1. Suppose you are given an array s[1 . . n] and a procedure reverse(s, i, j) which reverses the order of elements in s between positions i and j (both inclusive). What does the following sequence do, where 1< k < n

reverse (s,1,k)

reverse(s, k+1, n);

reverse(s, 1, n);

A) Rotates s left by k positions
B) Leaves s unchanged
C) Reverse all elements of s
D) None of the above

2. If 7 bits were used to store a character the percentage reduction of storage will be
A) 22.5
B) 2.5
C) 8
D) 12.5

3. The possible output of printf("%d %d ",p, p+1)if p is a float pointer variable is
A) 3272 3272
B) 3272 3276
C) 3272 3273
D) 3272 3274

4. Which of the following UNIX tools receives input only from standard input ?
A) awk
B) sed
C) grep
D) tr

5. Files that store data in the same format as used in the program are called
A) Binary files
B) Source files
C) Text files
D) Core

6. In a UNIX system if 4 people are currently using the vi editor, then the number of corresponding processes will be
A) 8
B) 4
C) 5
D) 1

7. When a process makes a system call, its mode changes from
A) User to kernel
B) Kernel to user
C) Unrestricted to restricted
D) All of the above

8. The following program

```
main()
{
    if (fork () >0)
    sleep (100);
}
```

Results in the creation of
A) An orphan process
B) A zombie process
C) A process that executes for ever
D) All of the above

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9. In which section of a process, the information about the arguments to the program are available?

A) Data   B) Text   C) Stack   D) User-block

10. Suppose the time to service a page fault is on the average 10 milli seconds, while a memory access takes 1 micro second. Then a 99.99% hit ratio takes an average memory access time of

A) 1.9999 milliseconds

B) 1 milli second

C) 9.999 micro seconds

D) 1.9999 microseconds

11. Which of the following system calls transforms an executable binary file into a process ?

A) fork   B) exec   C) ioct1   D) long jmp

12. R(A,B,C, D) is a relation. Which of the following does not have a lossless-join dependency preserving BCNF decomposition?

A) A->B, B->CD

B) A->B, B->C, C->D

C) AB->C, C->AD

D) A->BCD

13. An ordinary calculator treats all operators

A) To be of equal precedence and associating to the right

B) To be of equal precedence and associating to the left

C) To be of unequal precedence and associating to the left

D) Used in mathematical sense

14. The principle that a function can always be replaced by its value (irrespective of the context) without changing the meaning is called

A) Referential transparency

B) Orthogonality

C) Context-free

D) Unbinding

15. The period of time between an allocation and its subsequent disposal is called

A) Scope

B) Dynamic binding

C) Lifetime

D) Longevity

16. Heap allocation is required for languages that

A) Support recursion

B) Support dynamic data structures

C) Use dynamic scope variables

D) None of the above

17. A device employing INTR line for device interrupt puts the CALL instruction on the data bus while

    A) INTA is active   B) HOLD is active

    C) READY is active   D) None of the above

18. According to the principle of logic, an implication and its contrapositive must be

    A) Both true   B) Both true or both false

    C) Both false   D) None of these

19. Which of the following logical operation resembles an arithmetic multiplication operation ?

    A) OR   B) AND   C) NOR   D) XOR

20. Consider the following declaration of a two-dimensional array in char a [100][100]; Assuming that the main memory is byte addressable and that the array is stored starting from memory address 0, the address of a [40][50] is

    A) 4040   B) 4050   C) 5040   D) 5050

21. Spatial locality refers to the problem that once a location is referenced

    A) It will not be referenced again

    B) It will be referenced again

    C) A nearby location will be referenced soon

    D) None of the above

22. Virtual memory is

    A) An extremely large main memory

    B) An extremely large secondary memory

    C) An illusion of an extremely large memory

    D) A type of memory used in super computers

23. Fragmentation is

    A) Dividing secondary memory into equal sized fragments

    B) Dividing main memory into equal sized fragments

    C) Fragments of memory words used in a page

    D) Fragments of memory words unused in a page

24. Dijkstra's banking algorithm in an operating system solves
  (A) Deadlock avoidance
  B) Deadlock recovery
  C) Mutual exclusion
  D) Context switching

25. Sector interleaving in disks is done by the
  A) Disk manufacturer
  B) Disk controller cord
  C) Operating system
  D) None of the above

26. Pre-emptive scheduling, is the strategy of temporarily suspending a running process
  (A) Before the CPU time expires
  B) To allow starving process to run
  C) When it requests I/O
  D) None of the above

27. Dirty bit is used to show the
  A) Page with corrupted data
  B) Wrong page in memory
  (C) Page that is modified after being loaded into cache memory
  D) Page that is less frequently accessed

28. In 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

29. Which of the following is a service not supported by the operating system ?
  A) Resource management
  B) Accounting
  (C) Compilation
  D) I/O operation

30. Which of the following is true?
  A) The linkage editor is used to edit programs to be later linked together
  B) The linkage editor links object modules during compiling or assembling
  (C) The linkage editor links object modules and resolves external references between them before loading
  D) The linkage editor resolves external references between object modules during execution time

31. Cascading termination refers to termination of all child processes before the parent terminates
  A) Normally only
  B) Abnormally only
  (C) Normally or abnormally
  D) None of the above

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32. The main function of shared memory is to
   A) Use primary memory efficiently
   B) Do intra process communication
   C) Do inter process communication
   D) None of the above

33. Which of the following scheduling algorithms gives minimum average waiting time ?
   A) FCFS
   B) SJF
   C) Round-Robin
   D) Priority

34. Which of the following is true about Thrashing?
   A) Reduces page I/O
   B) Decreases the degree of multi-programming
   C) Implies excessive page I/O
   D) Improves system performance

35. Pumping lemma is generally used for proving
   A) A given grammar is not regular
   B) A given grammar is regular
   C) Whether two given regular expressions are equivalent
   D) None of the above

36. Let A, B and C are three languages. If A and C are regular and if AB=C then
   A) C has to be regular
   B) C cannot be regular
   C) C need not be regular
   D) C has to be a CFL

37. In a compiler, grouping of characters into tokens is done by the
   A) Code generator   B) Parser   C) Scanner   D) Code optimiser

38. A top-down parser generates
   A) Left-most derivation
   B) Right-most derivation
   C) Right-most derivation in reverse
   D) Left-most derivation in reverse

39. Which of the following symbol table implementation is based on the property of locality of reference ?
   A) Linear list
   B) Search tree
   C) Hash table
   D) Self-Organisation list

40. The technique of replacing run time computations by compile time computations is called
   A) Constant folding
   B) Code hoisting
   C) Peephole optimisation
   D) Invariant computation

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41. Which of the following is an output postfix notation of (A-B)*(C/D)+E ?

A) AB-CD/*E+   B) AB-CDE/*+   C) ABCDE-/*+   D) ABCDE+*/-

42. Back-patching is useful for handling

A) Conditional jumps
C) Backward references
B) Unconditional jumps
D) Forward references

43. The minimum time delay between the intiations of two independent memory operations is called

A) Access time   B) Cycle time   C) Transfer rate   D) Latency time

44. Which of the following does not need extra hardware for DRAM refreshing ?

A) 8085
C) Z-80
B) Motorola-6800
D) None of the above

45. The first operating system used in microprocessors is

A) Zenix   B) DOS   C) CP/M   D) Multics

46. Which of the following is a programmable internal timer ?

A) 8251   B) 8250   C) 8253   D) 8275

47. Which of the following weights make the complement operation easier in BCD form?

A) 8-4-2-1   B) Excess-3   C) 2-4-2-1   D) 3-2-1-0

48. The binary equivalent of the decimal number 0.4375 is

A) 0.0111   B) 0.1011   C) 0.1100   D) 0.1010

49. The number of columns in a state table for the sequential circuit with 'm' flipflops and 'n' input is

A) m+n   B) m+2n   C) 2m+n   D) 2m+2n

50. Which chips are erasable by ultra violet rays after removing them from the main circuit ?

A) EPROM chips
C) PROM chips
B) EEPROM chips
D) All of the above

51. Which of the following logic families is well suited for high speed operation ?

A) TTL   B) ECL   C) MOS   D) CMOS

52. Which of the following interrupts is both edge and level sensitive ?
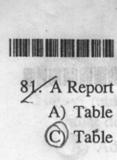
A) RST5.5   B) INTR   C) RST 7.5   D) TRAP

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53. The ASCII code 56 represents the character

A) V   B) 8   C) a   D) Carriage return

54. Which of the following is the minimum error code?

A) Octal code   B) Binary code

C) Gray code   D) Excess-3 code

55. Which of the following is volatile ?

A) Bubble memory   B) RAM

C) ROM   D) Magnetic disc

56. How many flip fops are needed to divide by 16 ?

A) 2   B) 4   C) 8   D) 16

57. The maximum number of I/O devices that can be addressed by INTEL 8085 is

A) 65536   B) 255   C) 512   D) 256

58. The instruction used to shift right the accumulator contents by one bit through the carry flag bit is

A) RLC   B) RAL   C) RRC   D) RAR

59. Tera is two to the power of

A) 32   B) 30   C) 40   D) 25

60. The maximum number of nodes on level i of a binary tree is

A) 2^{i-1} B) 3^{i-1} C) $i+1$ D) 2^{i+1}

61. In SQL, which statement is used to select employee number (EMPNO) and Department(DEPT) from (EMPL) table whose salary (SALARY) is 8000 ?

A) SELECT EMPNO, DEPT FROM EMPL = 8000

B) SELECT EMPNO, DEPT FROM EMPL WHERE SALARY = 8000

C) SELECT EMPNO, DEPT, SALARY = 8000 FROM EMPL

D) SELECT EMPNO, DEPT, FROM TABLE EMPL WHEN SALARY = 8000

62. Which of the following is useful in implementing quick sort ?

A) Stack   B) Set

C) List   D) Queue

63. The task(s) of the Lexical analysis phase of a compiler is

A) To parse the source program into the basic elements or tokens of the language

B) To build an executable application

C) To build a uniform symbol tree

D) All of the above

64. In CRT displays, increasing the refresh rate

A) Decreases flickering

B) Increases flickering

C) Decreases the size of image

D) Increases the size of image

65. The point of time a variable comes into existence in memory is determined by its

A) Scope

B) Storage class

C) Data type

D) All of the above

66. The topology with the highest reliability is

A) Bus topology

B) Star topology

C) Ring topology

D) Mesh topology

67. Which of the following ISO Layer is more closely related to the Network layer in TCP / IP model ?

A) Application

B) Session

C) Network

D) Data Link

68. Which of the following is not a standard RS-232 C signal ?

A) RTS

B) CTS

C) DSR

D) VDR

69. The extent to which the software can continue to operate correctly despite the introduction of invalid input is called

A) Reliability

B) Robustness

C) Fault-tolerance

D) Portability

70. Let R = (A, B, C, D, E, F) be a relation scheme with the following dependencies C->F, E->A, EC->D, A->B. Which of the following is a key for R ?

A) CD

B) EC

C) AE

D) AC

71. Which of the following layer protocols in OSI Reference model are responsible for user and the application program support such as passwords, file transfer, etc.?

A) Layer 7 protocols

B) Layer 6 protocols

C) Layer 5 protocols

D) Layer 4 protocols

72. The probability of success of two modules in unit testing is 0.9 each. The probability of success of integration testing is 0.9. The joint probability of success is

A) 0.9　　　　B) 0.81　　　　C) 0.729　　　　D) 0.1

73. Which of the following testing methods is normally used as the acceptance test for a software system?

A) Regression testing　　　　B) Integration testing

C) Unit testing　　　　D) Beta testing

74. A PL/SQL block can return user data to SQL*Plus through

A) Bind variables　　　　B) Substitution variables

C) Local variables　　　　D) None of these

75. Which of the following is widely used tool for developing PL/SQL code ?

A) Rapid SQL　　　　B) SQL++

C) SQL programmer　　　　D) TOAD

76. PL/SQL does not support arrays. However it has an equivalent construct which is

A) Records　　　　B) Collections　　　　C) Packages　　　　D) Types

77. Which of the following triggers can be used in DDL operations ?

A) Instead-Of-Trigger　　　　B) DML Trigger

C) System trigger　　　　D) DDL trigger

78. Which of the following is/are correct ?

A) An SQL query automatically eliminates duplicates

B) An SQL query will not work if there are no indexes on the relations

C) SQL permits attribute names to be repeated in the same relation

D) None of the above

79. Which of the following is a collection of Form components ?

A) Record Group　　　B) Record Set　　　C) Data Store　　　D) Object Group

80. A certain processor supports only the immediate and the direct addressing modes. Which of the following programming language formats cannot be implemented on this processor ?

1. Pointers　　　　2. Arrays　　　　3. Records

A) 1 and 2 only　　　B) 2 and 3 only　　　C) 1 and 3 only　　　D) 1, 2 and 3

81. A Report can be based on a ?
   A) Table but not a view
   B) View but not a table
   C) Table or a view
   D) All of the above

82. What is the environment variable that contains a list of directories where Java looks for classes referenced in a program ?
   A) PATHCLASS
   B) SEARCHPATH
   C) PATH
   D) CLASSPATH

83. Garbage collector in Java frees the programmer from worrying about
   A) Memory leaks
   B) Dangling references
   C) Creating new objects
   D) Recursion

84. Which of the following does not have a super class in Java?
   A) System
   B) Object
   C) Lang
   D) Exception

85. In Java the constants that cannot be changed are declared using the keyword
   A) Final
   B) Static
   C) Abstract
   D) Immutable

86. Let L denote the language generated by grammar S->0S0|00. Which of the following is true ?
   A) L = 0+
   B) L is regular but not 0+
   C) L is context free but not regular
   D) L is not context free

87. Which of the following can be used to generate HTML documentation from a Java source code?
   A) Javadoc
   B) JavaHtmlDoc
   C) Javac
   D) Jar

88. The number of tokens in the following C statement printf("i=%d, &i=%x", i, &i); is
   A) 3
   B) 26
   C) 10
   D) 21

89. Which of the following method is invoked by the garbage collector in Java ?
   A) Final
   B) Constructor
   C) Finally
   D) Finalize

90. The java compiler generates
   A) Assembly language
   B) Machine language
   C) P-code
   D) Byte code

91. Which of the following is true about pass by reference in C++ ?
    1. Copy of variables are not created
    2. Share the same address space
    3. A mechanism to use the memory effectively

    A) 1 and 2 only   B) 2 only   C) 1 and 3 only   D) 1, 2 & 3

92. The maximum number of binary trees that can be formed with three unlabelled nodes is
    A) 1   B) 5   C) 4   D) 3

93. Which of the following is a top-down parser ?
    A) Recursive descent parser   B) Operator precedence parser
    C) An LR(k) parser   D) An LALR(k) parser

94. Which of the following uses UDP as the transport protocol ?
    A) HTTP   B) Telnet   C) DNS   D) SMTP

95. In Ethernet, when Manchestor encoding is used the bit rate is
    A) Half the baud rate   B) Twice the baud rate
    C) Same as the baud rate   D) None of these

96. The inorder and preorder traversal of a binary tree are
    d b e a f c g   and   a b e c f g respectively
    The postorder traversal of the binary tree is
    A) d e b f g c a   B) e d b g f c a   C) e d b f g c a   D) d e f g b c a

97. The address of a Class B host is to be split into subnets with a 6- bit subnet number. What is the maximum number of subnets and the maximum number of hosts in each subnet ?
    A) 62 subnets and 262142 hosts   B) 64 subnets and 262142 hosts
    C) 62 subnets and 1022 hosts   D) 64 subnets and 1024 hosts

98. Which of the following algorithms have the lowest worst case complexity?
    A) Merge sort   B) Bubble sort   C) Quick sort   D) Selection sort

99. A machine took 200 seconds to sort 200 names, using bubble sort. In 800 seconds it can approximately sort
    A) 400 names   B) 800 names
    C) 750 names   D) 600 names

100. A multi-user, multi processing operating system cannot be implemented on hardware that does not support

A) Address translation

B) DMA for disk transfer

C) Privileged and non-privileged modes of CPU execution

D) Demand paging

101. Consider the following nested representation of binary trees:(X Y Z) indicates Y and Z are the left and right sub trees, respectively of node X. Note that Y and Z may be NULL, or further nested. Which of the following represents a valid binary tree ?

A) (12(4 5 6 7))

B) (1(2 3 4)5 6)7)

C) (1(2 3 4) (5 6 7))

D) (1(2 3 NULL) (4 5))

102. B⁺ trees are preferred to binary trees in data bases because

A) Disk capacities are greater than memory capacities

B) Disk access is much slower than memory access

C) Disk data transfer rates are much less than memory data transfer rates

D) Disks are more reliable than memory

103. Given an arbitrary non-deterministic finite automation (NFA) with N states, the maximum number of states in an equivalent minimised DFA is at least

A) N^2 B) 2^N C) 2N   D) N!

104. In the worst case, the number of comparisons needed to search a singly linked list of length n for a given element is

A) $\log_2 n$ B) n/2   C) $\log_2 n-1$ D) n

105. The smallest finite automation which accepts the language {x| length of x is divisible by 3} has

A) 2 states   B) 3 states   C) 4 states   D) 5 states

106. JavaScript code, embedded in a Web page runs from

A) Client machine

B) Server machine

C) Both (A) and (B)

D) None of these

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107. CGI enables
   A) A script/program to be run in the server to produce html output for http request
   B) A script/program to be run in the client for producing dynamism
   C) Java Script program to be run from browsers
   D) None of the above

108. Multiple inheritance is
   1. Possible in C++
   2. Not directly possible in Java
   3. Not possible in C++ or Java

   A) 1 and 3 only   B) 2 and 3 only   C) 3 only   D) 1 and 2 only

109. Which of the following is not a storage class supported by C++?
   A) Register   B) Auto   C) Mutable   D) Dynamic

110. Which of the following method in Exception class is used to get the error message for the exception that was thrown?
   A) Print Message   B) Extract Message
   C) Throw Message   D) To String

111. To promote encapsulation, Java provides an access modifier
   A) Public   B) Private
   C) Static   D) None of these

112. Consider the words u = a²ba³b² and v = bab². What is |uv| ?
   A) 8   B) 4   C) 12   D) 18

113. In SQL, which command is used to select only one copy of each set of duplicate rows ?
   A) SELECT DISTINCT   B) SELECT UNIQUE
   C) SELECT DIFFERENT   D) All of the above

114. In asynchronous transmission
   A) Inter-character gap is fixed   B) Inter-character gap is variable
   C) Inter-character gap is always zero   D) All of the above

115. Which of the following device copies electrical signals from one Ethernet to another ?
   A) Bridge   B) Repeater
   C) Hub   D) Passive Hub

116. Aliasing in the context of programming languages refers to
  A) Multiple variables having the same memory location
  B) Multiple variables having the same value
  C) Multiple variables having the same identifier
  D) Multiple uses of the same variable

117. Consider the following decision problems:
  (P1) Does a given finite state machine accept a given string
  (P2) Does a given context free grammar generate an infinite number of strings
  Which of the following statements is true?
  A) Both (P1) and (P2) are decidable
  B) Neither (P1) nor (P2) are decidable
  C) Only (P1) is decidable
  D) Only (P2) is decidable

118. The value of j at the end of execution of the following C program is

```
int incr(int i)
{
 static int count =0;
count=count+i;
return(count);
}
{
int i, j;
for(i=0;i<=4;i++)
j=incr(i);
}
```

  A) 10
  B) 4
  C) 6
  D) 7

119. Consider a machine with 64MB physical memory and a 32bit virtual address space. If the page size is 4KB, what is the approximate size of the page table?
  A) 16 MB
  B) 8 MB
  C) 2 MB
  D) 24 MB

120. Maximum number of edges in a n node undirected graph without self loops is
  A) n^2
  B) $n(n-1)/2$
  C) $n-1$
  D) $(n+1)(n)/2$

COMPUTER SCIENCE/INFORMATION TECHNOLOGY

Qn.No	Key	Qn.No	Key	Qn.No	Key	Qn.No	Key	Qn.No	Key	Qn.No	Key
1	A	21	C	41	A	61	B	81	C	101	C
2	D	22	C	42	D	62	AC	82	D	102	D
3	B	23	D	43	B	63	A	83	AB	103	C
4	D	24	A	44	C	64	A	84	B	104	D
5	A	25	C	45	C	65	B	85	A	105	C
6	B	26	A	46	C	66	D	86	B	106	A
7	A	27	C	47	C	67	D	87	A	107	A
8	B	28	D	48	A	68	D	88	C	108	D
9	C	29	C	49	C	69	B	89	D	109	D
10	D	30	C	50	A	70	B	90	D	110	D
11	B	31	C	51	B	71	A	91	D	111	B
12	C	32	C	52	D	72	C	92	B	112	C
13	A	33	B	53	B	73	D	93	A	113	A
14	A	34	C	54	C	74	A	94	C	114	B
15	C	35	A	55	B	75	D	95	A	115	B
16	B	36	C	56	B	76	B	96	A	116	A
17	A	37	C	57	D	77	C	97	C	117	A
18	B	38	A	58	D	78	B	98	A	118	A
19	B	39	D	59	C	79	D	99	A	119	C
20	B	40	A	60	A	80	D	100	C	120	B