

PGCET-2023

Seat No. _____

SUB: Computer / IT Engineering

Time: 1 Hour 30 minutes

Instructions:

1. Ensure that all pages are printed.
2. Use Black ball pen only
3. Change in option is not allowed
4. There is no negative marking
5. Use of non-programmable scientific calculator is allowed

1.	The minimum time delay between the initiations of two independent memory operations is called			
	A	Access time	B	Cycle time
	C	Transfer time	D	Latency time
2.	The Boolean expression $X + X'Y$ equals			
	A	$X+Y$	B	$X+XY$
	C	$Y + YX$	D	$X'Y + Y'X$
3.	The binary equivalent of the decimal 0.4375 is			
	A	0.0111	B	0.1011
	C	0.1100	D	0.1010
4.	The cache needs an access time of 20ns and the main memory 120ns. The average access time of CPU is (Assume hit-ratio 80%)			
	A	30ns	B	40ns
	C	35ns	D	45ns
5.	If FFFF is the last memory location in a memory then size of memory is			
	A	1k	B	16k
	C	32k	D	64k
6.	The Boolean variables A,B and C that solve the Boolean equations $AB+A'C=1$ and $AC+B=0$ are			
	A	1,0,0	B	0,1,1
	C	1,0,1	D	0,0,1
7.	<pre>"char c = 'a'; while (c++ <= 'z') putchar(xxx); If the required output is abcdefghi....z (complete alphabet in small) then xxx should be"</pre>			
	A	c	B	c++
	C	c-1	D	--c

8.	"The output of following c code will be, static char str[]="NO SUBSTITUTE FOR HARD WORK"; printf("%10.5s",str);"			
	A	NO SU	B	NO SUBSTIT
	C	NO SUBSTITUTE	D	Error
9.	"The output of following c code will be, int a=1,b=2,c=3; printf("%d",a+=(a+=3,5,a));"			
	A	8	B	12
	C	9	D	6
10.	"The output of following c code will be, int i = 10; void *p = &i; printf("%f\n", *(float*)p); return 0;"			
	A	10	B	0.000000
	C	Undefined behavior	D	Compile time error
11.	Given two sorted lists of size 'm' and 'n' respectively. The number of comparisons needed in the worst case by merge sort algorithm will be			
	A	mxn	B	maximum of m and n
	C	minimum of m and n	D	m+n-1
12.	A hash function f defined as f(key)=key mod 7, with linear probing is used to insert the keys 37,38,72,48,98,11,56 into a table indexed from 0 to 6. What will be the location of key 11?			
	A	3	B	4
	C	5	D	6
13.	Which of the following sorting algorithm has worst time complexity of nlog(n)?			
	A	Heap Sort	B	Quick Sort
	C	Insertion Sort	D	Selection Sort
14.	The post fix equivalent of prefix * + a b - c d is			
	A	ab + cd - *	B	ab cd + - *
	C	ab + cd * -	D	ab + - cd *
15.	Queue can be used to implement			
	A	Quick sort	B	Radix sort
	C	Recursion	D	Depth first search

16.	A graph is a tree if and only if graph is			
	A	Directed graph	B	Contains no cycles
	C	Planar	D	Completely connected
17.	Which of the following is an application of stack?			
	A	Finding factorial	B	Tower of Hanoi
	C	Infix to postfix	D	All of the above
18.	The OSI reference model has _____ layers			
	A	2	B	3
	C	4	D	7
19.	The _____ layer is responsible for delivery of messages from one process to another			
	A	physical	B	transport
	C	Network	D	Application
20.	Which error detection method involves polynomials?			
	A	CRC	B	Simple parity check
	C	Two dimensional parity check	D	Checksum
21.	The network topology with highest reliability is _____			
	A	BUS	B	Star
	C	Ring	D	Mesh
22.	The hamming distance between 001111 and 010011 is			
	A	1	B	2
	C	3	D	4
23.	The message 11001001 is to be transmitted using CRC polynomial $X^3 + 1$ to protect from error. The message should be transmitted as			
	A	11001001000	B	11001001011
	C	11001001010	D	11001001001
24.	In ethernet when manchester encoding is used, the bit rate is			
	A	half the baud rate	B	twice the baud rate
	C	same as baud rate	D	none

25.	FDDI stands for			
	A	Fixed distributed data interface	B	First division data interface
	C	Fiber distributed data interface	D	None
26.	In which OSI layer the various services will be provided directly to the users?			
	A	Session layer	B	Datalink layer
	C	Application layer	D	Presentation layer
27	The application layer in TCP/IP model includes _____ protocol			
	A	TELNET, FTP	B	SMTP
	C	DNS	D	All of the above
28	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 occur is			
	A	3	B	4
	C	5	D	6
29	Fence register is used for			
	A	CPU protection	B	Memory protection
	C	File protection	D	All of the above
30	The size of virtual memory depends on the size of			
	A	data bus	B	main memory
	C	address bus	D	None
31	In paged memory the hit ratio is 0.35. The time required to access page in secondary memory is 100ns. The time required to access a page from main memory is 10ns. The average time required to access a page is			
	A	3.0ns	B	68.0ns
	C	68.5ns	D	78.5ns
32	Thrashing			
	A	reduces page I/O	B	decreases the degree of multiprogramming
	C	implies excessive page I/O	D	improves the system performance
33	What is the full name of FAT?			
	A	File attribute table	B	File allocation table
	C	Font attribute table	D	Format allocation table

34	In Unix, which system call creates the new process?			
	A	Create	B	Fork
	C	New	D	none of the mentioned
35	The time taken to move the disk arm to the desired cylinder is called the _____			
	A	positioning time	B	random access time
	C	seek time	D	rotational latency
36	Round robin is a			
	A	Kind of magnetic drum	B	Process scheduling policy
	C	Process synchronization policy	D	Memory allocation policy
37	UNIX operating system			
	A	is multiuser	B	is multitasking
	C	can run on PC and Server system	D	all of these
38	The minimum number of edges in connected cyclic graph of n vertices is			
	A	n-1	B	n
	C	n+1	D	None
39	Which of the following standard algorithms is not Dynamic Programming based.			
	A	Bellman–Ford Algorithm for single source shortest path	B	Floyd Warshall Algorithm for all pairs shortest paths
	C	0-1 Knapsack problem	D	Prim's Minimum Spanning Tree
40	Dijkstra's algorithm is used to solve _____ problems?			
	A	Network lock	B	Single source shortest path
	C	All pair shortest path	D	Sorting
41	Which of the following is a Divide and Conquer algorithm?			
	A	Bubble Sort	B	Selection Sort
	C	Heap Sort	D	Merge Sort
42	What is the time complexity of the binary search algorithm?			
	A	O(n)	B	O(1)
	C	O(log ₂ n)	D	O(n ²)

43	The worst-case time complexity of Quicksort is?			
	A	$O(n)$	B	$O(1)$
	C	$O(\log 2n)$	D	$O(n^2)$
44	Every Boyee-Codd normal form is in			
	A	1NF	B	2NF
	C	3NF	D	All of above
45	"Given functional dependencies $X \rightarrow W$, $X \rightarrow Y$, $Y \rightarrow Z$ and $Z \rightarrow PQ$ Which of the following does not hold?"			
	A	$X \rightarrow Z$	B	$W \rightarrow Z$
	C	$X \rightarrow WY$	D	None
46	In ER diagram, ellipses represent			
	A	entity set	B	relationship among entity sets
	C	Attributes	D	link between attributes and entity sets
47	An attribute of one table matching the primary key of another table is called			
	A	foreign key	B	secondary key
	C	candidate key	D	composite key
48	The employee salary should not be greater than 2000. This is _____ constraint			
	A	Integrity	B	Referential
	C	over defined	D	Feasible
49	Which command is used to delete a table in SQL			
	A	Drop	B	Delete
	C	Alter	D	Update
50	What is rows of a relation known as?			
	A	Degree	B	Entity
	C	Tuple	D	Key
51	Which one of the following given statements possibly contains the error?			
	A	select * from emp where empid = 10003;	B	select empid from emp where empid = 10006;
	C	select empid from emp;	D	select empid where empid = 1009 and Lastname = 'GELLER';

52	Which one of the following commands is used to restore the database to the last committed state?			
	A	Savepoint	B	Rollback
	C	Commit	D	Both A & B
53	A grammar that produces more than one parse tree for some sentence is said to be			
	A	Ambiguous	B	Unambiguous
	C	Regular	D	None of these
54	"Consider the grammar $S \rightarrow ABSc \mid Abc$ $BA \rightarrow AB$ $Bb \rightarrow bb$ $Ab \rightarrow ab$ $Aa \rightarrow aa$ which of the following sentence can be derived by this grammar?"			
	A	abc	B	aab
	C	abcc	D	abbc
55	A bottom up parser generates			
	A	left most derivation	B	right most derivation
	C	right most derivation in reverse	D	left most derivation in reverse
56	In compiler, grouping of characters into tokens is done by			
	A	Scanner	B	Parser
	C	code generator	D	code optimizer
57	Compiler is a program that			
	A	Accepts a program written in a high level language and produces an object program	B	Appears to execute a source program as if it were machine language
	C	Automates the translation of assembly language into machine language	D	Places programs into memory and prepares them for execution
58	Which of the following error can a compiler check?			
	A	Syntax Error	B	Logical Error
	C	Both Logical and Syntax Error	D	Compiler cannot check errors
59	Regular expression $(x/y)(x/y)$ denotes which of the following set?			
	A	$\{xy, xy\}$	B	$\{xx, xy, yx, yy\}$
	C	$\{x, y\}$	D	$\{x, y, xy\}$

60	Which of the following comment about peep-hole optimization is true?			
	A	It is applied to small part of the code and applied repeatedly	B	It can be used to optimize intermediate code
	C	It can be applied to a portion of the code that is not contiguous	D	It is applied in symbol table to optimize the memory requirements.
61	What is the first step in the software development lifecycle?			
	A	System Design	B	Coding
	C	System Testing	D	Preliminary Investigation and Analysis
62	The agile software development model is built based on _____.			
	A	Linear Development	B	Incremental Development
	C	Iterative Development	D	Both Incremental and Iterative Development
63	To get the ordered list we use			
	A	<h1>	B	
	C		D	<ml>
64	The following html tag is used to display the content as a moving text			
	A	<marquee>	B	
	C	<a href>	D	none of the above
65	In HTML ____ tag contains the information about the current document such as title etc.			
	A	Body	B	TD
	C	HEAD	D	none of the above
66	8086 microprocessor is			
	A	64 bit processor	B	32 bit processor
	C	16 bit processor	D	8 bit processor
67	VLSI stands for			
	A	Very large scale integration	B	Very logical switch interface
	C	Very large switch integration	D	None of these
68	The exit control loop in C is			
	A	for loop	B	do...while loop
	C	while loop	D	switch...case

69	In OSI network architecture, the routing is performed by			
	A	Network layer	B	Transport layer
	C	Data link layer	D	Session layer
70	In OS, the Swap space exists in			
	A	primary memory	B	secondary memory
	C	CPU	D	None
71	Which networking protocol is used for assigning IP addresses to devices on a local network?			
	A	DHCP (Dynamic Host Configuration Protocol)	B	DNS (Domain Name System)
	C	SNMP (Simple Network Management Protocol)	D	FTP (File Transfer Protocol)
72	_____ is used in SQL query sort the result set in ascending/descending order?			
	A	SORT BY	B	ORDER BY
	C	GROUP BY	D	ARRANGE BY
73	Consider the join of a relation R with relation S. If R has m tuples and S has n tuples, then the maximum size of join is:			
	A	mn	B	m+n
	C	(m+n)/2	D	2mn
74	Representation of data structure in memory is known as:			
	A	Recursive	B	Abstract data type
	C	Storage structure	D	File structure
75	XML is designed to ____ and ____ data.			
	A	design, style	B	design, send
	C	store, style	D	store, transport
76	In XML, DTD stands for ____.			
	A	Document Type Declaration	B	Data Type Definition
	C	Document Type Definition	D	Document To Declaration
77	With symmetric key algorithms, the ____ key is used for the encryption and decryption of data.			
	A	Different	B	Same
	C	Both A and B	D	None

78	An asymmetric-key (or public-key) cipher uses ____ keys			
	A	1	B	2
	C	3	D	4
79	Scheduling is done so as to _____			
	A	increase CPU utilization	B	decrease CPU utilization
	C	keep the CPU more idle	D	none of the mentioned
80	Consider a complete graph G with 4 vertices. The graph G has ____ spanning trees.			
	A	15	B	8
	C	16	D	13
81.	If $A = \begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$ then $A^5 - 3A^4 + A^3 + 4A^2$ equals to			
	A	$\begin{bmatrix} 8 & -12 \\ -12 & 20 \end{bmatrix}$	B	$\begin{bmatrix} 2 & -3 \\ -3 & 5 \end{bmatrix}$
	C	$\begin{bmatrix} 1 & -1 \\ -1 & 2 \end{bmatrix}$	D	$\begin{bmatrix} 2 & 3 \\ 3 & 5 \end{bmatrix}$
82.	A bounded entire function is constant. This is stated intheorem.			
	A	Cauchy's integral	B	Morera's
	C	Cauchy's residue	D	Liouville's
83.	$\lim_{x \rightarrow \frac{\pi}{2}} \frac{\sin(x \cos x)}{\cos(x \sin x)} = \dots\dots\dots$			
	A	π	B	does not exist
	C	$\frac{2}{\pi}$	D	none of these
84.	Which of the following methods is not an iterative method for solving a system of simultaneous linear equations?			
	A	Gauss-Jacobi	B	Gauss-Seidel
	C	Gauss elimination	D	relaxation

85.	If a vector field \vec{F} is conservative and curve C is closed then $\oint_C \vec{F} \cdot d\vec{r} = \dots\dots$			
	A	vector function	B	non zero value
	C	0	D	0
86.	The system of linear equations $x + y + 2z = 9$, $2x + 4y - 3z = 1$, $3x + 6y - 5z = 0$ has			
	A	infinitely many solutions	B	no solution
	C	two solutions	D	a unique solution
87.	The formula of numerical integration obtained from Newton-Cotes' quadrature formula by putting $n = 2$ is known as			
	A	Simpson's one-third rule	B	Weddle's rule
	C	Simpson's three-eighth rule	D	Gaussian quadrature formula
88.	If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$ then $\text{div } \vec{r} = \dots$			
	A	3	B	\vec{r}
	C	$x + y + z$	D	none of these
89.	The local minimum value of $f(x, y) = xy + \frac{27}{x} + \frac{27}{y}$ is			
	A	53	B	54
	C	55	D	27
90.	In which distribution mean, median and mode coincide?			
	A	Poisson	B	Exponential
	C	Binomial	D	none of these
91.	Which of following function does not have Laplace transform?			
	A	$2t$	B	$\sin 2t$
	C	1	D	$\frac{1}{t}$
92.	The inverse Laplace transforms of $\tan^{-1}\left(\frac{2}{s}\right)$ is.....			
	A	$\frac{\sin 2t}{t}$	B	$\frac{\sinh 2t}{t}$
	C	$\frac{\sin t}{t}$	D	$\frac{\sin 2t}{2t}$
93.	The imaginary part of $f(z) = z^3$ is			
	A	$y^3 - 3x^2y$	B	$x^3 - 3xy^2$
	C	$3x^2y - y^3$	D	$3xy^2 - x^3$

94.	$\oint_c e^z dz = \underline{\hspace{2cm}}$, where c is any closed path.		
	A	$2\pi i$	B $\cos\pi + i \sin\pi$
	C	πi	D 0
95.	Consider the probability function $p(x) = \frac{6 - x - 7 }{36}$ for $x = 2, 3, 4, \dots, 12$. What is $p(6 < x < 8)$?		
	A	$\frac{11}{36}$	B $\frac{6}{36}$
	C	$\frac{5}{36}$	D none of these
96.	Which of the following methods does not require prior information about the approximate values?		
	A	root squaring method	B bisection method
	C	Newton-Raphson method	D false position method
97.	The integrating factor of the linear differential equation $\frac{dy}{dx} + \frac{y}{x} = \sin x$ is		
	A	$\log x$	B y
	C	x	D e^x
98.	Which of the following methods is one of the predictor-corrector method to solve first order linear differential equation numerically?		
	A	Picard's method	B Runge-Kutta fourth order method
	C	Taylor's series method	D none of these
99.	Which of the following differential equations is equivalent to $\frac{d}{dx}(e^x y) = x^3 e^x$		
	A	$\frac{dy}{dx} + (e^x y) = x^3 - y$	B $\frac{dy}{dx} = x^3 - y$
	C	$e^x \frac{dy}{dx} = x^3 - y$	D none of these
100.	The Wroskian of $\frac{d^2 y}{dx^2} + 3\frac{dy}{dx} + 2y = f(x)$ is.....		
	A	e^{-2x}	B $-e^{-3x}$
	C	$-e^{3x}$	D $-e^{2x}$