1. Which of the following is an illegal array definition ?

(a) type COLOGNE : (LIME, PINE, MUSK,MENTHOL);
var a : array [COLOGNE] of REAL;
(b) var a: array [REAL] of REAL;
(c) var a : array ['A' ..'Z'] of REAL;
(d) var a : array [BOOLEAN] of REAL;

2. The term Phong is associated with

(a)Ray tracing
(b)shading
(c)Hiddenline removal
(d)a game

3. The subnet mask 255.255.255.192

(a) extends the network portion to 16 bits
(b) extends the network portion to 26 bits
(c) extends the network portion to 36 bits
(d) has no effect on the network portion of an IP address

4. On a LAN, where are IP datagrams transported?

(a) In the LAN header.
(b) In the Application field.
(c) In the Information field of the LAN frame.
(d) After the TCP header.

5. In Ethernet, the source address field in the MAC frame is the _____ address.

(a) original sender's physical
(b) previous station's physical
(c) next destination's physical
(d) original sender's service port

6. Which of the following transmission media is not readily suitable to CSMA operation?

(a) Radio
(b) Optical fibers
(c) Coaxial cable
(d) Twisted pair

7. Consider the grammar
S→ ABCc|bc
BA→AB
Bb→bb
Ab→ab
Aa→aa
Which of the following sentences can be derived by this grammar?
(a) abc (b) aab
(c) abcc (d) abbc

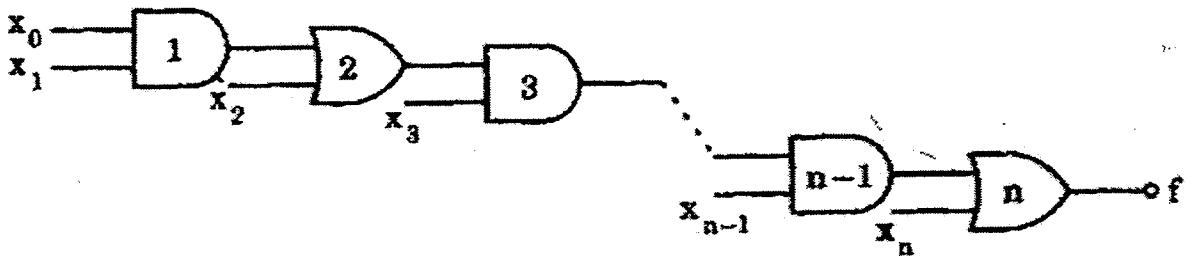
8. **The TCP sliding window**
(a) can be used to control the flow of information
(b) always occurs when the field value is 0
(c) always occurs when the field value is 1
(d) occurs horizontally

9. **What is the bandwidth of a signal that ranges from 40 kHz to 4 MHz?**
(a) 36 MHz
(b) 360 kHz
(c) 3.96 MHz
(d) 396 kHz

10. **Which Project 802 standard provides for a collision-free protocol?**
(a) 802.2
(b) 802.3
(c) 802.5
(d) 802.6

11. **The Boolean theorem $AB + \overline{A}\,C + BC = AB + \overline{A}\,C$ corresponds to**
(a) $(A + B) \cdot (\overline{A} + C) \cdot (B + C) = (A + B) \cdot (\overline{A} + C)$
(b) $AB + \overline{A}\,C + BC = AB + BC$
(c) $AB + \overline{A}\,C + BC = (A + B) \cdot (\overline{A} + C) \cdot (B + C)$
(d) $(A + B) \cdot (\overline{A} + C) \cdot (B + C) = AB + \overline{A}\,C$

12. In the given network of AND and OR gates f can be written as



(a) $x_0x_1x_2...x_n + x_1x_2...x_n + x_2x_3...x_n + ... + x_n$

(b) $X_0 X_1 + X_2 X_3 + ... + X_{n-1} X_n$

(c) $x_0 + x_1 + x_2 + ... + x_n$

(d) $X_0 X_1 + X_3 \ ... \ X_{n-1} + X_2X_3 + X_5 \ ... \ X_{n-1} + ... + X_{n-2} X_{n-1} + X_n$

13. If $N^2 = (7601)_g$ where N is a positive integer, then the value of N is

(a) $(241)_5$
(b) $(143)_6$
(c) $(165)_7$
(d) $(39)_{16}$

14. Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through an synchronous serial line at 2400 baud rate, and with two stop bits is

(a) 109
(b) 216
(c) 218
(d) 219

15. Four jobs to be executed on a single processor system arrive at time 0 in the order A, B, C, D. There burst CPU time requirements are 4,1, 8, 1, time units respectively. The completion time of A under robin round scheduling with time slice of one time unit is

(a) 10
(b) 4
(c) 8
(d) 9

16. **Which one of the following algorithm design techniques is used in finding all pairs of shortest distances in a graph?**
(a) Dynamic programming
(b) Backtracking
(c) Greedy
(d) Divide and Conquer

17. **The address space of 8086 CPU is**
(a) one Megabyte
(b) 256 Kilobytes
(c) 1 K Megabytes
(d) 64 Kilobytes

18. **More than one word are put in one cache block to**
(a) exploit the temporal locality of reference in a program
(b) exploit the spatial locality of reference in a program
(c) reduce the miss penalty
(d) none of these

19. **The performance of a pipelined processor suffers if**
(a) the pipeline stages have different delays
(b) consecutive instructions are dependent on each other
(c) the pipeline stages share hardware resources
(d) all of these

20. **If $(12x)_3 = (123)_x$, then the value of x is**
(a) 3
(b) 3 or 4
(c) 2
(d) none of the above

21. **The advantage of MOS devices over bipolar devices is that**
(a) it allows higher bit densities and also cost effective
(b) it is easy to fabricate
(c) i ts higher-impedance and operational speed
(d) all of these

22. **How many 2-input multiplexers are required to construct a 2^{10}-input multiplexer ?**
(a) 1023
(b) 31
(c) 10
(d) 127

23. **A computer uses 8 digit mantissa and 2 digit exponent. If a = 0.052 and b = 28E + 11, the b + a-b will**
(a) result in an overflow error
(b) result in an underflow error
(c) be 0
(d) be 5.28E + 11

24. **The Boolean expression $(A + \overline{C})(\overline{B} + \overline{C})$ simplifies to**

(a) $\overline{C} + A\overline{B}$

(b) $\overline{C}(\overline{A} + B)$

(c) $\overline{B}\,\overline{C} + A\overline{B}$

(d) None of these

25. **In the expression $\overline{A}(\overline{A} + \overline{B})$ by writing the first term A as A + 0, the expression is best simplified as**
(a) A + AB
(b) AB
(c) A
(d) A + B

26. The logic operations of two combinational circuits given in Figure-I and Figure-II are

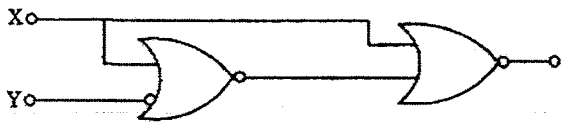


Figure -I

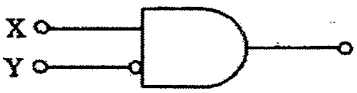
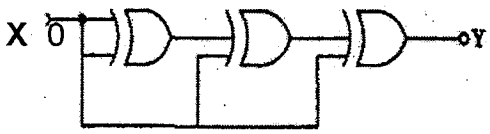


Figure -II

(a) entirely different
(b) identical
(c) complementary
(d) dual

27. The output Y of the given circuit is



(a) 1
(b) Zero
(c) X
(d) X'

28. Which of the following is not a valid rule for XOR?

(a) 0 XOR 0 = 0
(b) 1 XOR 1 = 1
(c) 1 XOR 0 = 1
(d) B XOR B = 0

29. The number of distinct simple graphs with up to three nodes is

(a) 15
(b) 10
(c) 7
(d) 9

30. Maximum number of edges in a n-node undirected graph without self loops is

(a) n^2
(b) n(n-1) /2
(c) n-l
(d) n(n+1) /2

31. If the two matrices $\begin{bmatrix} 1 & 0 & x \\ 0 & x & 1 \\ 0 & 1 & x \end{bmatrix}$ **and** $\begin{bmatrix} x & 1 & 0 \\ x & 0 & 1 \\ 0 & x & 1 \end{bmatrix}$ **have the same determinant, then the value of X is**

(a)1/2
(b) $\sqrt{2}$
(c) ±1/2
(d) ±1/ $\sqrt{2}$

32. The network 198.78.41.0 is a

(a) Class A network
(b) Class B network
(c) Class C network
(d) Class D network

33. The join operation can be defined as

(a) a cartesian product of two relations followed by a selection
(b) a cartesian product of two relations
(c) a union of two relations followed by cartesian product of the two relations
(d) a union of two relations

34. If a square matrix A satisfies $A^TA = I$, then the matrix A is
(a) Idempotent
(b) Symmetric
(c) Orthogonal
(d) Hermitian

35. Embedded pointer provides
(a) An inverted index
(b) A secondary access path
(c) A physical record key
(d) A primary key

36. An interrupt in which the external device supplies its address as well as the interrupt requests is known as
(a) vectored interrupt
(b) maskable interrupt
(c) non maskable interrupt
(d) designated interrupt

37. The ability to temporarily halt the CPU and use this time to send informationon buses is called
(a) direct memory access
(b) vectoring the interrupt
(c) polling
(d) cycle stealing

38. Relative to the program translated by a complier, the same program when interpreted runs
(a) faster
(b) slower
(c) at the same speed
(d) may be faster or slower

39. Consider the following Assembly language program :

```
MVIA  30 H
ACI   30 H
XRA   A
POP   H
```

After the execution of the above program, the contents of the accumulator will be

(a) 30 H
(b) 60 H
(c) 00 H
(d) contents of stack

40. Consider the following C function:

```
int f(int n)
{ static int i = 1;
if (n >=5 ) return n;
n = n + i;
i++;
return f(n);
}
```

The value returned by *f(1)* is

(a) 5
(b) 6
(c) 7
(d) 8

41. In a resident - OS computer, which of the following systems must reside in the main memory under all situations ?

(a) Assembler
(b) Linker
(c) Loader
(d) Compiler

42. Which of the following architecture is/are not suitable for realising SIMD ?

(a) Vector processor
(b) Array processor
(c) Von Neumann
(d) All of the above

43. Consider the following code segment.

```
for (int k = 0; k < 20; k = k + 2)
{
  if (k % 3 == 1)
    System.out.print(k + " ");
}
```

What is printed as a result of executing the code segment?

(a) 4 16
(b) 4 10 16
(c) 0 6 12 18
(d) 1 4 7 10 13 16 19

44. The device which is used to connect a peripheral to bus is known as

(a) control register
(b) interface
(c) communication protocol
(d) none of these

45. The TRAP is one of the interrupts available in INTEL 8085. Which one of the following statements is true of TRAP ?

(a) It is level triggered
(b) It is negative edge triggered
(c) It is the +ve edge triggered
(d) It is both +ve and -ve edges triggered

46. Raid configurations of disks are used to provide

(a) fault-tolerance
(b) high speed
(c) high data density
(d) none of these

47. Which of the following need not necessarily be saved on a context switch between processes ?

(a) General purpose registers
(b) Translation lookaside buffer
(c) Program counter
(d) All of these

48. Which of the following is termed as minimum error code ?
(a) Binary code
(b) Gray code
(c) Excess 3 code
(d) Octal code

49. The total time to prepare a disk drive mechanism for a block of data to be read from it is
(a) seek time
(b) latency
(c) latency plus seek time
(d) transmission time

50. Feedback queues
(a) are very simple to implement
(b) dispatch tasks according to execution characteristics
(c) are used to favour real-time tasks
(d) require manual intervention to implement properly

51. With Round-Robin CPU scheduling in a time shared system
(a) using very large time slices (quantas) degenerates into First-Come First served (FCFS) algorithm.
(b) using extremely small time slices improves performance
(c) using very small time slices degenerates into Last-In First-Out (LIFO) algorithm
(d) using medium sized time slices leads to shortest Request time First (SRTF) algorithm

52. Dynamic Address translation
(a) is part of the operating system paging algorithm
(b) is useless when swapping is used
(c) is the hardware necessary to implement paging
(d) storage pages at a specific location on disk

53. Thrashing
(a) always Occurs on large computers.
(b) is a natural consequence of virtual memory systems.
(c) can always be avoided by swapping.
(d) can be caused by poor paging algorithms.

54. What is the name of the operating system that reads and reacts in terms of actual time ?

(a) Batch system
(b) Quick response system
(c) Real time system
(d) Time sharing system

55. The memory Address Register

(a) is a hardware memory device which denotes the location of the current instruction being executed.
(b) is a group of electrical ckt, that performs the intent of instructions fetched from memory.
(c) contains the address of the memory location that is to be read from or stored into
(d) contains a copy of the designated memory location specified by the MAR after a "read" or the new contents of the memory prior to a "write".

56. An example of spooled device is a

(a) line printer used to print the output of a number of jobs.
(b) terminal used to enter input data to a running program.
(c) secondary storage device in a virtual memory system.
(d) graphic display device.

57. Dirty bit for a page in a page table

(a) helps avoid unnecessary writes on a paging device
(b) helps maintain LRU information
(c) allows only read on a page
(d) none of these

58.Checkpointing a job

(a) allows it to be completed successfully
(b) allows it to continue executing later
(c) prepares it for finishing
(d) occurs only when there is an error in it

59. A public key encryption system

(a) allows anyone to decode the transmissions
(b) allows only the correct sender to decode the data
(c) allows only the correct receiver to decode the data
(d) does not encode the data before transmitting it

60. Overlaying

(a) requires use of a loader
(b) allows larger programs, but requires more effort
(c) is most used on large computers
(d) is transparent to the user

61. A critical section is a program segment

(a) which should run in a certain specified amount of time
(b) which avoids deadlock
(c) where shared resources are accessed
(d) which must be endorsed by a pair of semaphore operations, P & U

62. In which of the following four necessary conditions for deadlock processes claim exclusive control of the resources they require ?

(a) no preemption
(b) mutual exclusion
(c) circular wait
(d) hold and wait

63.Fork is

(a) the creation of a new job
(b) the dispatching of a task
(c) increasing the priority of a task
(d) the creation of a new process

64. Which of the following need not necessarily be saved on a Context Switch between processes?

(a) General purpose register
(b) Translation look aside buffer
(c) Program Counter
(d) Stack pointer

65. Consider a logical address space of 8 pages of.1024 words mapped into memory of 32 frames. How many bits are there in the logical address?

(a) 13 bits
(b) 15 bits
(c) 14 bits
(d) 12 bits

66. The performance of Round Robin algorithm depends heavily on

(a) size of the process
(b) the I/O bursts of the process
(c) the CPU bursts of the process
(d) the size of the time quantum

67. The page replacement algorithm which gives the lowest page fault rate is

(a) LRU
(b) FIFO
(c) Optional page replacement
(d) Second chance algorithm

68. Which of the following class of statement usually produces no executable code when compiled?

(a) declaration
(b) assignment statements
(c) input and output statements
(d) structural statements

69. What is the value of F(4) using the following procedure:

```
function F(k : integer):
integer;
    begin
    if(k<3) then F:=k else F: = F(k-l)*F(k-2) + F(k-3)
    end;
```

(a) 5
(b) 6
(c) 7
(d) 8

70. Stack A has the entries a, b, c (with a on top). Stack B is empty. An entry popped out of stack A can be printed immediately or pushed to stack B. An entry popped out of the stack B can only be printed. In this arrangement, which of the following permutations of a, b, c are not possible?

(a) b a c
(b) b c a
(c) c a b
(d) a b c

71. The time required to search an element in a linked list of length n is

(a) $O(\log_2 n)$
(b) O (n)
(c) O(1)
(d) $O(n^2)$

72. Which of the following operations is performed more efficiently by doubly linked list than by linear linked list?

(a) Deleting a node whose location is given
(b) Searching an unsorted list for a given item
(c) Inserting a node after the node with a given location
(d)Traversing the list to process each node.

73. We can make a class abstract by

(a) Declaring it abstract using the virtual keyword
(b) Making at least one member function as virtual function
(c) Making at least one member function as pure virtual function
(d) Making all member function const.

74. A Steiner patch is

(a) Biquadratic Bezier patch
(b) Bicubic patch
(c) Circular patch only
(d) Bilinear Bezier patch

75. A complete binary tree with the property that the value at each node is at least as large as the values at its children is known as

(a) binary search tree
(b) AVL tree
(c) Completely balanced tree
(d) Heap

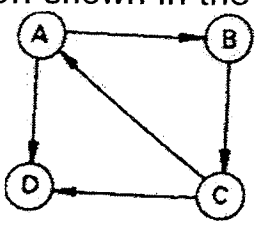
76. The minimum number of fields with each node of doubly linked list is

(a) 1
(b) 2
(c) 3
(d) 4

77. How many comparisons are needed to sort an array of length 5 if a straight selection sort is used and array is already in the opposite order ?

(a) 1
(b) 10
(c) 15
(d) 20

78. Consider the graph shown in the figure below.



Which of the following is a valid strong component ?

(a) a, c, d
(b) a, b, d
(c) b, c, d
(d) a, b, c

79. Repeated execution of simple computation may cause compounding of

(a) round-off errors
(b) syntax errors
(c) run-time errors
(d) logic errors

80. In C, what is the effect of a negative number in a field width specifier ?

(a) the values arc displayed right justified
(b) the values are displayed centered
(c) the values are displayed left justified
(d) the values are displayed as negative numbers