

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.

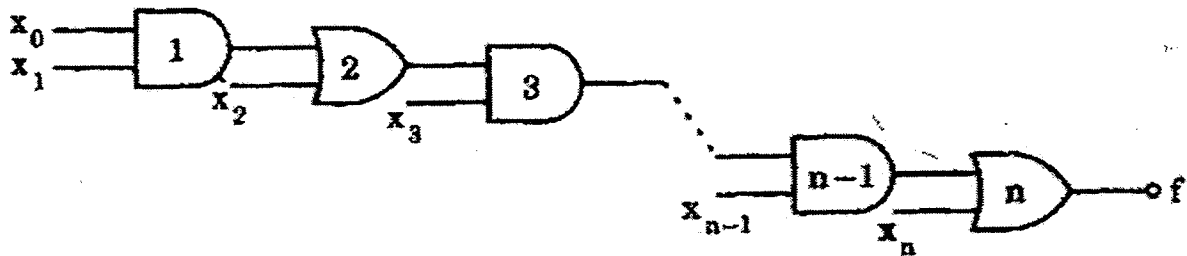
- (a) original sender's physical
- (b) previous station's physical
- (c) next destination's physical
- (d) original sender's service port

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

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



- (a) $x_0x_1x_2\dots x_n + x_1x_2\dots x_n + x_2x_3\dots x_n + \dots + x_n$
- (b) $x_0x_1 + x_1x_2 + \dots + x_{n-1}x_n$
- (c) $x_0 + x_1 + x_2 + \dots + x_n$
- (d) $x_0x_1 + x_3 \dots x_{n-1} + x_2x_3 + x_5 \dots x_{n-1} + \dots + x_{n-2}x_{n-1} + x_n$

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. Their 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

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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) its higher-impedance and operational speed
 - (d) all of these

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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 $(A + \bar{C})(\bar{B} + \bar{C})$ simplifies to
- (a) $\bar{C} + A\bar{B}$
 - (b) $\bar{C}(\bar{A} + B)$
 - (c) $\bar{B}\bar{C} + A\bar{B}$
 - (d) None of these
25. In the expression $\bar{A}(\bar{A} + \bar{B})$ by writing the first term A as $A + 0$, the expression is best simplified as
- (a) $A + AB$
 - (b) AB
 - (c) A
 - (d) $A + B$

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

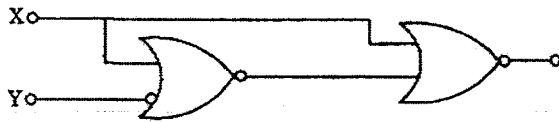


Figure - I



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) $0 \text{ XOR } 0 = 0$
- (b) $1 \text{ XOR } 1 = 1$
- (c) $1 \text{ XOR } 0 = 1$
- (d) $B \text{ XOR } B = 0$

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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) $n-1$
 - (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) $\pm 1/2$
 - (d) $\pm 1/\sqrt{2}$
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

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34. If a square matrix A satisfies $A^T A = I$, 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 information on buses is called

- (a) direct memory access
- (b) vectoring the interrupt
- (c) polling
- (d) cycle stealing


38. Relative to the program translated by a compiler, 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

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- (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

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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

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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 (quanta) 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.

 The logo of the Indian Space Research Organisation (ISRO) features a stylized rocket or arrow pointing upwards, with the word 'ISRO' in English and its Hindi equivalent 'इसरो' written below it.	INDIAN SPACE RESEARCH ORGANISATION	Page 11 of 16
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- 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

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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

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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-1)*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?

|                                                                                     |                                    |               |
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- (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

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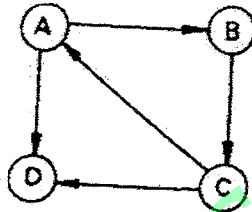
76. The minimum number of fields with each node of doubly linked list is

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

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