THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA, VADODARA

Ph. D. ENTRANCE TEST (PET) – 7th August 2022

Signature of Invigilator _____

Roll. No. | | | | | | |

Paper - II
Computer Science (22/36)

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 (22/36)

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

01) If A and B are two mutually exclusive and exhaustive events and the probability that the non-occurrence of A is ¾, then the probability of occurrence of B is __.
A) 1/4
B) 1/2
C) 3/4
D) 1/16

02) The negation of the statement 'Ramu is handsome or he is intelligent' is _____.
A) Ramu is either handsome or intelligent
B) Ramu is not handsome and he is not intelligent
C) Ramu is not handsome and he is intelligent
D) None of these

03) The mode of distribution of 13 and its mean is 4 then, its median is _____.
A) 7
B) 9
C) 8
D) 11

04) In a group of 20 students, 10 play cricket, 12 play volleyball and 3 play neither of the games. How many students play exactly one game?
A) 12
B) 10
C) 5
D) 7

05) If a set has 4 elements, then the number of relations on A is _____.
A) 4^6
B) 2^8
C) 4^{16}
D) 2^{16}

06) The number of selections that can be made by taking 4 letters from the word 'ENTRANCE' is _____.
A) 70
B) 36
C) 35
D) 72

07) Which of the following is not true about graphs?
A) Every path is a walk
B) Every cycle is a path
C) Every trail is a cycle
D) Every circuit is a trail

08) The minimum number of connected components of a simple graph with 10 vertices and 7 are _____.
A) 3
B) 4
C) 10
D) 7

09) The solution for the following system of equations by Gauss elimination method is _____.

$2x + y - z = 4$
$3x - 2y + 4z = 8$
$x - 3y + 2z = 1$

A) (2, -1, 2)
B) (-1, 2, -2)
C) (2, 1, 1)
D) (-1, 1, 2)

10) The result of the subtraction $(95)_{16} - (88)_{16}$ is _____.
A) $(07)_{16}$
B) $(05)_{16}$
C) $(0D)_{16}$
D) None of these

11) The base of the number system, such that following equation holds is _____.

$310/20 = 13$

A) 2
B) 3
C) 5
D) None of these

12) Consider the following processors (ns stands for nanoseconds).
Assume that the pipeline registers have zero latency.
P1: Four-stage pipeline with stage latencies 1 ns, 2 ns, 2 ns, 1 ns.
P2: Four-stage pipeline with stage latencies 1 ns, 1.5 ns, 1.5 ns, 1.5 ns.
P3: Five-stage pipeline with stage latencies 0.5 ns, 1 ns, 1 ns, 0.6 ns, 1 ns.
P4: Five-stage pipeline with stage latencies 0.5 ns, 0.5 ns, 1 ns, 1 ns, 1.1 ns.

Which processor has the highest peak clock frequency?

A) P1
B) P2
C) P3
D) P4

13) ALU basically performs _____.
A) Combinational functions on its inputs
B) Instruction storage functions
C) Sequential function on its inputs
D) Data retrieve functions

14) How many 2-input multiplexers are required to construct a 2^{10} input multiplexer?
   A) 1023
   B) 128
   C) 512
   D) 10

15) Consider two tables Dept(dno, floorno) – containing details about departments located on which floors, and Floor(floorno) – all possible floors. Which Relational Algebraic operator would be used to find departments which are located on all the floors?
   A) DIVISION
   B) PROJECTION
   C) NATURAL JOIN
   D) SELECTION

16) Which of the following is not a DCL command?
   A) GRANT CONNECT
   B) GRANT SELECT
   C) GRANT ACCESS
   D) GRANT RESOURCE

17) The Shared Intention Exclusive lock of the multiple granularity protocol is compatible with which of the following locks?
   A) Exclusive
   B) Shared
   C) Intention Shared
   D) Intention Exclusive

18) A relation with three attributes having one prime and two non-prime attributes will definitely be in _____.
   A) 2NF
   B) 3NF
   C) BCNF
   D) 4NF

19) 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

20) Which of the following statementsis false?
   A) A table can have more than one foreign key
   B) A foreign key cannot be null
   C) A foreign key can have duplicate values
   D) A foreign key can be connected to the candidate key

21) Which of the following is not an advantage of DBMS over the file system?
   A) Data Security
   B) Data Integrity
   C) Data Complexity
   D) Data Consistency

22) To prevent process starvation the following technique can be used:
   A) Thread scheduling
   B) Process Prioritization
   C) Process Balancing
   D) Aging

23) Which one of the following is not a requirement to solve the critical section problem?
   A) No Preemption
   B) Progress
   C) Bounded Waiting
   D) Mutual Exclusion

24) With reference to virtual memory management, the stack algorithms for page replacement, do not suffer from _____.
   A) Convoy effect
   B) Starvation
   C) Belady's anomaly
   D) Thrashing

25) Which of the following disk scheduling algorithm behaves just like an elevator in a building, first servicing all the requests going up and then reversing to service requests the other way?
   A) SCAN Scheduling
   B) C-SCAN Scheduling
   C) C-LOOK Scheduling
   D) SSTF Scheduling

26) Which of the following is not a method of allocating disk space?
   A) Contiguous allocation
   B) Virtual allocation
   C) Linked allocation
   D) Indexed allocation

27) The address generated by a CPU is commonly referred to as:
   A) Physical address
   B) Real address
   C) Logical address
   D) CPU generated address

28) A memory management scheme that supports user view of memory is:
   A) First fit
   B) Non-contiguous
   C) Segmentation
   D) Compaction

29) The worst-case complexity of Branch and Bound is as good as _____.
   A) Divide and Conquer
   B) Greedy
   C) Dynamic Programming
   D) None of these

30) Which Statement is false for Red Back Tree
A) Every simple path from a node to a descendant leaf contains the same number of black nodes
B) If a node is red, then both its children are black
C) Every leaf (NULL) is red
D) Every node is either red or black

31) A sorting algorithm which can prove to be a best time algorithm in one case and a worst time algorithm in worst case is _____.
A) Insertion
B) Selection
C) Quick
D) Merge

32) The cost of union operation in Linked List is _____.
A) O(1)
B) O(n)
C) O(logn)
D) None of these

33) Travelling Salesmen problem is _____.
A) NP-Complete
B) NP-Hard
C) It may fall in NP-Hard or NP-Complete
D) All of these

34) Data structure that contains a relationship between a pair of elements, not necessarily hierarchical or sequential in nature, is _____.
A) Tree
B) Graph
C) String
D) Array

35) Which of the following is memory less?
A) Push Down Automata
B) Linear Bounded Automata
C) Finite State Machine
D) Turing Machine

36) Deterministic Push Down Automata is more precisely used to verify
A) Regular Grammar
B) Context Free Grammar
C) Context Sensitive Grammar
D) Unrestricted Grammar

37) Linear Bounded Automata is more precisely used to verify
A) Regular Grammar
B) Context Free Grammar
C) Context Sensitive Grammar
D) Unrestricted Grammar

38) Unrestricted grammar is also called _____ Grammar.
A) Type 3
B) Type 2
C) Type 1
D) Type 0

39) A compiler is a program that _____.
A) place program into memory and prepares them for execution
B) automates the translation of assembly language into machine language
C) accepts program written in high level language and produces an object program
D) appears to execute a source program as if it were machine language

40) What is Hexa-Decimal equivalent of Octal number 112.642?
A) 94.D10
B) 4A.1A2
C) 4A.D10
D) 4A.D1

41) In K-Map, Quad eliminates _____ variables.
A) 1
B) 2
C) 3
D) 4

42) What is the maximum number of directly addressable locations in the memory of a processor having 10-bits wide control bus, 20-bits address bus, and 8-bits data bus?
A) 512
B) 1024
C) 1600
D) 1048576

43) Which traversal of BST gives data elements in non-decreasing order?
A) Pre-order
B) Post-order
C) In-order
D) None of these

44) The _____ protocol maps a MAC address to its corresponding IP address.
A) ARP
B) RARP
C) DNS
D) DHCP

45) UDP is _____ protocol.
A) Connectionless and unreliable
B) Connection oriented and unreliable
C) Connectionless and reliable
D) Connection oriented and reliable

46) The third stage of email uses _____ protocol for mail access.
   A) SMTP
   B) POP3
   C) MIME
   D) All of these

47) Which of the following start address is not used for private networks?
   A) 10.0.0.0
   B) 172.16.0.0
   C) 192.168.0.0
   D) 168.172.0.0

48) Consider that an union definition contains three elements: { int x; char ch[3]; and float f; } in C. How many bytes of memory will be allocated to union variable?
   A) 5
   B) 9
   C) 10
   D) 4

49) The _____ guarantees that all bytes of the allocated memory block have been initialized to 0.
   A) Malloc
   B) Calloc
   C) Free
   D) All of these

50) What will be the output of following code in C?
   { int a=0; if (a=0) printf("a is zero"); else printf("a is not zero"); }
   A) a is zero
   B) a is not zero
   C) a is zero a is not zero
   D) a is not zero a is zero

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Rough Work: