 66. A full binary tree with n non-leaf nodes containsA) $\log_2 n$ nodesB) $n+1$ nodesC) $2n$ nodesD) $2n+1$ nodes.67. What is true for the complete bipartite graphs $K(3, 3)$ and $K(2, 4)$?

A) Both are planar

B) Neither is planar

C) Both are isomorphic

D) None of these.

68. Linked lists are not suitable for

A) insertion sort

B) binary search

C) radix sort

D) polynomial manipulation.

69. The postfix expression for the infix expression

$$\frac{A+B * (C+D)}{F+D * E} \text{ is}$$

A) $\frac{AB+CD++F}{D+E+}$ B) $\frac{ABCD++F}{+DE++}$ C) $\frac{A+B+CD}{F+DE++}$

D) None of these.

70. If the binary search algorithm determines that the search argument is in lower half of the array, which of the following statements will set appropriate variable to the appropriate value?

A) Start Sub = Middle Sub - 1;

B) Start Sub = Middle Sub + 1;

C) Stop Sub = Middle Sub - 1;

D) Stop Sub = Middle Sub + 1;

B

| Turn o

71. Which of the following is not used as an intermediate representation ?

- A) Postfix notation
 B) DAG
 C) 3 address code
 D) Context free grammar.

72. If L_1 and L_2 are two regular languages defined as

$L_1 = \{000, 001, 0, 010\}$ and $L_2 = \{00, 01, 0\}$, then the number of strings in $L_1 \cup L_2$ will be

- A) 7
 B) 6
 C) 5
 D) 8.

73. Two finite state machines are said to be equivalent if they

- A) have same number of states
 B) have same number of edges
 C) have same number of states and edges
 D) recognize same set of tokens.

74. If $X = \text{FIRST}$ and $Y = \epsilon$ the result of XY will be

- A) FIRST
 B) FIRST FIRST
 C) FIRST ϵ
 D) FIRST ϵ .

75. The number of productions of the following grammar is

$E \rightarrow E + T \mid T$

$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

- A) 5
 B) 3
 C) 6
 D) 4.

B

76. CFG can be recognized by a

- A) push-down automata
 B) 2-way linear bounded automata
 C) both (A) and (B)
 D) none of these.

77. Canonical derivations are otherwise called as

- A) left most derivations
 B) right most derivations
 C) left most reductions
 D) right most reductions.

78. Which of the following implementations of three address codes occupy less space ?

- A) Triples
 B) Quadruples
 C) Indirect triples
 D) All will occupy same space.

79. Local and loop optimization in turn provide motivate

- A) Data flow analysis
 B) Constant folding
 C) Peephole optimization
 D) DFA and constant folding.

80. Macro-expansion type parameter passing is called as

- A) Call-by value
 B) Call-by reference
 C) Copy-restore
 D) Call-by name.

81. With a single resource, deadlock occurs

- A) if there are more than two processes competing for that resource
 B) if there are only two processes competing for that resource
 C) if there is a single process competing for that resource
 D) none of these.

B

| Turn over

82. Mutual exclusion problem occurs between
- A) two disjoint processes that do not interact
 - B) processes that share resources
 - C) processes that do not use the same resource
 - D) none of these.
83. The first-fit, best-fit and the worst-fit algorithm can be used for
- A) contiguous allocation of memory
 - B) linked allocation of memory
 - C) indexed allocation of memory
 - D) all of these.
84. In a Round Robin CPU scheduling, as the time quantum is increased, the average turn-around time
- A) increases
 - B) decreases
 - C) remains constant
 - D) varies irregularly.
85. A computer system has 4 level cache organized in a block-set-associative manner, with 4 blocks per set, 64 words per block. The number of bits in the SET and WORD fields of the main memory address format is
- A) 15, 4
 - B) 6, 4
 - C) 7, 2
 - D) 4, 6.
86. Relocatable programs
- A) cannot be used with fixed partitions
 - B) can be loaded almost anywhere in memory
 - C) do not need a linker
 - D) can be loaded only at one specific location.

B

87. If a virtual memory system has 4 pages in real memory and the rest must be swapped to disk, which of the following is the hit ratio for the following page address stream? Assume that memory starts empty. Use FIFO algorithm.
- A) 10%
 - B) 15%
 - C) 25%
 - D) 31%.
88. In a file system, disaster recovery
- A) is needed by every installation
 - B) is never needed
 - C) varies in degree between installations
 - D) requires off-site computer for immediate use.
89. Interrupts per second
- A) is a good measure of the system I/O activity
 - B) is a good measure of the system loading activity
 - C) should never be greater than 1000/second
 - D) is higher on smaller computers
90. Program threats are
- A) Trojan Horse
 - B) trap doors
 - C) both (A) and (B)
 - D) none of these.
91. The recurrence relation $T(n) = nT(n/2) + n^2$ is satisfied by
- A) $T(n) = O(n^2)$
 - B) $T(n) = O(n^3)$
 - C) $T(n) = O(n \log n)$
 - D) $T(n) = O(n \log^2 n)$

F-044

B

Turn over

92. In which of the following sorting algorithms the number of comparisons needed is the minimum if the items are initially in reverse order and is maximum if the items are in order?

- A) Straight insertion sort B) Binary insertion sort
C) Heap sort D) Bubble sort.

93. Time complexity of an algorithm $T(n)$, where n is the input size is given by

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

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

The order of this algorithm is

- A) $\log n$ B) n
C) n^2 D) n^n .

94. Which of the following statements is true?

- I. As the number of entries in a hash table increases, the number of collisions increases.
- II. Recursive programs are efficient.
- III. The worst case complexity for quick sort is $O(n^2)$.
- IV. Binary search using a linear linked list is efficient.

- A) I and II B) II and III
C) I and IV D) I and III.

95. A hash table has space for 100 records. Then the probability of collision before the table is 10% full, is

- A) 0.45 B) 0.5
C) 0.3 D) 0.34 (approx.).

B

96. Breadth first traversal is a method to traverse

- A) all successors of a visited node before any successors of any of those successors
B) a single path of the graph as far as it can go
C) graph using shortest path
D) none of these.

97. A machine took 200 sec to sort 200 names, using bubble sort. In 800 seconds, it can approximately sort

- A) 400 names B) 800 names
C) 750 names D) 1200 names.

98. The algorithm design technique used in the quick sort algorithm is

- A) Dynamic programming B) Back tracking
C) Divide and conquer D) Greedy method.

99. Algorithm which solves the all-pair shortest path problem is

- A) Dijkstra's algorithm B) Floyd's algorithm
C) Prim's algorithm D) Warshall's algorithm.

100. Consider the following two functions:

$$g_1(n) = \begin{cases} n^3 & \text{for } 0 \leq n < 10,000 \\ n^2 & \text{for } n \geq 10,000 \end{cases}$$

$$g_2(n) = \begin{cases} n & \text{for } 0 \leq n < 100 \\ n^3 & \text{for } n > 100 \end{cases}$$

Which of the following is true?

- A) $g_1(n) \text{ is } O(g_2(n))$ B) $g_1(n) \text{ is } O(n^2)$
C) $g_2(n) \text{ is } O(g_1(n))$ D) $g_2(n) \text{ is } O(n)$

B

(Turn over)

101. Who got the Nobel Prize for Peace in the year 2011 ?

- A) Thomas Sargent
 B) Christopher Sims
 C) Ellen Johnson Sirleaf, Leymah Gbowee and Tawakkol Karman
 D) Tomas Transtroma

102. Which country won the Kabaddi World Cup, 2011 ?

- A) United Kingdom
 B) India
 C) Canada
 D) Germany

103. The Raman effect is used in the study of

- A) X-rays
 B) Cells
 C) Chromosomes
 D) Molecular energy

104. Green India Programme is the National Action plan on

- A) Pollution
 B) Climate change
 C) Rainfall
 D) Environment

105. In which district is Adichanallur which had been the habitat of human race during 1000-2000 BC located ?

- A) Aryalur
 B) Ramnarathapuram
 C) Tirunelveli
 D) Virudhunagar

B

106. Which of the following is measured on the Richter scale ?

- A) Density of liquids
 B) Intensity of earthquakes
 C) Velocity of tornadoes
 D) Height of mountains

107. Which work is known as an encyclopaedia of social life in the Eleventh Century ?

- A) Dasakumaracharita by Dandin
 B) Kathasaritsagar by Somadeva
 C) Rarpuramanjari by Rajasekhara
 D) Rajatarangini by Kalhana

108. Who led the French forces during the battle of Waterloo ?

- A) Duke of Wellington
 B) Duke of Cornwall
 C) Napoleon Bonaparte
 D) Duke of Scotland

109. What is zero hour ?

- A) When matters of utmost importance are raised
 B) When money bill is introduced in the Lok Sabha
 C) When proposals of opposition are considered
 D) Interval between morning and evening sessions

110. Which of the following is a direct tax ?

- A) Excise duty
 B) Sales tax
 C) Income tax
 D) Both (B) & (C)

B

| Turn over

SECTION - B

(2 marks each)

111. In an 8085 microprocessor system with memory mapped I/O.
- A) I/O devices have 8 bit addresses
 - B) I/O devices are accessed using IN and OUT instructions
 - C) there can be maximum of 256 input devices and 256 output devices
 - D) arithmetic and logic operations can be directly performed with the I/O data.

112. The following statement :

```
printf (" %f", 9/5); prints
```

- A) 1.8
- B) 1.0
- C) 2.0
- D) None of these.

113. Consider the following set of statements :

```
Float x, y;
```

```
x = 7; y = 10;
```

```
x* = y* = y + 255;
```

After the execution of the above set of statements, the value of x will be

- A) 70
- B) 3695
- C) 2995
- D) none of these.

114. Consider Fibonacci tree. The depth of a node i in a binary tree is length of the path from the root node to i . Depth of the root node is 0. If d is depth of a Fibonacci tree, and F_d is the d^{th} number in the Fibonacci sequence, then the number of nodes in Fibonacci tree is given by

$$|F_d| = |F_{d-1}| + |F_{d-2}| + 1$$

 $|F_d|$ is also given by the relationship

- A) $|F_d| = F_d$
- B) $|F_d| = F_d + d$
- C) $|F_d| = F_{d+1} - 1$
- D) $|F_d| = F_d * d$

B

115. Depth of a complete binary tree with n nodes is (where \log is to the base 2).

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

116. The following sequence of operations is performed on a stack :

```
PUSH (10), PUSH (20), POP, PUSH (10), PUSH (20), POP, POP, POP, PUSH (20), POP
```

The sequence of values popped out is

- A) 20, 10, 20, 10, 20
- B) 20, 20, 10, 10, 20
- C) 10, 20, 20, 10, 20
- D) 20, 20, 10, 20, 10

117. The total number of memory accesses involved (including Op-Code fetch) when an 8085 processor executes the instruction LDA 2008 is

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

118. How many RAM chips of size $(2K \times 1 \text{ bit})$ are required to build 1 M Byte memory?

- A) 8
- B) 10
- C) 24
- D) 32

119. The process of organizing the memory into two banks to allow 8 and 16 bit data operation is called

- A) Bank switching
- B) Indexed mapping
- C) Two-way memory interleaving
- D) Memory segmentation

120. The larger the RAM of a computer, the faster is the speed, since it eliminates

- A) need for ROM
- B) need for external memory
- C) frequent disk I/Os
- D) need for a data wide path

B

Turn over

12PT-06

121. Which of the following is not primitive recursive but partially recursive?

- A) Carnot's function
 B) Riemann function
 C) Bounded function
 D) Ackermann's function.

122. The language $L = \{a^n b^m c^n b^m \mid n \geq 1, m \geq 1\}$

- A) is context free
 B) is not context free
 C) abstract problem of checking number of formal and actual parameters
 D) both (B) and (C).

123. What is the highest type number which can be applied to the following grammar?

 $S \rightarrow Aa, A \rightarrow Ba, B \rightarrow abc$

- A) Type 0
 B) Type 1
 C) Type 2
 D) Type 3.

124. Consider the Boolean expression $x'y'z' + x'y'z + x(y+z)$. The equivalent product of sums form is

- A) $x'y'z' + x'y'z + xy + xz$
 B) $(x+y'+z)(x+y+z)(x+y+z)$
 C) $(y'+z')(x'+y+z)$
 D) $(y+z)(xy'+z)$.

125. How many 4 digit even numbers have all 4 digits distinct?

- A) 2240
 B) 2296
 C) 2620
 D) 4536.

B

12PT-06

126. In a group of 72 students, 47 have background in Electrical, 59 have background in Mathematics and 42 have background in both the subjects. How many students do not have background in any of the subjects?

- A) 8
 B) 13
 C) 25
 D) 34.

127. The number of different signals which can be given from 6 flags of different colours taken one or more at a time is

- A) 1958
 B) 1956
 C) 16
 D) 64.

128. For matrix $\begin{bmatrix} -4 & 2 \\ 4 & 3 \end{bmatrix}$, the eigenvector is

- A) $\begin{bmatrix} 3 \\ 2 \end{bmatrix}$
 B) $\begin{bmatrix} 4 \\ 3 \end{bmatrix}$
 C) $\begin{bmatrix} 2 \\ -1 \end{bmatrix}$
 D) $\begin{bmatrix} -2 \\ 1 \end{bmatrix}$.

129. Four arbitrary points $(x_1, y_1), (x_2, y_2), (x_3, y_3), (x_4, y_4)$ are given in the xy plane. Using the method of least squares, if regressing y upon x gives the fitted line $y = ax + b$; and regressing y upon x gives the fitted line $y = ax + b$; and regressing x upon y gives the fitted line $x = cy + d$, then

- A) two fitted lines must coincide
 B) two fitted lines need not coincide
 C) it is possible that $ac = 0$
 D) a must be $\frac{1}{c}$.

B

| Turn over

130. A given grammar is said to be *ambiguous* if
- A) two or more productions have the same non-terminal on the left hand side
 - B) a derivation tree has more than one associated sentence
 - C) there is a sentence with more than one derivation tree corresponding to it
 - D) brackets are not present in the grammar.
131. These are five records in a database :

Name	Age	Occupation	Category
Raman	27	CON	A
Akbar	22	ENG	B
Janifar	28	DOC	C
Maya	32	SER	D
Deva	24	MJS	E

There is an index file associated with this and it contains the values 1, 3, 2, 5.

4. Which one of the fields is the index built form ?

- A) Age
 - B) Name
 - C) Occupation
 - D) Category.
132. IP address can be used to specify a broadcast and map to hardware broadcast if available. By conversion broadcast address has hosted with all bits is
- A) 0
 - B) 1
 - C) both (A) and (B)
 - D) none of these.
133. Which of the following is a wrong example of network layer ?
- A) Internet Protocol ARPANET
 - B) X-25 Packet land Protocols
 - C) Source routing and Domains Naming use net
 - D) X-25 level 2 ISO.
134. Manchester code is a
- A) NRZ code
 - B) Polar code
 - C) Both (A) and (B)
 - D) None of these.

B

135. A noiseless 3 kHz channel transmits bits with binary level signals. What is the maximum data rate ?

- A) 3 kbps
- B) 6 kbps
- C) 12 kbps
- D) 24 kbps.

136. Poor response time is caused by

- A) process or busy
- B) high I/O rate
- C) high paging rates
- D) all of these.

137. Parallel printer uses

- A) RS 232 C interface
- B) Centronics interface
- C) Handshake mode
- D) all of these.

138. Consider join of a relation R with a relation S. If R has m tuples and S has n tuples then maximum and minimum sizes of the join respectively are

- A) $m + n$ and 0
- B) mn and 0.
- C) $m + n$ and $m - n$
- D) mn and $m + n$.

139. The employee salary should not be greater than Rs. 2,000. This is

- A) integrity constraint
- B) referential constraint
- C) overdefined constraint
- D) feasible constraint.

140. Which of the following contains a complete record of all activities that affect the contents of a database during a certain period of time ?

- A) Report writer
- B) Query language
- C) Data manipulation language
- D) Transaction log

141. Errors that can be pointed out by the compiler are

- A) Syntax errors
- B) Semantic errors
- C) Logical errors
- D) Internal errors.

[Turn over

B

142. Every symbolic referent to a memory operand has to be assembled as
- A) (offset, index base) B) (segment base, offset)
 C) (index base, offset) D) offset.
143. The most powerful parser is
- A) SLR B) LALR
 C) canonical LR D) operator precedence.
144. Consider six files : $F_1, F_2, F_3, F_4, F_5, F_6$ with corresponding sizes 100, 200, 70, 40, 250 and 50 respectively. The files are to be stored on a sequential device in such a way that as to optimize access time. In what order should the files be stored?
- A) $F_6, F_5, F_4, F_3, F_2, F_1$
 B) $F_1, F_2, F_3, F_4, F_5, F_6$
 C) $F_5, F_2, F_1, F_3, F_4, F_6$
 D) $F_4, F_6, F_3, F_1, F_2, F_5$
145. Disk requests come to a disk driver for cylinders 10, 22, 20, 2, 40, 6 and 38, in that order at a time when the disk drive is reading from cylinder 20. The seek time is 6 ms per cylinder. If the scheduling algorithm is the closest cylinder next, then the total seek time will be
- A) 360 ms B) 876 ms
 C) 850 ms D) 900 ms.
146. A search procedure which associates an address with a key value and provides a mechanism for dealing with two or more values assigned to the same address is called
- A) linear search B) binary search
 C) hash coded search D) radix search.

B

147. Search tables used by compilers for efficient searching generally use
- A) hash tables B) linear lists of records
 C) binary search tables D) binary search trees.
148. The running time of an algorithm $T(n)$ where (n) is the input size, is given by

$$T(n) = 87 \lfloor n/2 \rfloor + 6n, \quad n > 1$$

$$* p, \quad \text{if } n = 1,$$

where p, q are constants.

The order of the algorithm is

- A) n^2 B) n^n
 C) n^3 D) n
149. If $L_1, L_2 \subseteq \Sigma^*$, $L_1 \leq p$, and L_2 is neither \emptyset nor Σ^* , then
- A) $L_1 \leq p L_2$ B) $L_2 \leq p L_1$
 C) both (A) and (B) D) none of these.

150. Uniform symbol table

- A) contains all constants in the program
 B) is a permanent table of device rules in the form of patterns for matching with the uniform symbol table to discover syntactic structure
 C) consists of full or partial list of the tokens as they appear in the program, created by Lexical Analysis and used for syntax analysis and interpretation
 D) a permanent table which lists all key words and special symbols of the language in symbolic form.

B