



ਪੰਜਾਬ ਟੈਕਨੀਕਲ ਯੂਨੀਵਰਸਿਟੀ ਜਲੰਧਰ

PUNJAB TECHNICAL UNIVERSITY JALANDHAR

Max. Marks: 90

Time: 90 Mins.

Entrance Test for Enrollment in Ph.D. Programme

Important Instructions

- > Fill all the information in various columns, in capital letters, with blue/black ball point pen.
- > Use of calculators is not allowed.
- > All questions are compulsory. No negative marking for wrong answers.
- > Each question has only one right answer.
- > Questions attempted with two or more options/answers will not be evaluated.

Stream: (Engg/Arch/Pharm/Mgmt/App.Sci/lif Sci/Lang./Hum.)

...Engineering.....

Discipline

...Computer Science and Engineering.....

Name

.....

Fathers Name

.....

Roll Number

Date: 15-07-2012

Signature of Candidate:

.....

Signature of Invigilator

.....

1. One of the following Memories has the highest speed in terms of data transfer to and from the processor.

- A) L1 Cache
- B) RAM
- C) Hard Disk
- D) L3 Cache

2. Determine the value of the following boolean expression, using the identifiers defined below:

CONST f = 200;
 p = -0.001;
 q = 0.001;
 (q < 0) OR ((f > 0) AND (f < 100))

- A) True
- B) False
- C) Incorrect syntax
- D) Incorrect Values

3. 10^6 bytes of memory is called

- A) 1 KB
- B) 1 MB
- C) 1 GB
- D) 1 TB

4. A digital computer has 8 registers of 32 bit each. How many multiplexers are needed to construct bus for this digital computer?

- A) 8
- B) 16
- C) 32
- D) 64

5. The number of binary bits required to represent a digit of octal number is

- A) 2
- B) 3
- C) 4
- D) 6

6. If Total complexity after micro analysis is $5n^3 + 10n^2 + 100n + 400 \log n + 10$, The Big Oh complexity is

- A) n^2
- B) n^3
- C) $5n + 400 \log n$
- D) $5n^3 + 10n^2 + 100n + 400 \log n + 10$

7. The goodness of an algorithm is most often expressed in terms of its

- A) Best Case complexity
- B) Average Case complexity
- C) Worst Case complexity
- D) Random case complexity

8. In searching algorithms which of the following are the dominant operations

- A) Swapping
- B) Multiplication
- C) Comparison
- D) Arithmetic

9. In case of Binary Search Algorithm if the number to be found is present at the first place then it represents

- A) Best case
- B) Average Case
- C) Worst Case
- D) None of the Above

10. The minimum time will be taken by the algorithm of complexity

- A) $n(\log n)^3$
- B) $n/\log^2 n$
- C) $n^3 \log n$
- D) $n^2 \log^2 n$

11. If insertion sort runs in $8n^2$ steps and merge sort runs in $64n \lg n$ steps, for which values of n does insertion sort becomes slower than merge sort

- A) 8
- B) 32
- C) 64
- D) 128

12. Fill in the blank in the following expression

$$(\text{_____})_{16} = (104653)_8$$

- A) 73B28
- B) 89AB
- C) C853
- D) 10AE3

13. Fill in the blank in the following expression

$$(61AC7)_{16} = (\text{_____})_2$$

- A) 01101101101011000111
- B) 01100001101011000111
- C) 01100001101000000111
- D) 01100001101011000000

14. While inserting a new array, if the array is full, then we need to extend the array by some size, what is the best policy to be exercised in such a case

- A) increase array size by 1
- B) increase array by a constant c
- C) Double the size of the existing array
- D) Increasing array size in the powers of 2

15. An array of size 100 is given and the memory addressing is byte by byte. If The base address of the array is 1000 and every record consists of 40 bytes then address of array[10] will be

- A) 1040
- B) 1400
- C) 1440
- D) 1080

16. There are 20 people who work in an office together. Four of these people are selected to attend four different conferences. The first person selected will go to a conference in New Delhi, the second will go to Kolkata, the third to Chennai, and the fourth to Mumbai. How many such selections are possible?

- A) 116280
- B) 80
- C) 4845
- D) none of these

17. Which of the following is false?

- A) Time required to access an element is more in linked list than an array.
- B) We need to define the size of the linked list in advance
- C) It is easier to insert and delete in an linked list than an array
- D) Memory is wasted in a Doubly linked list to store the address of next node and previous node in the list

18. Which of the following permutation can be obtained in the output (in the same order) using a stack assuming that the input is the sequence 1, 2, 3, 4, 5 in that order?

- A) 3, 4, 5, 1, 2
- B) 3, 4, 5, 2, 1
- C) 1, 5, 2, 3, 4
- D) 5, 4, 3, 1, 2

19. $\text{Front}(\text{Enqueue}(\text{New}(),v))=?$

- A) v
- B) new()
- C) $\text{Front}(\text{New}())$
- D) X

20. What will be the output of the following program

```
main()
{
  int k = 3;
  switch(k)
  {
  default : k += 2;
  case 4 : k +=1;
  case 5: --k;
  }
```

- A) 5
- B) 3
- C) 2
- D) 4

21. If the Preorder of a binary search tree is abcdfge and inorder cbfdgae then what is the Postorder

- A) cfgdbea
- B) cdbfgae
- C) cfgbdea
- D) cgfdbea

22. Suppose that we have numbers between 1 and 1000 in a binary search tree, and we want to search for the number 363. Which of the following sequences could not be the sequences of nodes examined.

- A) 2, 252, 401, 398, 330, 344, 397, 363
- B) 924, 220, 911, 244, 898, 258, 362, 363
- C) 925, 202, 911, 240, 912, 245, 363
- D) 2, 399, 387, 219, 266, 382, 381, 278, 363

23. for $i = 1$ to $n-1$ do
 for $j = 1$ to $n-i$ do
 if $(a[j+1] < a[j])$ then swap $a[j]$ and $a[j+1]$

- A) The given code is for
- B) Bubble sort
- C) Insertion sort
- D) Selection Sort

24. If V is the number of vertices and E is the number of edges in the Graph, In the adjacency matrix of the graph the size of the matrix is

- A) $V \times V$
- B) $E \times E$
- C) $V \times E$
- D) $(V+E) \times E$

25. if v is the number of vertices, e is the number of edges and f is the number of faces (regions bounded by edges, including the outer region) of a planar graph then as per the Euler's Formula

- A) $v+f = 2+e$
- B) $v+e = 2+f$
- C) $e+f = 2+ v$
- D) $e+v = f-2$

26. Page stealing is

- A) If a user job accesses a page and a page is not available in the main memory
- B) If the memory is full and the required page is replaced with the inactive page
- C) Swapping the pages in and out of the memory frequently
- D) Removing the pages in the background at intervals till a certain level

27. A process can follow the sequence in order

- A) Ready, New, Run, Terminated
- B) Blocked, ready, terminated, Run
- C) New, Ready, Blocked, Run, Terminated
- D) New, Ready, Run, Terminated

28. The average waiting time for non-preemptive SJF scheduling for the following process is

- | | | |
|-------------|--------------|--------------|
| P1-1 minute | P2-20 minute | P3-10 minute |
|-------------|--------------|--------------|
- A) 7 minute
 - B) 4 minute
 - C) 10.6 minute
 - D) 11 minute

29. The entry in the FAT corresponding to each cluster does not contain

- A) Which cluster id unused
- B) Which cluster is reserved
- C) Total no. of clusters in file
- D) Last cluster of file

30. If multiple jobs are there sharing access to a device but only one can access the device at one time then it is called

- A) reader's problem
- B) Writer's problem
- C) Mutual Exclusion
- D) SPOOL

31. To ensure that after successful transaction completion, all updates persist irrespective of system failures

- A) Atomicity
- B) Consistency
- C) Isolation
- D) Durability

32. A transaction A may read some data updated by another transaction B might not have yet committed. If B fails and gets aborted, the data as read by A would not exist. It is the case of

- A) Lost update
- B) Dirty Read
- C) Phantom Records
- D) Nonrepeatable read

33. A join in RDBMS without any condition is called

- A) Self join
- B) Left outer join
- C) Right outer join
- D) cross join

34. SQL is called

- A) System Query Language
- B) Sequel Query Language
- C) Standard Query Language
- D) structures query language

35. The process of giving several meanings to an operator or a function is known as

- A) Abstraction
- B) Overloading
- C) Encapsulation
- D) Binding

36. Which of the following statement is wrong.

- A) $5+5 = a;$
- B) $ss = 12.25;$
- C) $st = 'm' * 'b';$
- D) $is = 'A' +10;$

37. The content of a 4 bit register is initially 1101. The register is shifted to the right with serial input being 101101. What is the content of the register after each shift?

- A) 0110
- B) 1110
- C) No change
- D) 1111

38. Simplify using four variable maps

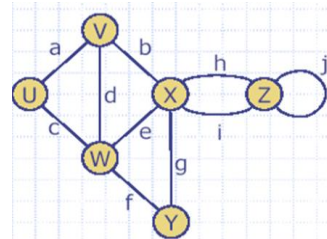
$$w'z+xz+x'y+wx'z$$

- A) $x'y + z$
- B) $x+y+z$
- C) $wz + x$
- D) $xz + wz$

39. A PN flip flop has four operations: clear to 0, no change, complement and set to 1, when inputs P and N are 00, 01, 10 and 11 respectively. Derive the characteristic equation

- A) $PQ + NQ$
- B) $PQ + NQ'$
- C) $P + NQ$
- D) $PQ'+NQ$

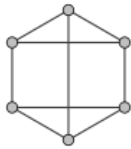
40.



Minimum Vertex Cover of the given graph is

- A) U,W,X,Z
- B) V,Y,Z
- C) U,X,Z
- D) W,X,Z

41.



The Given Graph is

- A) Regular Graph
- B) Complete Graph
- C) Planar Graph
- D) Bipartite Graph

42. Which class of IP address allows the largest number of networks, but least number of hosts

- A) Class A
- B) Class B
- C) Class C
- D) Class D

43. Which of the following is called a conversation layer. It monitors all dialogs and sessions and is responsible for maintaining them.

- A) Data Link
- B) Transport
- C) Session
- D) Physical

44. What is the default subnet mask of a Class B Network

- A) 255.0.0.0
- B) 255.255.0.0.
- C) 255.255.255.0
- D) 255.255.255.255

45. What is MAC Address

- A) Address burnt on the crossover cable
- B) Address burned on NIC by the manufacturer
- C) A unique serial number of the Host
- D) Another name for IP address

46. Which step is used in resolution in predicate calculus so that no two clauses reference the same two variables?

- A) Standardization
- B) Unification
- C) Elimination
- D) None of these

47. Which of the following concludes the result by comparing contradicting clauses?

- A) Standardization
- B) Unification
- C) Elimination
- D) Resolution

48. What does LISP stands for?

- A) Logic in Sequence programming
- B) Logic in System Programming
- C) List Processing
- D) Logic Processing

49. Who introduced resolution as an inference method in logic?

- A) Alan Turing
- B) A.L. Samuel
- C) J.A. Robinson
- D) Newell

50. Which production system has the property that if the application of a particular sequence of rules transforms state x into state y, then any permutation of those rules that is allowable also transforms state x into state y.

- A) Non monotonic
- B) Monotonic
- C) Commutative
- D) Partially commutative

51. Various phases follow in which one of the following sequences?

- A) Fetch-decode-execute
- B) Execute-fetch-decode
- C) Decode-fetch-execute
- D) Fetch-execute-decode

52. External fragmentation is a disadvantage of

- A) Single contiguous Allocation
- B) Fixed partitioned allocation
- C) Relocatable variable partitioned allocation
- D) Variable partitioned allocation

53. Elimination of blank space, tabs, comments is done in

- A) Intermediate code generation
- B) Syntax phase
- C) Semantic phase
- D) Lexical phase

54. Naming convention in the DOS consists of

- A) Logical Drive/Filename/Path
- B) Pathname/ Filename/ Drive
- C) Filename/ Drive/Pathname
- D) Logical Drive/Path/filename

55. The compulsory file system in the Unix is known as

- A) Root
- B) Boot
- C) Inode
- D) Mount

56. When one writes a program in a high level language the path it is likely to follow for execution is

- A) Compiler , Assembler , Loader , Binder
- B) Compiler, Binder, Loader , Assembler
- C) Compiler, assembler, Binder, Loader
- D) Assembler, Binder, Loader, Compiler

57. Which one of the Following is NOT a CPU (Processor)

- A) 68000
- B) 80386
- C) 8086
- D) 80586

58. $(10101110)_2 + (10000111)_2 = (\quad)_2$

- A) 100110011
- B) 100001100
- C) 100110101
- D) 111111111

59. Which of the following points to the address of the next instruction to be executed?

- A) Program Counter
- B) Memory Address Register (MAR)
- C) Memory Buffer Register (MBR)
- D) Instruction Register (IR)

60. $(101450)_8 = (\quad)_{16}$

- A) 8300
- B) 3028
- C) 8328
- D) 1283

61. Given following three processes and their execution time and all arrive at the same time

| | | |
|-------------|--------------|--------------|
| P1-1 minute | P2-10 minute | P3-10 minute |
|-------------|--------------|--------------|

What is the average waiting time in minutes for FCFS scheduling for above processes?

- A) 7
- B) 4
- C) 10
- D) 21

62. Which one of the following loops will execute at least once?

- A) Do While
- B) While
- C) For
- D) Switch

63. To interchange the values of variables m and n, using replacement notation by $t \leftarrow m, m \leftarrow n, n \leftarrow t$ three assignments are used. If we want to rearrange (a,b,c,d) to (b,c,d,a) by a sequence of replacements. The new value of a is to be the original value of b & so on. How many assignments are required?

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

64. Five items 1,2,3,4,5 are pushed in a stack in order starting from 1. The stack is popped four times, popped elements are inserted in a queue, two elements are deleted from the queue & pushed back in the stack. Now one element is popped from the stack, the popped element is

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

65. Consider a disk with the following characteristics:
 8,192 cylinders, A block size of 4096 bytes
 An average rotational latency of 5ms, An average seek time of 7ms, A block transfer time of 0.5ms.
 How much time in ms would it take to read 100 blocks that are randomly stored on the disk?

- A) 12.5
- B) 62
- C) 57
- D) 1250

66. For a B+ tree of order 10, consisting of 3 levels, the maximum number of leaf nodes would be

- A) 121
- B) 36
- C) 1000
- D) 100

67. Which of the following algorithms has running time $\Theta(n^2)$ in the worst case but $\Theta(n \log n)$ on average?

- A) Bubble sort
- B) Merge sort
- C) Heap sort
- D) Quick sort

68. Consider the following pseudocode

```
x: =1;
i: =1;
while (x ≤ 1000)
begin
    x: = 2x;
    i: = i +1;
end;
```

What is the value of *i* at the end of the pseudocode?

- A) 4
- B) 5
- C) 6
- D) 7

69. The solution of the quadratic equation $x^2 - 11x + 22 = 0$ is $x=3$ and $x=6$. What is the base of the numbers?

- A) 16
- B) 8
- C) 10
- D) 2

70. One of the following best defines the Greedy Strategy

- A) It always gives Global optimal solution
- B) It gives local optimal solution
- C) It Combines the local optimal solution to give the Global optimal solution
- D) It combines the global optimal solution to give the Local optimal solution

71. In a fractional Knapsack three items (1,2,3) have weights (4,8,6) & profits (12,32,30) respectively. If the weight of the knapsack is 10 then the solution is

- A) 3->6 , 2->4
- B) 3->4 , 2->6
- C) 3->6 , 1->4
- D) 1->4 , 2->6

72. $O(f(n))$ minus $O(f(n))$ is equal to

- A) zero
- B) A constant
- C) $f(n)$
- D) $O(f(n))$

73. In Master Method $T(n) = a * T(n/b) + f(n)$, *a* refers to

- A) size of sub problem
- B) No. of sub problems
- C) Size of the problem
- D) Time to combine solutions

74. Find the complexity of the following code

```
for (i=0; i<n;i++)
{
    for (j=0; i<n;j++)
    {
        for (k=0; i<n;k++)
        {
            i=j;
        }
    }
}
```

- A) $O(n)$
- B) $O(\log n)$
- C) $O(n \log n)$
- D) $O(n^3)$

75. One of the following coin change problem does not form the greedy choice property in which we give the coin in ascending order to give the minimum no. of coins

- A) 32,8,1
- B) 30,20,5,1
- C) 50,12,3
- D) 30,12,3

76. A sparse matrix is

- A) matrix with very few data elements
- B) matrix with minimum no. of zeros
- C) matrix with zero at diagonal elements
- D) A matrix with dense data

77. $T(n) = 4T(n/2) + n$ then in Big Oh Notation it is

- A) $O(n^2)$
- B) $O(4)$
- C) $O(n)$
- D) $O(\log(n))$

78. The problems where the solution is in yes or no are called

- A) Halting problems
- B) Deterministic problems
- C) Decision problems
- D) Divide and conquer problems

79. the set of problems which have nondeterministic polynomial time algorithms are called

- A) P class of problems
- B) Decision problems
- C) NP complete
- D) NP

80. In Strassen's Multiplication Algorithm the $T(n)$ is

- A) $7T(n) + bn^2$
- B) $7T(n/2) + bn^2$
- C) $8T(n/2) + bn^2$
- D) $7T(n/2) + bn$

81. Reduction in degree of normalization is done for

- A) Keeping tables large in size
- B) To reduce the number of tables
- C) To reduce complexity
- D) To improve query performance

82. Create view Graders as select * from employee where grade = 'B';

- A) Horizontal view
- B) Vertical View
- C) Grouped View
- D) Joined View

83. What is not true about coupling

- A) degree of independence between software modules
- B) tightly coupled systems make the system complex
- C) Low coupling also creates a problem for design
- D) structured programming uses tight coupling

84. Data Security is implemented by

- A) Abstraction
- B) Polymorphism
- C) Inheritance
- D) Encapsulation

85. An operation that creates an object and/or initializes its state is known as

- A) Modifier
- B) Destructor
- C) Constructor
- D) Iterator

86. Java Uses the following functions for dynamic binding.

- A) Virtual functions
- B) Type casting
- C) Dynamic method dispatch
- D) Multithreading

87. Protecting information by transforming into an unreadable format is called

- A) SSL
- B) Digital certificate
- C) Cryptography
- D) Compression

88. No need for further authentication when switching from one application to another in an enterprise is called

- A) SSO
- B) Authorization
- C) .NET
- D) Cryptography

89. Web application need special care for performance because

- a. web applications need multiple layers and many of them are remote
- b. the load of any application at any given time cannot be estimated
- c. heterogeneity and multivendor products
- d. support modules like security, varying UI

- A) abc
- B) bcd
- C) cda
- D) abcd

90. A Graphical technique for understanding and organizing the data independent of the actual database implementation

- A) DFD
- B) ER Modelling
- C) Flowchart
- D) Decision table