

## PGAT Computer Science and IT

1. What would be the output of the following C code snippet?

```
main(){  
    printf("%d,%d\n", 5/2, 5/2*3);  
}
```

- A) 2.5,7.5  
B) 3,9  
C) 2.5,0  
D) 2,6
2. Which of the following statements is TRUE about CSMA/CD protocol?  
A) IEEE 802.11 wireless LAN makes use of CSMA/CD as its data link protocol  
B) Ethernet is not based on CSMA/CD protocol  
C) CSMA/CD is not suitable for a high propagation delay network like satellite networks  
D) CSMA/CD networks are contention-free
3. In a C program, an efficient way to store and manipulate a graph is by using:  
A) A linked list of arrays  
B) A two dimensional array  
C) An array of trees  
D) A stack
4. Suppose A and B are two arrays containing m and n integral values respectively. Assume that each array has separately been sorted in ascending order. What would be the time complexity of merging the contents of A and B into a third array C of m+n elements in the order of ascending values?  
A)  $O(m+n)$   
B)  $O(m.n)$   
C)  $O(m/n)$   
D)  $O(m-n)$
5. Which of the following can be said to be true of a complete binary tree with  $2n+1$  nodes?  
A) Contains n leaf nodes  
B) Contains n non-leaf nodes  
C) Contains n-1 leaf nodes  
D) Contains n-1 non-leaf nodes
6. Which one of the following data structures would be most appropriate for evaluating a postfix arithmetic expression?  
A) Array  
B) Linked list  
C) Stack  
D) Binary tree

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7. The quicksort algorithm is based on which one of the following algorithm design techniques?
  - A) Greedy
  - B) Dynamic programming
  - C) Divide and Conquer
  - D) Backtracking
  
8. Which one of the following SQL statements allows to change the definition of a table?
  - A) Alter.
  - B) Update.
  - C) Create.
  - D) Select.
  
9. Which one of the following keys represents the relationship between two tables?
  - A) Primary key
  - B) Secondary Key
  - C) Foreign Key
  - D) Redundant key
  
10. In a relational database, which one of the following operations should be used if we are interested in only certain columns of a table?
  - A) PROJECTION
  - B) SELECTION
  - C) UNION
  - D) JOIN
  
11. To delete a particular column in a relational table, which one of the following SQL operations should be used?
  - A) UPDATE
  - B) ALTER
  - C) DROP
  - D) DELETE
  
12. Which of the following can be used to make changes to a database permanent?
  - A) Rollback
  - B) Grant
  - C) Commit
  - D) Revoke
  
13. What would be the effect of executing the following C code snippet?

```
int a=8, b=15;  
x= (a>b) ? a:b;
```

  - A) assigns 8 to x
  - B) gives an error message
  - C) assigns 15 to x
  - D) assigns 7 to x
  
14. In a virtual memory operating system, which one of the following events results in a page fault?

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- A) There is an error in accessing a specific page.
  - B) A program accesses a page that is not currently residing in main memory.
  - C) A program accesses a page that is currently residing in main memory.
  - D) A program accesses a page belonging to another program.
15. How many memory chips of size (128 x 8) are needed to provide a memory capacity of 4096 x 16?
- A) 64
  - B) 128
  - C) 32
  - D) 25
16. When a processor fetches an instruction of the executing program, the binary code of the instruction gets stored in which of the following?
- A) Program counter.
  - B) Instruction register.
  - C) Accumulator.
  - D) Instruction pointer.
17. For the following C code snippet, how many times will the while loop execute?
- ```
char a='a';  
while(a > 'a' && a <= 'z') a++;
```
- A) 26
  - B) 25
  - C) 0
  - D) Infinite times
18. What is the value of x after completion of execution of the following C program segment?
- ```
x=-5; y=10;  
if(x>y)x=1;  
else if(y<0) x=(x) * (-1);  
else x=2*x;
```
- A) -10
  - B) 5
  - C) -5
  - D) 10
19. How many times will the for loop of the following C program execute?
- ```
main(){  
    for( i=10; i=20; i++)  
        printf("%d, \n" ,i);  
}
```
- A) 10
  - B) 11
  - C) 9
  - D) Infinite number of times
20. In ISO/OSI network architecture, packet routing is the responsibility of which one of the following layers?

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- A) Network Layer
  - B) Transport Layer
  - C) Physical Layer
  - D) Session Layer
21. Which component of a compiler makes significant use of the concept of a finite state automaton (FSA)?
- A) Lexical analyzer
  - B) Parser
  - C) Code generator
  - D) code optimizer
22. Which one of the following protocols is based on the CSMA/CD protocol?
- A) Ethernet
  - B) Token Ring
  - C) FDDI
  - D) Token bus
23. Which of the following regular expression over  $\{0,1\}$  denotes the set of all strings not containing 100 as a substring
- A)  $(1+0)^*$
  - B)  $0^*1010^*$
  - C)  $(10+1)^*0^*$
  - D)  $0^*1^*01^*$
24. What is the maximum number of relations that can be defined on the set  $A = \{1, 2, 3, 4\}$  ?
- A) 1024
  - B) 16
  - C) 65536
  - D) 256
25. What would be the value of the variable x after the completion of execution of the following C program segment?
- ```
int x=y=5;
x-=y+1;
```
- A) 1
  - B) 6
  - C) -1
  - D) -6
26. Where do Java applets execute?
- A) JVM on server side
  - B) JVM on client side
  - C) Sometimes on JVM at the client site and sometimes at the server side depending upon the application
  - D) JSP on server side
27. Why are start and stop bits used in asynchronous serial communication protocols?
- A) Error detection
  - B) Error correction

- C) Synchronization
  - D) Parity checking
28. Flip flops can be used for realizing which one of the following circuits?
- A) Counter
  - B) Modulator
  - C) Demodulator
  - D) Rectifier
29. An FSM can be designed to recognize the language generated by which one of the following?
- A) Any context free grammar
  - B) Any regular grammar
  - C) Any Context sensitive grammar
  - D) Any unambiguous grammar
30. Which one of the following protocols uses UDP as the transport protocol?
- A) HTTP
  - B) Telnet
  - C) DNS
  - D) SMTP
31. Why are GO TO statements normally avoided while writing a program?
- A) It increases the running time of programs
  - B) It increases memory requirements of programs
  - C) It results in larger executable code sizes
  - D) It makes debugging difficult
32. Consider the statement: "The different types of employees of an organization are workers, engineers, and managers." Assuming that Employee, Manager, Worker, and Engineer to be the different classes in a C++ program implementation, what can be said about the relationship between the Employee and Manager classes?
- A) Association
  - B) Generalization-specialization
  - C) Containment
  - D) Polymorphism
33. Which one of the following is a black box testing approach?
- A) Path testing
  - B) Boundary value testing
  - C) Mutation testing
  - D) Branch testing
34. Alpha and Beta testing are considered to be which one of the following types of testing?
- A) Regression testing
  - B) Unit testing
  - C) Integration testing
  - D) System testing
35. In a Java program, which one of the following events will cause a thread to die?
- A) The method wait() is called.
  - B) Execution of the run() method ends.

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- C) Execution of the start() method ends.
- D) Execution of the thread's constructor ends.

36. What will be written to the standard output when the following Java program is run?

```
public class Puzzle {  
    public static void main(String[] args) {  
        System.out.println(9 ^ 2);  
    }  
}
```

- A) 81
  - B) 7
  - C) 11
  - D) 0
37. MAC address is used by networking protocols operating at which ISO/OSI layer?
- A) Transport
  - B) Data link
  - C) Network
  - D) Physical
38. What is the purpose of flow control in a communication network?
- A) To ensure that a packet is retransmitted if it is not received at the destination
  - B) To reassemble segments at the correct order at the receiving station
  - C) To regulate the size of each segment
  - D) To provide a means to the receiver to govern the rate at which data is transmitted by the sender
39. How many edges does a complete graph of n vertices have?
- A) n-1
  - B) n
  - C)  $n(n-1)/2$
  - D)  $n(n+1)/2$
40. What is the maximum number of relations that can be formed from set  $A = \{\text{cat, dog, rat}\}$  to set  $B = \{\text{male, female}\}$ ?
- A) 64
  - B) 6
  - C) 32
  - D) 15
41. What can be said about a relation that is reflexive, anti-symmetric and transitive?
- A) Function
  - B) Equivalence relation
  - C) Partial order
  - D) Group
42. What would be the output of the following C code segment?

```
char x = 'B';  
switch (x) {
```

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```
case 'A': printf("a");  
case 'B': printf("b");  
case 'C': printf("c");
```

```
}
```

- A) B
- B) b
- C) c
- D) bc

43. Which one of the following should be the most appropriate data structure to use for converting a recursion into an iterative procedure?

- A) Queue.
- B) Graph.
- C) Stack.
- D) Tree.

44. What would be the maximum value of a signed integer, if it uses two bytes of storage?

- A)  $2^{16} - 1$
- B)  $2^{15} - 1$
- C)  $2^{16}$
- D)  $2^{15}$

45. The spanning tree of connected graph with 10 vertices would contain at least

- A) 9 edges
- B) 11 edges
- C) 10 edges
- D) 12 edges

46. Which one of the following sorting algorithms would be the most appropriate to use, if the list to be sorted is almost in the required order?

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

47. What would be returned by the following recursive function after we call it with the parameters (0, 3)?

```
int test (int a, int b){  
    if (a==b) return (1);  
    else if (a>b) return(0);  
    else return (a+test(a+1, b));  
}
```

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

48. To implement a Sparse matrix dynamically, which one of the following data structures would be most appropriate?

- A) Trees

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- B) Graphs
  - C) Priority Queues
  - D) Linked List
49. What is the maximum number of different Boolean functions involving  $n$  Boolean variables?
- A)  $n^2$
  - B)  $2^n$
  - C)  $2^{2^n}$
  - D)  $2^{n^2}$
50. The Boolean expression  $A+BC$  can be expressed as which one of the following?
- A)  $(A+B)(A+C)$
  - B)  $(A'+B)(A'+C)$
  - C)  $(A+B)(A'+C)$
  - D)  $(A+B)C$
51. The functional dependencies  $A \rightarrow B$  and  $DB \rightarrow C$  imply which one of the following dependencies?
- A)  $DA \rightarrow C$
  - B)  $A \rightarrow C$
  - C)  $B \rightarrow A$
  - D)  $DB \rightarrow A$
52. In a time-shared operating system, when the allocated time slice of a running process ends, it is put in which one of the following states?
- A) Ready State
  - B) Blocked State
  - C) Suspend State
  - D) Terminated State
53. It is necessary for a relational database table to have at least which one of the following keys?
- A) Secondary key
  - B) Alternate key
  - C) Unique key
  - D) Primary key
54. Which one of the following sorting algorithms is of divide-and-conquer type?
- A) Bubble sort.
  - B) Insertion sort.
  - C) Quick sort.
  - D) Heap sort
55. Which one of the following data structures is used by a compiler to manage information about the program variables and their attributes?
- A) Abstract syntax tree (AST)
  - B) Symbol table
  - C) Semantic stack
  - D) Parser table
56. What is the number of data select inputs that a 64:1 multiplexer would have?
- A) 6



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

57. What is the language generated by the following grammar over the alphabet {a,b}?

$$S \rightarrow aSa | bSb | a | b$$

- A) All palindromes
  - B) All odd length palindromes
  - C) All Even length palindromes
  - D) All strings that are not necessarily palindromes
58. Semaphores are normally used to solve which one of the following problems?
- A) Race condition
  - B) Mutual exclusion
  - C) Deadlock
  - D) Livelock
59. Which one of the following statements correctly characterizes a critical section?
- A) A part of the operating system that cannot be accessed by user processes
  - B) A segment of instructions of a process that accesses some resource modifiable by other processes
  - C) A contiguous part of memory to which only one process can write at any time
  - D) A contiguous part of memory which can be read by one process at a time
60. Which one of the following is the most suitable data structure to use in a program for checking whether an arithmetic expression has balanced parentheses?
- A) Queue
  - B) Tree
  - C) Heap
  - D) Stack

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	1 D	21 A	41 C	
	2 C	22 A	42 D	
	3 B	23 D	43 C	
	4 A	24 C	44 B	
	5 B	25 C	45 A	
	6 C	26 B	46 C	
	7 C	27 C	47 D	
	8 A	28 A	48 D	
	9 C	29 B	49 C	
	10 A	30 C	50 A	
	11 B	31 D	51 A	
	12 C	32 B	52 A	
	13 C	33 B	53 D	
	14 B	34 D	54 C	
	15 A	35 B	55 B	
	16 B	36 C	56 A	
	17 C	37 B	57 B	
	18 A	38 D	58 B	
	19 D	39 C	59 B	
	20 A	40 A	60 D	