THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA, VADODARA

Ph. D. ENTRANCE TEST (PET) 2023

Signature of Invigilator

Roll. No. | | | | | | |

Paper - II
Computer Science

Maximum Marks: 50 **No. Of Printed Pages: 8**

Instruction for the Candidate:

1. This paper consists of **FIFTY (50)** multiple choice type questions. Each Question carries **ONE (1)** mark.
2. There is no Negative Marking for Wrong Answer.
3. A separate OMR Answer Sheet has been provided to answer questions. Your answers will be evaluated based on your response in the OMR Sheet only. No credit will be given for any answering made in question booklet.
4. Defective question booklet or OMR if noticed may immediately replace by the concerned invigilator.
5. Write roll number, subject code, booklet type, category and other information correctly in the OMR Sheet else your OMR Sheet will not be evaluated by machine.
6. Select most appropriate answer to the question and darken appropriate oval on the OMR answer sheet, with black / blue ball pen only. DO NOT USE PENCIL for darkening. In case of over writing on any answer, the same will be treated as invalid. Each question has exactly one correct answer and has four alternative responses (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.
   Example: Ⓐ ● Ⓒ Ⓓ where (B) is correct response.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. Calculators, Log tables any other calculating devices, mobiles, slide rule, text manuals etc are NOT allowed in the examination hall. If any of above is seized from the candidates during examination time; he/ she will be immediately debarred from the examination and corresponding disciplinary action will be initiated by the Center Supervisor as deemed fit.
10. DO NOT FOLD or TEAR OMR Answer sheet as machine will not be able to recognize torn or folded OMR Answer sheet.
11. **You have to return the OMR Answer Sheet to the invigilator at the end of the examination compulsorily** and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet on conclusion of examination.

Paper - II
Computer Science

Note: This paper contains **FIFTY (50)** multiple-choice questions. Each Question carries **ONE (1)** mark.

1.		When there are multiple instances of each resource type, which of the following algorithm can be used for deadlock avoidance?
	(a)	Banker's algorithm
	(b)	Resource allocation graph
	(c)	wait for graph
	(d)	circular wait
2.		Process Control Block for a process does not contain information related to:
	(a)	Disk space usage
	(b)	Process State
	(c)	Pointers to scheduling queues
	(d)	Program counter
3.		For the relation R(ABCD), the functional dependencies are: A→C B→D
	(a)	BCNF
	(b)	3NF
	(c)	2NF
	(d)	1NF
4.		What is the purpose of port numbers in network of computers?
	(a)	Keeps track of different upper layer conversations crossing the network at the same time.
	(b)	Source systems use them to keep the session organized.
	(c)	End systems use them to dynamically assign end users to particular session.
	(d)	Source systems generate them to predict destination address.
5.		Which one is not a criterion for comparing CPU scheduling algorithms?
	(a)	Response time
	(b)	Memory space
	(c)	CPU utilization
	(d)	Throughput
6.		For the relation R(ABCD), the key would be: A→C B→D
	(a)	AD
	(b)	BC
	(c)	AB
	(d)	CD
7.		View serializability is implemented by which of the following protocols?
	(a)	Timestamp based protocol
	(b)	Two-phase locking protocol
	(c)	Tree protocol
	(d)	Thomas' Write Rule
8.		Which of the following disk scheduling algorithm behaves just like an elevator in a building?
	(a)	SCAN Scheduling
	(b)	C-SCAN Scheduling
	(c)	C-LOOK Scheduling
	(d)	SSTF Scheduling
9.		Which protocol is used to map an IP address to a MAC address?
	(a)	ARP
	(b)	RARP
	(c)	ICMP
	(d)	PPP

10.		A computer on a 6 Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1 Mbps. It is initially filled to capacity with 8 megabits. How long can the computer transmit at full 6 Mbps?
	(a)	1.4 sec
	(b)	1.6 sec
	(c)	1.5 sec
	(d)	1.3 sec
11.		Mapping cardinality refers to:
	(a)	Connecting attributes
	(b)	Connecting entities
	(c)	Mapping complexities
	(d)	Mapping constraints
12.		The selection of an in-memory process to use the CPU while the execution of another process is on hold is carried out by the:
	(a)	Dispatcher
	(b)	Resource scheduler
	(c)	Medium term scheduler
	(d)	Short term scheduler
13.		What is NOT possible for the views v1 and v2 created on the table – Emp (empno, ename, sal, comm, hiredate, deptno)? CREATE VIEW v1 AS SELECT * FROM Emp WHERE sal >= 5000 CREATE VIEW v2 AS SELECT * FROM v1 WHERE comm IS NOT NULL WITH CHECK OPTION
	(a)	View v1 can insert employees with sal > 5000
	(b)	View v1 can insert employees with sal < 5000
	(c)	View v2 can insert employees with sal > 5000
	(d)	View v2 can insert employees with sal < 5000
14.		Which among the following is not a component in a firewall system?
	(a)	Bridge
	(b)	Proxy server
	(c)	Packet filtering router
	(d)	Circuit level gateway
15.		SLA in cloud computing services stands for:
	(a)	Service level authority
	(b)	Software level agreement
	(c)	Service level agreement
	(d)	Software level authority
16.		In Boolean Algebra Laws, A . A' = _____.
	(a)	A
	(b)	A'
	(c)	1
	(d)	0
17.		The circuit used to store 1-bit data is called _____.
	(a)	Register
	(b)	Gate
	(c)	Flip Flop
	(d)	Counter
18.		Registers and counters are example of _____ circuits.
	(a)	Combinational
	(b)	Sequential
	(c)	Programmable
	(d)	Memory

19.		If in a machine instruction x y z; x represents OPCODE, y represents register and z represents memory address; then what is the addressing mode of this instruction?
	(a)	Direct addressing
	(b)	Indirect addressing
	(c)	Register addressing
	(d)	Immediate addressing
20.		Which of the following architecture supports variable-length instructions?
	(a)	CISC
	(b)	RISC
	(c)	DSP
	(d)	All of these
21.		Which of the following is, mostly, a bidirectional bus?
	(a)	Address bus
	(b)	Data bus
	(c)	Control bus
	(d)	All of these
22.		The _____ is usually synchronous and is explicitly triggered by the program to interact with OS.
	(a)	Trap
	(b)	Interrupt
	(c)	Thread
	(d)	Exception
23.		Von Neumann architecture is _____.
	(a)	SISD
	(b)	SIMD
	(c)	MISD
	(d)	MIMD
24.		Which of the following is able to correct 1-bit error in data transfer?
	(a)	CRC
	(b)	Odd parity
	(c)	Even parity
	(d)	Hamming Code
25.		Machine instruction executed by CPU/ALU in RISC machines, usually, operates on data stored in _____ type of memory.
	(a)	RAM
	(b)	Cache
	(c)	Registers
	(d)	Hard Disk
26.		Which of the following can be used to find common values in a dataset?
	(a)	Mean
	(b)	Median
	(c)	Mode
	(d)	All of these
27.		If for two sets A & B, n(A) = 40 and n(B) = 60 and n(A U B) = 80 then n(A ∩ B) is?
	(a)	20
	(b)	40
	(c)	100
	(d)	180
28.		A connected graph with n vertices and n - 1 edges is called _____.
	(a)	Complete Graph
	(b)	Bipartite Graph
	(c)	Hamiltonian Graph
	(d)	Tree

29.		A factory produces two types of products: A and B. Product A has a defect rate of 10%, while product B has a defect rate of 5%. If a randomly selected product is defective, what is the probability that it is product A?
	(a)	33.33%
	(b)	25%
	(c)	66.67%
	(d)	75%
30.		Which of the following statements about LU decomposition is true?
	(a)	It can only be applied to square matrices
	(b)	It decomposes a matrix into lower and upper triangular matrices
	(c)	It is used to find the determinant of a matrix
	(d)	It is a method for solving systems of linear equations
31.		Resolution of externally defined symbols is performed by:
	(a)	Linker
	(b)	Loader
	(c)	Compiler
	(d)	Assembler
32.		Which of the following grammar rules violate the requirements of an operator grammar? P, Q, R are nonterminals, and r, s, t are terminals.
	(a)	$P \rightarrow Q\ R$
	(b)	$P \rightarrow Q\ s\ R$
	(c)	$P \rightarrow \varepsilon$
	(d)	$P \rightarrow Q\ t\ R\ r$
33.		The condition expansion facility of macro processors is provided to:
	(a)	test a condition during the execution of the expanded program
	(b)	to expand certain model statements depending upon the value of a condition during the execution of the expanded program
	(c)	to implement recursion
	(d)	to expand certain model statements depending upon the value of a condition during the process of macros expansion
34.		How many tokens will be generated by the scanner for the following statement ? x = x ∗ (a + b) – 5;
	(a)	12
	(b)	11
	(c)	10
	(d)	7
35.		Consider the translation scheme shown below: S → T R R → + T {print ('+');} R | ε T → num {print (num.val);} Here num is a token that represents an integer and num.val represents the corresponding integer value. For an input string '9 + 5 + 2', this translation scheme will print –
	(a)	9 + 5 + 2
	(b)	9 5 + 2 +
	(c)	9 5 2 +
	(d)	+ + 9 5 2
36.		Consider the grammar E → E + n | E × n | n For a sentence n + n × n, the handles in the right-sentential form of the reduction are:
	(a)	n, E + n and E + n × n
	(b)	n, E + n and E + E × n
	(c)	n, n + n and n + n × n
	(d)	n, E + n and E × n

37.		Which of the following is an application of Finite Automaton?
	(a)	Compiler Design
	(b)	Grammar Parsers
	(c)	Text Search
	(d)	All of the mentioned
38.		Which of the following options is correct? Statement 1: Initial State of NFA is Initial State of DFA. Statement 2: The final state of DFA will be every combination of final state of NFA.
	(a)	Statement 1 is true and Statement 2 is true
	(b)	Statement 1 is true and Statement 2 is false
	(c)	Statement 1 can be true and Statement 2 is true
	(d)	Statement 1 is false and Statement 2 is also false
39.		Given Language: L= {ab U aba}* If X is the minimum number of states for a DFA and Y is the number of states to construct the NFA, |X-Y|=?
	(a)	2
	(b)	3
	(c)	4
	(d)	1
40.		Which of the following are non-regular?
	(a)	The set of strings in {a,b}* with an even number of b's
	(b)	The set of strings in {a, b, c}* where there is no c anywhere to the left of a
	(c)	The set of strings in {0, 1}* that encode, in binary, an integer w that is a multiple of 3.
	(d)	None of the mentioned
41.		How can we describe an array in the best possible way?
	(a)	The Array shows a hierarchical structure.
	(b)	Container that stores the elements of similar types
	(c)	Arrays are immutable.
	(d)	The Array is not a data structure
42.		Which one of the following is the size of int arr[9] assuming that int is of 4 bytes?
	(a)	9
	(b)	36
	(c)	35
	(d)	72
43.		Which of the following is a linear data structure?
	(a)	Arrays
	(b)	AVL Trees
	(c)	Binary Trees
	(d)	Graphs
44.		Which of the following is not the type of queue?
	(a)	Priority queue
	(b)	Single-ended queue
	(c)	Circular queue
	(d)	Ordinary queue
45.		When a pop() operation is called on an empty queue, what is the condition called?
	(a)	Overflow
	(b)	Syntax error
	(c)	Garbage Value
	(d)	Underflow
46.		Which of the following is a Divide and Conquer algorithm?
	(a)	Bubble sort
	(b)	Selection sort
	(c)	Heap sort
	(d)	Merge sort

47.		What is the best case time complexity of the binary search algorithm?
	(a)	O(1)
	(b)	O(n)
	(c)	O(log2n)
	(d)	O(n^2)
48.		In a graph of n nodes and n edges, how many cycles will be present?
	(a)	Exactly 1
	(b)	At most 1
	(c)	At most 2
	(d)	Depends on the graph
49.		Which of the following data structures can be used to implement queues?
	(a)	Arrays
	(b)	Stack
	(c)	Linked List
	(d)	All of the above
50.		Which of the following algorithms are useful for processing queries on trees?
	(a)	Heavy Light Decomposition
	(b)	Centroid Decomposition.
	(c)	Both (A) and (B)
	(d)	Neither (A) nor (B)

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Rough Work: