S/SO/2013/02
COMPUTER SCIENCE

Roll No.	BOOKLET NO.	2101

Candidate should write his/her Roll No. in the box above. ↑

Total No. of Questions : **150**

Time : **2 Hours**]	No. of Printed Pages : **32**	[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. Reduced form of the expression AB' + CD' + BC'D' + ABCD + ABC'D is :

(A) A + CD' + BD'

(B) A + BCD' + A'CD'

(C) AD' + AD + CD'

(D) A + CD' + BCD'

2. Push down automata can most conveniently represent :

(A) Context sensitive grammars

(B) Context free grammars

(C) Regular grammars

(D) Unrestricted grammars

3. How many switch points are needed in a crossbar switch network that connects 4 processors to 5 memory modules ?

(A) 4 × 5 = 20

(B) 4 + 5 = 9

(C) 4 × 5 − 4 = 16

(D) 4 × 5 − 5 = 15

4. A digital computer has common bus system for 16 registers of 32 bits each. The bus is constructed with multiplexers. How many multiplexers of what size will be needed ?

(A) 4 multiplexers of size 32 × 1

(B) 32 multiplexers of size 16 × 1

(C) 16 multiplexers of size 32 × 1

(D) 8 multiplexers of size 16 × 1

5. A deterministic finite state automaton that accepts all strings of 0's and 1's which terminate in last two same symbols will contain minimum :

(A) 3 states

(B) 4 states

(C) 5 states

(D) 6 states

6. Which of the following circuits can be used as parallel to serial converter ?

(A) Digital counter

(B) Decoder

(C) Demultiplexer

(D) Multiplexer

7. Cache memory works on the principle and idea of :

(A) the heuristic 80-20 rule   (B) locality of reference

(C) virtual memory   (D) segmentation

8. If A and B are non-terminal symbols and w is a string of terminal symbols only, then which of the following is a right linear grammar ?

(A) A → Bw (B) A → Bw/w

(C) A → wB   (D) A → wB/w

9. The number of 128 × 8 RAM chips needed to provide a memory capacity of 2048 bytes will be :

(A) 8   (B) 16

(C) 4   (D) None of these

10. The value of k, in LR(k) can not be :

(A) 0   (B) 1

(C) 2   (D) None of these

11. The language L = $\{0^n 1^n 2^i \mid n \geq 1, i \geq 1\}$ is generated by the following context free grammar :

(A) S → AB, A → 0A|0, B → 1B2|12

(B) S → AB, A → 0A1|01| B → 2B|2

(C) S → 0A1B|01B|B, A → 01, B → 2B|2

(D) All of the above

12. Every symbolic reference to a memory operand has to be assembled as :

(A) offset, index base   (B) segment base, offset

(C) index base, offset   (D) offset

13. Which of the following shows the logical state of a digital circuit output for every possible combination of logical states in the inputs ?

(A) Routing table   (B) Function table

(C) Decision table   (D) Truth table

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

    (A) Bank switching

    (B) Index mapping

    (C) Two-way memory interleaving

    (D) Memory segmentation

15. Turing machine can be used for :

    (A) Accepting regular grammars

    (B) Accepting unrestricted grammars and computation of integer functions

    (C) Design of a mathematical model

    (D) Counting number of states in a DFA

16. Floating point representation with 8-bit fraction and 6-bit exponent of the binary number + 1001.11 is :

    (A) Fraction : 01001110, Exponent : 000100

    (B) Fraction : 10011100, Exponent : 000011

    (C) Fraction : 00100111, Exponent : 000100

    (D) Fraction : 01001110, Exponent : 100100

17. The speedup ratio for a k-segment pipeline with a clock cycle time t_p used to execute n tasks, given t_n as the time to complete each task by a non-pipelined unit, is expressed as :

    (A) $S = kt_n/(k + n - 1)t_p$ (B) $S = nt_n/(k + n - 1)t_p$

    (C) $S = kt_p/(k + n - 1)t_n$ (D) $S = nt_p/(k + n - 1) t_n$

18. Let N be the number of bits in the sum obtained by a ripple carry adder. Then the time required by the adder is :

    (A) Constant time   (B) 0(N) i.e. linear time

    (C) 0(log N) i.e. logarithmic time   (D) 0(N log N)

19. Form of production rules given by $A \rightarrow BC \mid a$; where B, A, C are non-terminal and a is a terminal symbol represents :

   (A) CNF grammar

   (B) GNF grammar

   (C) Left recursive grammar

   (D) Left factored grammar

20. For any two regular expressions r and s over the alphabet Σ, the regular expression $(r*s*)*$ is equal to :

   (A) $(r.s)*$ (B) $(r + s)*$

   (C) $(r* + s*)^+$ (D) None of these

21. The number of symbols necessary to simulate a TM with m symbols and n states is :

   (A) $m + n$ (B) $m.n$

   (C) $8mn + 4m$ (D) $4\ mn + m$

22. A push down machine behaves like a finite state machine when the number of auxiliary memory it has, is :

   (A) 1   (B) 0

   (C) 2   (D) none of these

23. Which of the following is more responsible loading operating system from the FD/HD into RAM ?

   (A) Bootstrap loader   (B) CPU

   (C) Power On Self Test (POST)   (D) Boot Record

24. Access time of a high speed Cache memory is 40 ns and its hit ratio is 80%. Main memory has an access time of 100 ns. The effective access time for CPU to access memory is :

(A) 52 ns (B) 70 ns

(C) 80 ns (D) 60 ns

25. Minimum number of 2-input NAND gates required to implement the function F = (x' + y') (z + w) is :

(A) 6 (B) 4

(C) 5 (D) 3

26. P, Q and R are three languages. If P and R are regular and if PQ = R, then :

(A) Q has to be regular (B) Q can not be regular

(C) Q need not be regular (D) Q can not be a CFL

27. The universal TM influenced the concept of :

(A) Stored program computers

(B) Computability

(C) Interpretative implementation of programming language

(D) All of the above

28. The language of all words with at least 2 a's is described by the regular expression :

(A) b*ab*a(a + b)* (B) (ab)*a b* a(ba)*

(C) (a + b)* ab* a(a + b)* (D) all of these

29. Which of the following parsers is the most powerful ?

    (A) Operator precedence   (B) LALR

    (C) Canonical LR   (D) SLR

30. Local and loop optimization inturns provide motivation for :

    (A) Data flow analysis

    (B) Constant folding

    (C) Peephole optimization

    (D) DFA and constant folding

31. A 6-MHz channel is used by a digital signalling system utilizing 4-level signals. The maximum possible transmission rate is :

    (A) 1.5 Mbaud/sec   (B) 12 Mbaud/sec

    (C) 24 Mbaud/sec   (D) 6 Mbaud/sec

32. FDDI is :

    (A) ring network   (B) mesh network

    (C) star network   (D) bus based network

33. Indefinite blocking is called :

    (A) deadlock   (B) starvation

    (C) both (A) and (B)   (D) none of these

34. A public key encryption system :

    (A) allows only the correct receiver to decode the data

    (B) allows any one to decode the data

    (C) allows only the correct sender to decode the data

    (D) does not encode the data before its transmission

35. A logical address space of 8 pages of 1024 words is mapped to a physical memory of 32 frames. The number of bits in logical and physical addresses are :

(A) 3 bits and 5 bits

(B) 13 bits and 15 bits

(C) 10 bits and 5 bits

(D) 18 bits and 5 bits

36. The average turn around time by using shortest job. First scheduling technique for the four jobs with next burst time as 6, 3, 8 and 7 units respectively will be :

(A) 13 units

(B) 15 units

(C) 24 units

(D) 16 units

37. Bit vector is defined as :

(A) The free space list implemented as a bit map or bit vector

(B) No free space list is implemented

(C) Both (A) and (B)

(D) None of the above

38. Round-Robin scheduling is essentially the pre-emptive version of :

(A) SJF

(B) FIFO

(C) Longest time first

(D) Shortest remaining time first

39. A packet-switching network :

(A) is free

(B) can reduce the cost of using an information utility

(C) allows communication channel to be shared among more than one user

(D) both (B) and (C) above

40. A bridge operates in :

(A) Physical and data link layer

(B) Only data link layer

(C) Only physical layer

(D) Network layer

41. The dotted-decimal notation for the IP address 10000001 00001011 00001011 11101111 is :

(A) 129.11.11.239   (B) 249.155.251.15

(C) 129.11.10.240   (D) none of these

42. An IP address 227.12.14.87 is in the following class :

(A) E   (B) D

(C) B   (D) C

43. The signal to noise ratio for a voice grade line is 30.1 dB or a power ratio of 1023 : 1. The maximum archivable data rate on this line whose spectrum ranges from 300 Hz to 3400 Hz is :

(A) 6200 bps   (B) 34000 bps

(C) 9600 bps   (D) 31000 bps

44. An operating system contains 3 user processes each requiring 2 units of resource R. The minimum number of units of R such that no deadlock will ever arise is :

(A) 3   (B) 5

(C) 4   (D) 6

45. If an instruction takes i microseconds and a page fault takes an additional j microseconds, the effective instruction time if on an average a page fault occurs every k instruction is :

(A) $i + j/k$ (B) $(i + j)/k$

(C) $i + (j * k)$ (D) $(j + k) * k$

46. The main advantage of the concept of interrupt is :

    (A) polling

    (B) spooling

    (C) job scheduling

    (D) blocking the currently running process

47. Thrashing is :

    (A) the high paging activity

    (B) an activity in which processes spent more time paging than executing

    (C) both (A) and (B)

    (D) none of the above

48. The network interface that permits equipment without an ISDN interface to be connected into an ISDN interface is known as :

    (A) TE2   (B) TA

    (C) TE   (D) TE1

49. The number of addresses in block, 200.17.21.128/127 is :

    (A) 16   (B) 32

    (C) 31   (D) 24

50. A modem that packs 6 bits into each signal change and operates at 14,400 bps can result in a maximum throughput of :

    (A) 14400 bps   (B) 9600 bps

    (C) 2400 bps   (D) 4800 bps

51. The probability that a single bit will be in error on a typical telephone line using 4800 bps modem is 10^{-3}. If no error detection mechanism is used, the residual error rate for a communication line using 9-bit frames is approximately equal to :

    (A) 0.009   (B) 0.003

    (C) 0.999   (D) 0.991

52. The despatcher :

    (A) schedules the tasks into the processor

    (B) is always very small and simple

    (C) puts tasks in I/O wait

    (D) never changes task priorities

53. At a single terminal CPU, 40% of the users do not need to wait and the average wait time for all users is 50 minutes. The average wait time for those who wait, is approximately :

    (A) 60   (B) 80

    (C) 70   (D) 100

54. In a memory system s is the number of sectors per track, and t is the number of tracks per cylinder, then a disk address cylinder i, surface j, sector k can be mapped to one-dimensional block number b as :

    (A) b = k + s * (j + i * t)

    (B) b = s + k * (j + i* t)

    (C) b = i + j * (s + k* t)

    (D) b = j + i * (s + k* t)

55. Belady's anomaly refers to :

    (A) The decrease in page faults with increase in no. of frames

    (B) Increase in page faults with decrease in frames

    (C) Increase in page faults with increase in frames

    (D) None of the above

56. For a scheduling problem $(J_{a1}, J_{a2}, J_{a3}, J_{a4}) = (6, 9, 15, 20)$ and $(J_{b1}, J_{b2}, J_{b3}, J_{b4}) = (12, 3, 17, 28)$ a task T_{a1} must be completed before starting T_{b1}. Which of these is an optimal non-preemptive schedule ?

   (A) J_1, J_3, J_4, J_2 (B) J_3, J_4, J_1, J_2

   (C) J_4, J_2, J_1, J_3 (D) J_2, J_3, J_1, J_4

57. In an operating system, which is the definition of a correct process transition ?

   (A)   Wakeup : ready-running   (B)   Despatch : ready-running

   (C)   Block : ready-blocked   (D)   Timer runout : ready-blocked

58. Six files $F_1, F_2, F_3, F_4, F_5, F_6$ with sizes as 100, 200, 70, 40, 250 and 50 are to be stored on a sequential device in such a way as to optimize the access time. The order of their storage should be :

   (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) $F_5, F_2, F_1, F_3, F_6, F_4$ (D) $F_4, F_6, F_3, F_1, F_2, F_5$

59. A synchronous communication line uses byte oriented protocol with size of each frame as 100 characters (including control bytes). If the bit error probability is 10^{-4} and each character is 8 bits long without a parity bit, the probability that the frame will arrive with one or more bit errors is equal to :

   (A) $1 - (0.0001)^8$ (B) $(0.9999)^{100}$

   (C) $(0.0001)^{100}$ (D) $(1 - (1 - 0.0001)^{800})$

60. Communication protocols always have a :

(A) Set of symbols

(B) Start of header

(C) Special flag symbol

(D) BCC

61. Which one is the most important feature of the spiral model ?

(A) Quality management

(B) Risk management

(C) Performance management

(D) Efficiency management

62. In Putnam resource allocation model, Rayleigh curve is modeled by the equation :

(A) $m(t) = 2ate^{-at^2}$

(B) $m(t) = 2kte^{-at^2}$

(C) $m(t) = 2kate^{-at^2}$

(D) $m(t) = 2kbte^{-at^2}$

63. The function that sets the position to a desired point in the file is :

(A) fseek( )

(B) getw( )

(C) ftell( )

(D) put( )

64. What does the 'C' statement printf ("%d", ++5); prints ?

(A) 5

(B) 6

(C) 7

(D) an error message

65. What is the result of execution of the following 'C' statements ?

    int i=5;

    do{putchar(i+100); printf("%d", i−−);}

    while (i);

    (A) i5h4g3f2e1   (B) 14h3g2f1e0

    (C) an error message   (D) none of these

66. Which of the following is *not* a size metric ?

    (A) LOC   (B) FP

    (C) Program length   (D) Cyclomatic complexity

67. The failure intensity of a software is 0.005 failures/hour during 10 hours of its operation. The reliability of software can be expressed as :

    (A) 0.90   (B) 0.92

    (C) 0.95   (D) 0.98

68. Assume a class C with objects 01, 02 and 03. For the statement 03 = 01 − 02 to work correctly, the overloaded operator must :

    (A) Return a value

    (B) Create a named temporary object

    (C) Use the object of which it is a member as an operand

    (D) Both (A) and (C) above

69. Virtual functions in C++ allow to :

    (A) Use the same function call to execute member function of objects from different classes

    (B) Create functions that have no body

    (C) Group objects of different classes so that they can all be accessed by the same function code

    (D) Create an array of type pointer-to-base-class that can hold pointers to derived class

70. Which of the following parsing methods handles left-recursive grammars ?

(A) top-down parsing (B) bottom-up parsing

(C) both (A) and (B) (D) none of these

71. For a function of n variables, boundary value analysis yields :

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

(C) n + 4 test cases (D) none of these

72. A program requires two 8-bit integers as inputs. If only one second is required to execute one set of inputs, how much time will it take to execute all possible combinations of inputs ?

(A) 15 hours (B) $8 \times 8 \times 2$ seconds

(C) $2^8 \times 2^8 \times 2$ seconds (D) 18 hours

73. In Java the difference between break and continue statements is :

(A) break causes the complete termination of the loop whereas continue terminates only current iteration

(B) break causes the termination of the current iteration of the loop whereas continue terminates the loop permanently

(C) break causes the complete termination of the loop whereas continue does not terminate the execution at all

(D) none of the above

74. Which Java package is automatically available when you write a Java program ?

(A) java.text (B) java.lang

(C) java.swing (D) java.util

75. Assertions are most closely associated with what type of error ?

   (A) run-time   (B) compile-time

   (C) logic   (D) disk

76. In C++ which of the following is most likely used to convert from a user defined class to basic type ?

   (A) a conversion function that is a member of a class

   (B) an overloaded = operator

   (C) a one-argument constructor

   (D) a built-in conversion function

77. The purpose of regression testing is to :

   (A) increase confidence in the correctness of a modified program

   (B) locate errors in a modified program

   (C) preserve the quality and reliability of software

   (D) all of the above

78. A program P calls subprograms P1 and P2. If P1, can fail 50% times and P2 can fail 40% times, then P can fail :

   (A) 50%   (B) 60%

   (C) 10%   (D) 70%

79. The relationship between data elements in a module is called :

   (A) coupling   (B) cohesion

   (C) modularity   (D) none of these

80. Which class in Java provides many methods that you can call to control your threads, including yield, sleep and set priority ?

 (A) Thread   (B) Runnable

 (C) Group   (D) None of these

81. What is the output of the following 'C' program :

main( )

    {

        int x=10, y=10, z=5, i;

        i=x < y < z;

        printf("\n%d", i);

    }

 (A) 1   (B) 0

 (C) error   (D) 5

82. If x[10] is an array of 10 integers, then which of the following will point to the second element of the array ?

 (A) x[2]   (B) x[1]

 (C) (x + 1)   (D) (x + 2)

83. Which of the following C statements is syntactically *correct* ?

 (A) for ( );   (B) for(;);

 (C) for (;;);   (D) none of these

84. A friend function can be used to :

   (A) Avoid arguments between classes

   (B) Allow access to classes whose source code is unavailable

   (C) Allow one class to access an unrelated class

   (D) Increase the versatility of an overloaded operator

85. YACC generates parsers based on :

   (A) LALR(1) grammars

   (B) LL(1) grammars

   (C) Operator-precedence grammars

   (D) General context free grammars

86. Which one is *not* a requirement elicitation technique ?

   (A) interview   (B) the use case approach

   (C) fact finding   (D) data flow diagrams

87. BNF is meta language for describing :

   (A) the syntax of a language

   (B) context free grammars

   (C) both (A) and (B)

   (D) shell programming

88. Minimum number of times the body of do ...... while loop is executed is :

   (A) zero   (B) one

   (C) infinite   (D) three

89. According to Brooks, if n is the number of programmers in a project team, then the number of communication path is :

(A) $n(n - 1)/2$

(B) $n \log n$

(C) n

(D) $n(n + 1)/2$

90. According to the COCOMO basic model the expression $E = a(kLOC)^b$. The unit of E is :

(A) PM(Person Month)

(B) PY(Person Year)

(C) PH(Person Hour)

(D) EMD

91. A logical schema is :

(A) The entire database

(B) A standard way to organise information into accessible parts

(C) The way data is actually stored on disk

(D) None of the above

92. Which of the following languages has recently become the de facto standard for interfacing application programs with RDBMS ?

(A) dBASE

(B) 4GL

(C) Oracle

(D) SQL

93. For a database relation R(A, B, C, D), the domains of A, B, C and D include only atomic values. The following functional dependencies and those that can be inferred from them also exist :

$$A \to C, B \to D$$

The relation is in :

(A) 1NF but not in 2NF

(B) 2NF but not in 3NF

(C) 3NF

(D) None of these

94. A database schema R(A, B, C) depicts the following functional dependencies :

$$A \to BC, B \to C, A \to B, AB \to C$$

The canonical cover for this set is :

(A) $A \to BC$ and $B \to C$

(B) $A \to BC$ and $AB \to C$

(C) $A \to BC$ and $A \to B$

(D) $A \to B$ and $B \to C$

95. Which of the data model is independent of both hardware and DBMS ?

(A) external

(B) internal

(C) conceptual

(D) all of these

96. What will be the result of statement SELECT * FROM EMPLOYEE WHERE SALARY in (4000, 8000) ?

(A) all employees whose salary is either 4000 or 8000

(B) all employees whose salary is between 4000 and 8000

(C) all employees whose salary is not between 4000 and 8000

(D) none of the above

97. The value of scale-up, if the original system can process 1000 transactions in a given time and the parallel system can process 300 transactions in the same time, is :

(A) 2

(B) 3

(C) 4

(D) None of these

98. Which of the following is *not* a DDL statement ?

(A) ALTER

(B) DROP

(C) CREATE

(D) SELECT

99. Which of the following is a spatial indexing method ?

(A) X-trees

(B) R-trees

(C) B-trees

(D) None of these

100. Degree of a table with 5000 rows and 50 columns is :

(A) 50

(B) 500

(C) 5000

(D) None of these

101. Which of the following clauses is usually used together with aggregate functions ?

(A) ORDER BY ASC

(B) GROUP BY

(C) ORDER BY DESC

(D) None of these

102. Which of these expresses the specific number of entity occurrences associated with one occurrence of the related entity ?

    (A) degree

    (B) connectivity

    (C) cardinality

    (D) None of these

103. Which of the following transformation is referred to as commutativity of projection and join ?

    (A) $\pi_{L_1 \cup L_2} (R \bowtie S) \equiv \pi_{L_1} (R_1)) \bowtie_C \equiv \pi_{L_2}(S))$

    (B) $R \cup S \equiv S \cup R$

    (C) $R \cap S \equiv S \cap R$

    (D) Both (B) and (C)

104. Which of the following is a statement after which you can *not* issue a commit command ?

    (A) INSERT

    (B) SELECT

    (C) UPDATE

    (D) DELETE

105. VDL is used to specify :

    (A) internal schema

    (B) external schema

    (C) conceptual schema

    (D) none of these

106. OLAP is :

    (A) A dynamic synthesis of multidimensional data

    (B) A analysis of multidimensional data

    (C) A consolidation of large volume of multidimensional data

    (D) All of the above

107. In distributed query processing, semi-join operation is used to :

(A) Reduce the size of a relation that needs to be transmitted

(B) Reduce the communication cost

(C) Both (A) and (B)

(D) None of the above

108. The time required to insert an element in a stack with linked list implementation is :

(A) $0(1)$

(B) $0(\log_2 n)$

(C) $0(n)$

(D) $0(n \cdot \log_2 n)$

109. The postfix equivalent of the prefix : $* - AB - CD$ is :

(A) $AB + CD - *$

(B) $ABCD - - *$

(C) $AB + CD * -$

(D) $AB + - CD *$

110. The worst case time required to search a given element in a sorted linked list of length n is :

(A) $0(1)$

(B) $0(\log_2 n)$

(C) $0(n)$

(D) $0(n \log_2 n)$

111. The maximum number of binary trees that can be formed with three unlabelled nodes is :

(A) 1

(B) 5

(C) 4

(D) 3

112. A full binary tree with n leaf nodes contains :

    (A) n nodes

    (B) $\log_2$ n nodes

    (C) 2n – 1

    (D) 2^n nodes

113. The time complexity of an algorithm with n inputs is expressed as :

    $T(n) = T(n - 1) + 1/n$ if $n > 1$

    $= 1$, otherwise

    The order of complexity of this algorithm is :

    (A) 0(log n)

    (B) 0(n)

    (C) $0(n^2)$

    (D) $0(n^n)$

114. Which of the following traversal techniques lists nodes of a binary search tree in ascending order ?

    (A) postorder

    (B) inorder

    (C) preorder

    (D) none of these

115. Which of the following algorithm design techniques is used in the quicksort algorithm ?

    (A) dynamic programming

    (B) back-tracking

    (C) greedy method

    (D) divide and conquer

116. A text is made up of the characters a, b, c, d, e each occurring with the probabilities 0.12, 0.40, 0.15, 0.08, and 0.25 respectively. The optimal coding technique will have the average length of :

    (A) 2.15

    (B) 3.01

    (C) 2.30

    (D) 1.78

117. The linked list representation of sparse matrices is superior to the generalised dope vector method because it is :

(A) conceptually easier

(B) completely dynamic

(C) efficient in accessing an entry

(D) efficient if the sparse matrix is a band matrix

118. Minimum number of colours needed to colour a graph with one vertex and two edges is :

(A) 4   (B) 3

(C) 2   (D) 1

119. An advantage of chained hashing table (external hashing) over the open hashing is :

(A) Worst case complexity of search operation is less

(B) Space used is less

(C) Deletion is easier

(D) None of the above

120. The number of interchanges (swap) needed to sort the numbers 8, 22, 7, 9, 31, 19 5, 13 in ascending order, using bubble sort is :

(A) 11   (B) 12

(C) 13   (D) 14

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

(A) n – 1   (B) n

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

122. Heap allocation is required for languages :

    (A) that support recursion

    (B) that support dynamic data structures

    (C) that use dynamic scope rules

    (D) none of the above

123. The number of 'ADD' and 'REMOVE' operations required to access n/2 th element of a queue of 'n' elements so that the original queue remains the same after the access is :

    (A) 4 * n   (B) 8 * n

    (C) 4 * n – 1   (D) 8 * n – 1

124. The following sequence of operations is performed on stack push(1), push(2), pop, push(1), push(2), pop, pop, pop, push(2), pop. The sequence of popped values are :

    (A) 2, 2, 1, 1, 2   (B) 2, 2, 1, 2, 2

    (C) 2, 1, 2, 2, 1   (D) 2, 1, 2, 2. 2

125. If B is the circuit matrix of a graph with k components. e edges, and n vertices, the rank of B is :
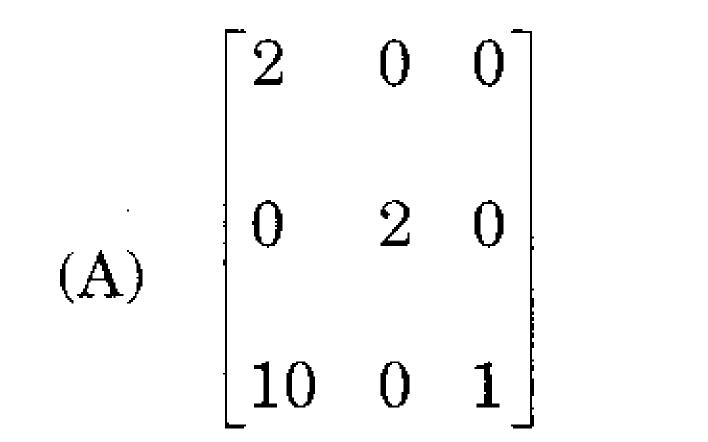
    (A) n – k   (B) e – n + k

    (C) e – n + 2k   (D) e + n – k

126. Gantt charts may be prepared with :

    (A) spread sheet   (B) database management system

    (C) word processor   (D) (A) and (C) both

127. Which is normally used where a high degree of interaction is necessary ?

    (A) batch mode processing

    (B) remote terminal processing

    (C) intelligent terminal processing

    (D) online processing

128. If the logical interaction intersection of the 4-bit codes for end points of a line is not zero, the line lies :

    (A) entirely on the screen   (B) entirely off the screen

    (C) partially on the screen   (D) none of these

129. An exploded slice is a feature of a :

    (A) bar chart   (B) pie chart

    (C) line graph   (D) none of these

130. Animation is nothing but running of :

    (A) scenes   (B) blocks

    (C) bits   (D) scan-lines

131. If a point (x, y) is first scaled by a factor $S_x = S_y = 2$, then translated by $t_x = 10$, $t_y = 0$. The resultant transformation matrix will be :

(A) $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 10 & 0 & 1 \end{bmatrix}$

(B) $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 10 & 1 \end{bmatrix}$

(C) $\begin{bmatrix} 10 & 0 & 1 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$

(D) none of these

132. XML documents can be created using :

(A) Wizards

(B) Editors

(C) Operating system

(D) HTML

133. Javascript is mainly used with :

(A) database

(B) text

(C) web pages

(D) VB

134. Which of the following colour graphics display adapter has the highest resolution ?

(A) HGA

(B) CGA

(C) VDA

(D) SVGA

135. Which one is the fastest driver of JDBC ?

(A) type 1

(B) type 2

(C) type 3

(D) type 4

136. How many instances of a servelet can be created ?

(A) 1

(B) 2

(C) 3

(D) none of these

137. Which one of the following is *not* a responsibility of the stub in RMI ?

(A) Initiating remote calls

(B) Marshalling arguments to be sent

(C) Informing the remote reference layer that the call is complete

(D) Calling the actual remote object implementation

138. How many types of lists are supported by HTML ?

(A) 2

(B) 3

(C) 5

(D) none of these

139. An alternative protocol to the TCP is :

(A) UDP

(B) SMTP

(C) EDP

(D) None of these

140. $P \leftrightarrow Q$ is logically equivalent to :

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

(B) $(P \wedge Q) \leftarrow (P \vee Q)$

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

(D) None of the above

141. If there exists exactly one production deriving every non-terminal in a context free Grammar, then L(G) is :

(A) A finite set

(B) A set containing only one string

(C) An infinite set

(D) None of the above

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

(A) All the type errors are detected

(B) Type checking is done during the execution

(C) It increases the cost of execution

(D) None of the above

143. Which of the following does the parent and child process share after a fork( ) ?

(A) The same PCB

(B) The same stack

(C) Data declared global to the program

(D) None of the above

144. Which of the following statements are *true* of (hard and soft) real-time scheduling ?

(A) They minimize the average weight time

(B) They maximize CPU utilization

(C) They use multi-level queues

(D) None of the above

145. ~ (P → Q) is equivalent to :

(A) ~ P ∧ Q

(B) P ∨ Q

(C) P ∧ ~ Q

(D) ~ P ∧ ~ Q

146. Embedded computers typically run on which operating system ?

(A) Windows XP

(B) Clustered

(C) Real-time

(D) None of these

147. Block Cache and Buffer Cache are used :

(A) to improve disk performance

(B) to handle interrupts

(C) to increase the capacity of main memory

(D) to speed up main memory read operation

148. Which of the following is *not* a part of CRT ?

(A) Phosphor screen

(B) Shadow mask

(C) Gas plasma

(D) Electron gun

149. A synthesized attribute is an attribute whose value at a parse tree node depends on :

(A) Attributes at siblings level only

(B) Attributes at children nodes only

(C) Attributes at parent nodes only

(D) None of the above

150. How many bits are required to encode all 26 letters, 10 symbols and 10 numerals ?

(A) 5

(B) 6

(C) 7

(D) 46