Section 1 - Lect Computer Engg

No. of Questions: 100
Duration in Minutes: 120

1) Let r denotes number system radix. The only value(s) of r that satisfy the equation $\sqrt{121_r}=11_r$ is /are

A) Decimal 10
B) Decimal 11
C) Decimal 10 and 11
D) any value > 2

2) Which statement is true for logic families of digital IC's?

A) CMOS is preferably require low power consumption in system
B) ECL requires high speed operation in system
C) MOS is suitable for circuits that need high component density
D) All of these

3) Which of the following sequence is incorrect for the JK flip flop, where Q_n and Q_{n+1} are present state and next state respectively

A) J=0 k=1 Q_n=1 Q_{n+1}=0
B) J=1 k=0 Q_n=1 Q_{n+1}=1
C) J=1 k=1 Q_n=0 Q_{n+1}=1
D) J=0 k=0 Q_n=1 Q_{n+1}=0

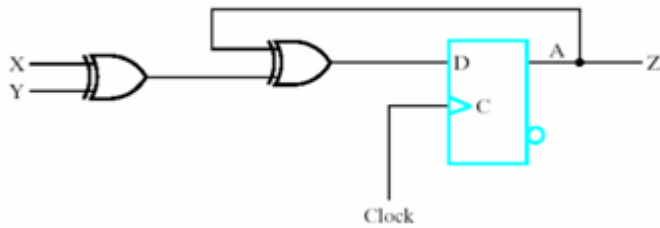4) Number of NAND gates required for realization of f(A,B) = A+B'C is ?

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

5) Simplify the Boolean expression $F(x,y,z) = \sum(2,3,4,5)$?

A) F = x'y+xy'
B) F = x'y'+1
C) F = xy'+x'
D) None of the above

6) Which one of the following expressions does not represent exclusive NOR of x and y?

A) $xy+x'y'$
B) $x \oplus y'$
C) $x' \oplus y$
D) $x' \oplus y'$

7) For the given circuit if the present state $A_n=1$, inputs X=0, Y=1, what will be the next state $A_{(n+1)}$ and output (Z) ?

A) $A_{(n+1)} = 0$, Z =0

B) $A_{(n+1)} = 0$, Z =1

C) $A_{(n+1)} = 1$, Z =0

D) $A_{(n+1)} = 1$, Z =1

8) A full adder circuit can be changed to full subtractor by adding a

A) NOR gate

B) NAND gate

C) Inverter

D) AND gate

9) Which of the following factors do not affect the hit ratio of the cache?

A) Block replacement algorithm

B) Block frame size

C) Cycle count

D) Main memory size

10) The most appropriate matching for following pairs is

X. Indirect addressing   1. Loop
Y. Auto decrement addressing   2. Constraints
Z. Immediate addressing   3. Pointers

A) X-1,Y-3, Z-2

B) X-3,Y-1,Z-2

C) X-2, Y-1, Z-3

D) X-3,Y-2,Z-1

11) How many address line and I/O lines are required? If capacity of RAM is 1024 words of 8-bits.

A) 10 bit address line and 8 bit I/O lines

B) 8 bit address line and 10 bit I/O lines

C) 10 bit address line and 10 bit I/O lines

D) None of the above

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12) What will be output of the program given below

sum = 0;

for(i = -10; i<0; i++)

sum = sum + abs(i);

printf("%d",sum);

A) 500
B) -505
C) 55
D) -55

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13) Which is the false property of an algorithm, where Π = O, Ω, or Θ.

A) If f(n) = Π (g(n)) and g(n) = Π (h(n)), then f(n) = Π (h(n))
B) f(n) - g(n) = Π (max{f(n), g(n)})
C) f(n) = O(g(n)) iff g(n) = Ω (f(n))
D) f(n) = Θ(g(n)) iff g(n) = Θ (f(n)

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14) Which statement is FALSE related to undirected graphs

A)   An undirected graph is a tree if it is connected and does not contain a cycle
B)   An undirected graph is connected if, for every pair of nodes u and v, there is a path from u to v.
C)   In an undirected graph a path is simple if all nodes are not distinct.
D)   In an undirected graph a cycle is a path $v_1, v_2, , v_{k-1}, v_k$ in which $v_1 = v_k$, k > 2, and the first k-1 nodes are all distinct

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15) Which is the correct matching of algorithms given below with their approach

Algorithm	Type of approach
A. Minimum spanning tree	1. Divide and Conquer
B. Quick Sort	2. Greedy
C. Merge Sort	3. Brute-force
D. Longest common subsequence (LCS)	4. Branch-and-bound

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

16) Link list is preferably not suitable for implementation of?

A) Insertion sort
B) Binary search
C) Radix sort
D) Polynomial manipulation

17) The number of comparisons required to search a sorted vector of 1023 elements using the binary search algorithm is:

A) 5
B) 10
C) 15
D) 20

18) What is the maximum height of any AVL tree with 7 nodes? Assume that height of a tree with a single node is 0.

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

19) A binary search tree contains the values 3,6,10,22,25,30,60,75. The tree is traversed in pre-order and the values are displayed out .Which sequence is the valid output?

A) 25,6,3,10,22,60,30,75
B) 25,6,10,3,22,75,30,60
C) 25,6,75,60,30,3,10,22
D) 75,30,60,22,10,3,6,25

20) The maximum number of nodes in a binary tree at level n is ?

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

21) Time complexity of $T(n) = T(n/3) + T(2n/3) + O(n)$ is ?

A) $O(1)$
B) $O(n \log n)$
C) $O(\log n)$
D) $O(n^2)$

22) What is the worst case complexity of sorting 'n' numbers using quick sort method?

A) θ (n)
B) θ (n log n)
C) θ (n^2)
D) θ (log n)

23) Match the following pairs is

A. Volatile	1.Queue
B. Function Pointer	2. Auto
C. Default	3.Guest and host
D. FIFO	4. Switch-case

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

24) Consider a binary max-heap implemented using an array. Which one of the following array represents a binary max-heap?

A) 25, 12, 16, 13, 10, 8, 14
B) 25, 14, 13, 16, 10, 8, 12
C) 25, 14, 16, 13, 10, 8, 12
D) 25, 14, 12, 13, 10, 8, 16

25) To implement Dijkstra's shortest path algorithm on unweighted graph so that it runs in linear time, the data structure to be used is ?

A) Queue
B) Stack
C) Heap
D) B-tree

26) Which is not a required deadlock condition of an operating system

A) Mutual exclusion
B) Hold and wait
C) Cycle
D) Preemptive

27) A CPU generally handles an interrupt by executing an interrupt service routine

A)   As soon as an interrupt is raised

B)   By checking the interrupt register at the end of fetch cycle
C)   By checking the interrupt register at fixed time intervals
D)   By checking the interrupt register after finishing the execution of the current instruction

28) A process executes the code

fork( );

fork( );

fork( );

The total number of child process created is

A) 3
B) 4
C) 7
D) 8

29) A memory of 1000K has what amount of user space if size of OS is 200K, and loader consumes 50K?

A) 800 K
B) 950 K
C) 750 K
D) 1150 K

30) Mutual exclusive problem occurs between

A) Two disjoint processes that are unaware of each other
B) Processes that share resources
C) Processes directly aware of each other
D) All of these

31) Which of the following statements is False in operating system?

A)   The shortest job first(SJF) scheduling algorithm minimizes the average turn around time
B)   Thrashing leads to under utilize the performance of CPU
C)   Internal fragmentation can be eliminated by segmentation and paging
D)   Semaphore value depends on number of resources to be shared

32) What is the ideal way of emptying the queue of a strong semaphore

A) Random

B) LIFO
C) LILO
D) FIFO

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33) Consider the set of processes P1 to P5 For the following data set calculate average turnaround time for the shortest remaining time first.

Process	Burst time	Arrival time
P_1	3	0
P_2	6	2
P_3	4	4
P_4	5	6
P_5	2	8

A) 1.3 ms
B) 3.1 ms
C) 5.4 ms
D) 7.2 ms

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34) Which of the following statement is true?

A) Shortest remaining time first scheduling may cause starvation
B) Preemptive scheduling may cause starvation
C) Round robin is better than FCFS in terms of response time
D) All of these

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35) For the 4 block per set associative memory system having 4K blocks, cache memory size is 128 blocks and each block contains 16 words the following parameters are correct

A) 4 bits Word field , 5 bits set field, 7 bits tag field
B) 5 bits Word field , 4 bits set field, 7 bits tag field
C) 5 bits Word field , 7 bits set field, 5 bits tag field
D) 5 bits Word field , 7 bits set field, 4 bits tag field

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36) If 32-bit addressing is used for pages whose maximum size is 512KB, what is the maximum number of pages that can be addressed

A) 4096
B) 2048
C) 8192
D) 16384

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37) Match the following pairs is

A. RAID0	1. Parallel access
B. RAID1	2. Striping
C. RAID2	3. Use hamming code
D. RAID3	4. Mirrored

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

38) The median of an image matrix given below is:

23	25	30
10	15	5
40	30	5

A) 23
B) 15
C) 25
D) 30

39) The electron beam in a color picture tube is refreshed to make a video realistic in seconds is?

A) 15 frames
B) 25 frames
C) 35 frames
D) 45 frames

40) Which of the following is transformation that distorts the shape of an object?

A) Scaling
B) Rotation
C) Shearing
D) None of the above

41) Which combinations of methods are identical and most efficient to plot pixel positions along a straight line path?

A) DDA and Bresenham's algorithm
B) Mid-point and Bresenham's algorithm

C) DDA and Mid-point algorithm

D) All of the above

42) Which algorithms are used to fill the interior of objects with covered boundaries?

A) The scan line algorithm

B) Boundary-fill algorithm

C) Flood-fill algorithm

D) All of the above

43) The maximum number of points that can be displayed without overlap on CRT is referred to as?

A) Resolution

B) Persistence

C) Aspect ratio

D) Pixels

44) The most appropriate matching for following pairs is

X. A world-coordinate area selected for display	1. pixmap
Y. An RGB color system with 24 bits of storage per pixel	2. Aspect ratio
Z. Ratio of horizontal to vertical points	3. Full-color system
W. Frame buffer	4. Window

A) X-4,Y-3,Z-2,W-1

B) X-1,Y-3,Z-2,W-4

C) X-1,Y-2,Z-4,W-3

D) X-4,Y-1,Z-2,W-3

45) Which of the following is not for line clipping?

A) Cohen-Sutherland algorithm

B) Nicholl-Lee-Nicholl algorithm

C) Liang Barsky Algorithm

D) Sutherland-Hodgeman Algorithm

46) The Painter's Algorithm is based on the following property?

A) Polygon

B) Frame buffer

C) Depth buffer

D) Surface buffer

47) Which algorithm uses only integer arithmetic ?

A) DDA
B) Beam Penetration
C) Bresenham's
D) None of these

48) A RTP packet is encapsulated in _____.

A) a UDP user datagram
B) a TCP segment
C) an IP datagram
D) None of the above

49) In a real-time video conference, data from the server is _____ to the client sites.

A) Unicast
B) Multicast
C) Broadcast
D) None of the above

50) Which is used to compress video

A) MPEG
B) JPEG
C) MPEG and JPEG
D) None of the above

51) Vanishing Points are used in

A) Composite transformations
B) Clipping
C) Conversing points in perspective projections
D) None of these

52) MIMD is used employed to achieve-

A) computation
B) parallelism
C) pipelining
D) distribution

53) The addition of 4-bit , two's complement, binary numbers 1101 and 0100 results in

A) 0001 and an overflow
B) 1001 and no overflow
C) 0001 and no overflow
D) 1001 and an overflow

54) Each interrupt has a specific place in code memory where program execute. The correct sequence of 8051 μ Controller interrupt increasing order vector address is:

Type of Interrupt
A.External Interrupt 0
B.Timer 0 overflow
C.External Interrupt 1
D.Timer 1 overflow

A) A, B, C, D
B) B, D, A, C
C) A, C, B, D
D) D, C, B, A

55) For any relation of the functional dependency FD is A → B , DB → C then

A) B → A
B) DA → C
C) DB → A
D) C → A

56) In order to maintain the consistency during transactions database provides

A) Commit
B) Atomic
C) Flashback
D) Rollback

57) Which of the join operations do not preserve non matched tuples.

A) Left outer join
B) Right outer join
C) Inner join
D) Natural join

58) Following Functional Dependencies hold on R(A, B, C) as A→BC, B→CA, C→AB which is a combination of candidate keys

A) {A},{B},{C}
B) {A},{B}
C) {B},{C}
D) {C},{A}

59) The abstraction level based intermediate schema is referred to as:

A) Logical schema
B) Subschema
C) Physical schema
D) Conceptual schema

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60) What is the output of the following query SELECT TRUNC(5234.5678,-2) FROM DUAL;?

A) 5200
B) 5230
C) 5230.00
D) 5234.5600

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61) The correct SQL statement for creating an index is?

A) INDEX ID;
B) INDEX ON ID;
C) CREATE INDEX ON ID;
D) CREATE INDEX ID;

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62) Database table by name Loan_Records is given below.

Borrower	Bank_Manager	Loan_ Amount
VASU	Sunderajan	10000.00
ABHISHEK	Ramgopal	5000.00
PIYUS	Sunderajan	7000.00

What is the output of the following SQL query?

SELECT count(*)

FROM(

(SELECT Borrower. Bank_Manager FROM Loan_Records) AS S

NATURAL JOIN

(SELECT Bank_Manager, Loan_Amount FROM Loan_Records) AS T);

A) 3
B) 9
C) 5

D) 6

63) Which of the following concurrency control schemes is not based on the serializability property?

A) Time-stamp based locking
B) Graph-based locking
C) Two – phase locking
D) None of these

64) The state of a virtual table in SQL that is constructed from other table?

A) A Schema
B) A view
C) A Log buffer
D) A Window

65) Which of the following is used to store movie and image files in the database?

A) Clob
B) Blob
C) Binary
D) Image

66) In order to automatically index sites the search engines uses a(n)

A) Query optimizer
B) DB Administrator
C) Search engine optimizer
D) Crawler

67) Bucket is a unit of disk contiguous block contains multiple records. Which of the following technique is used to control bucket overflow:

A) Closed hashing
B) Open hashing
C) multiple hashing
D) All of these

68) OLAP stands for

A) Online analytical processing
B) Online analysis processing
C) Online transaction processing
D) Online aggregate processing

69) Which of the following is the collection of data objects that are similar to one another within the same group?

A) data source
B) Grid

C) Cluster

D) Table

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70) At which level we can create dimensional models?

A) Business requirements level

B) Architecture models level

C) Detailed models level

D) Implementation level

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71) The data is stored, retrieved and updated in ....

A) OLAP

B) OLTP

C) Online processing

D) POP3

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72) Which is a correct matching

A)   Relation cardinality --> Number of fields (or columns) in the relation

B)   Relation instance --> Set of tuples that each conform to the schema of the relation

C)   Relation degree --> Number of tuples in the relation

D)   Attribute domain --> Data type associated with a row

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73) Which is an incorrect statement

A)   A composite primary key is a primary key consisting multiple columns

B)   If foreign key is not null, it can be a part of primary key

C)   No part of the primary key cannot be null

D)   Foreign key must match an existing primary key value

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74) Assume 10 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?

A) 45, 8

B) 90, 9

C) 45, 9

D) 45,106

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75) The most appropriate matching for following pairs is

X.	Transport layer	1.	TELNET
Y.	Application layer	2.	UDP
Z.	Data link layer	3.	RS-449
W.	Physical layer	4.	HDLC

A) X-1,Y-2,Z-4,W-3
B) X-1,Y-3,Z-2,W-4
C) X-2,Y-1,Z-4,W-3
D) X-2,Y-1,Z-3,W-4

76) In stop-and wait ARQ, for 20 data packets sent, how many acknowledgements are needed?

A) 20
B) 21
C) 19
D) None of these

77) Which of the following is the character oriented protocol

A) SDLC
B) HDLC
C) BiSYNC
D) LAPB

78) Which of the following pairs is not correctly matched

A) Security - Application layer
B) Congestion control- Transport layer
C) Address resolution - Network layer
D) Segmentation and reassembly- Data link layer

79) An open source port scanner used to determine open ports and basic vulnerabilities on the network is:

A) nmap
B) netfind
C) nslookup
D) nbtstat

80) Which of the following is a four-wire Gigabit Ethernet implementation?

A) 1000Base-SX
B) 1000Base-LX
C) 1000Base-T
D) 1000Base-CX

81) Which protocol is used to configure host computers automatically for obtaining IP?

A) DNS
B) HDLC
C) ICMP
D) DHCP

82) Which statement is true for TCP and UDP protocols?

A) TCP is connection-less and UDP is connection oriented
B) TCP is unreliable and UDP is connection-oriented
C) TCP is unreliable and UDP is reliable
D) TCP is connection oriented and UDP is connection less

83) Which protocol is generally used to encrypt data between web browser and web servers?

A) IPSec
B) SSL
C) PPTP
D) Digital Signature

84) Consider different activities related to email.

m1: Send an email from a mail client to a mail server

m2: Download an email from mailbox server to a mail client

m3: Checking email in a web browser

Which is the application level protocol used in each activity?

A) m1:HTTP m2:SMTP m3:POP
B) m1:SMTP m2:FTP m3:HTTP
C) m1: SMTP m2: POP m3: HTTP
D) m1: POP m2: SMTP m3:IMAP

85) Which phase of SDLC Statistically, belongs to the maximum percentage of errors

A) Design
B) Implementation and Coding
C) Specifications
D) Testing

86) The purpose of using Capability Maturity Model (CMM) is ?

A) Inventory control
B) Production control
C) Quality assurance accreditation
D) None of the above

87) Which model of software development is best suited If requirements are easily understandable and defined?

A) Waterfall model
B) Prototyping model
C) Iterative enhancement model
D) Spring model

88) What are characteristics required for a good Software Requirement Specification (SRS)?

A) correctness
B) completeness
C) consistency
D) All of the above

89) Which phase of SDLC is most effected during, Costly faults is introduced?

A) Analysis
B) Design
C) Coding
D) Maintenance

90) Which of the following is hardware interrupts?

A) RST5.5, RST6.5, RST7.5
B) INTR
C) TRAP
D) All of the above

91) The RS 232 ports are commonly used for communication between two devices within 50 to 100 feets. Which of the following statement is incorrect related to RS 232:

A) Maximum data rate is 20,000 bits per second
B) It uses unbalanced lines
C) Allows communication between two devices only
D) 8051 does not support RS 232 ports directly

92) Which addressing mode is not supported by 8051 microcontroller

A) Register addressing
B) Direct addressing
C) Register relative addressing
D) Relative base index addressing

93) Which 8051 µ-Controller instruction is incorrect

A) MOV R4, #11h
B) MOV B, #11
C) MOV R4, R7
D) MOV 56h, A

94) Which statement is incorrect related to the 8051 I/O Ports

A) Ports P1, P2, and P3 have internal pullups
B) Ports P1, P2, P3 can support up to 12 LS-TTL inputs
C) Port 0 has open drain outputs
D) Port 0 internal pullups are not active during normal port operation

95) Which is false statement for the 8051 microcontroller architecture

A) It contains internal RAM of 128 Bytes
B) It has 16 bit program counter(PC) and data pointer(DPTR)
C) It contains one 16-bit timer/counters
D) It has 2 external and 3 internal interrupt sources

96) The generalized solution to the second order linear differential equation

$$\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 13y = 0$$

A) $y = e^{3x}(A\sin 2x + B\cos 2x)$

B) $y = e^{2x}(A\sin 3x + B\cos 3x)$

C) $y = e^{-2x}(A\sin 3x + B\cos 3x)$

D) $y = e^x(A\sin x + B\cos x)$

97) In a district the population growth in any year is three times its growth in the previous year. The second order linear difference equation models is:

A) $x_{n+2} - 4x_{n+1} + 3x_n = 0$

B) $x_{n+2} + 2x_{n+1} + 3x_n = 0$

C) $x_{n+2} - 2x_{n+1} + 3x_n = 0$

D) $x_{n+2} + 4x_{n+1} + 3x_n = 0$

98) Solution of the difference equation $X_n - X_{n-1} = 0.1X_{n-1}$, where $X_1 = 10$ is:

A) $10(1.1)^n$

B) $10(1.1)^{n-1}$

C) $10(0.9)^{n-1}$

D) $0.9(10)^n$

99) Which of the following statement is FALSE

A)   Secant method does not require an initial range which contains a zero.
B)   If the starting points are far away from the initial zero, the Secant method may not converge.
C)   The convergence is not guaranteed by Newton- Raphson's method.
D)   Newton- Raphson's method fails if the derivative is very large.

100) Which method is the fastest method for finding zeroes of a function

A) Secant method
B) Newton- Raphson's method
C) Bisection method
D) Method of false position