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Programme	:	**B.Tech.**	**Semester**	:	**Fall 2021-22**
Course Name	:	**Programming for Computing Engineers**	**Course Code**	:	**PLA1001**
Faculty Name	:		**Slot / Class No**	:	**A11+A12+A13-0471**
Time	:	**1½ hours**	**Max. Marks**	:	**50**

Q.No.	Question Description	Marks
1	Which of the following option leads to the portability and security of Java? A) Bytecode is executed by JVM B) The applet makes the Java code secure and portable C) Use of exception handling D) Dynamic binding between objects Ans:	1
2	Which of the following is a valid declaration of a chain Java? A) char ch = '\utea'; B) char ca = 'tea'; C) char cr = \u0223; D) char cc = '\itea'; Ans:	1
3	What is the extension of compiled java classes? A) .out B) .java C) .class D) None of the above Ans:	1
4	What is the range of 'byte' datatype in Java? A) -32768 to 32767 B) -128 to 127 C) -2147483648 to 2147483647 D) None of the above Ans:	1

5	In Java, Which data type value is returned by all transcendental math functions? A) float B) double C) Int D) Can be any of the above Ans:	1
6	Which of these is used to perform all input & output operations in Java? A) classes B) Variables C) streams D) Methods Ans:	1

7	What will be the output of the program given below?
	
	class A
	{
	public static void main(String args[])
	{
	int g = 3;
	System.out.print(++g * 8);
	}
	}
	
	A) 25
	B) 24
	C) 32
	D) 33
	
	Ans:
		1

8	Predict the output of following Java Program
	
	class B
	{
	public static void main(String args[]) {
	int x = -4;
	System.out.print(x>>1);
	System.out.print(" ");
	int y = 4;
	System.out.print(y>>1);
	}
	}
	
	A) Compiler Error
	B) -2 2
	C) 2 2
	D) 0 2
	
	Ans:
		1

9	Choose the output of the following program from the given options.
	
	class C{
	public static void main(String args[]) {
	System.out.print(10 + 20 + "Finalexams ");
	System.out.println("FinalExams" + 10 + 20);
	}
	}
	
	A) 30FinalExams FinalExams30
	B) 1020FinalExams FinalExams1020
	C) 30FinalExams FinalExams1020
	D) 1020FinalExams FinalExams30
	
	Ans:
		1

10	For switch case statement in Java, which of the following is a valid datatype 1. Short 2. Byte 3. Int 4. Char A) 1 Only B) 1 and 2 Only C) 1, 2 and 3 D) All of the above Ans:	1

11	Which of these is necessary to specify at time of array initialization? A) Row B) Column C) Both Row and Column D) None of the mentioned Ans:	1

12	What will be the output of the following Java code?
	Class A
	{
	public static void main(String args[])
	{
	int array_variable [] = new int[10];
	for (int i = 0; i < 10; ++i)
	{
	array_variable[i] = i;
	System.out.print(array_variable[i] + "");
	i++;
	}
	}
	}
	
	A) 0 2 4 6 8
	B) 1 3 5 7 9
	C) 0 1 2 3 4 5 6 7 8 9
	D) 1 2 3 4 5 6 7 8 9 10
	
	Ans:
		1

13	Which of the following statement is correct with respect to Java Collections? A) HashMap internally implements HashSet B) HashMap is the interface; HashSet is the concrete class C) HashSet internally implements HashMap D) HashSet is the interface; HashMap is the concrete class Ans:	1
14	Which of the below is invalid identifier with the main method? A) public B) static C) private D) final Ans:	1

15	How can we identify whether a compilation unit is class or interface from a .class file? A) Java source file header B) Extension of compilation unit C) We cannot differentiate between class and interface D) The class or interface name should be postfixed with unit type Ans:	1

16	What is the time complexity of following code:
	
	int a = 0
	int i = 0;
	int N = <some integer value>
	
	while (i < N)
	{
	a += i;
	System.out.println(i)
	i*=2
	}
	
	A. O(N)
	B. O(Sqrt(N))
	C. O(N / 2)
	D. O(log N)
	
	Ans:
		1

17	int i, j, k = 0;
	for (i = n / 2; i <= n; i++) {
	  for (j = 2; j <= n; j = j * 2) {
	  k = k + n / 2;
	  }
	}
	
	For the code given above, what is the time complexity?
	
	A) O(n)
	B) O(nlogn)
	C) O(n^2)
	D) O(n^2logn)
	
	Ans:
		1

18	Which among the following is a Short Circuit AND operator? A) & B) && C) | D) || Ans:	1

19	What is the output of the following snippet?
	
	void func(int x,int y)
	{
	Print x y;
	x=x+y;
	y=x-y;
	x=x-y;
	Print y x
	return;
	}
	
	What would be the output of the program if the function call func(10,20) is made?
	
	A) 10 20 and 20 10
	B) 10 20 and 15 20
	C) 10 20 and 20 18
	D) 10 20 and 10 20
	
	Ans:
		1

20	What is the output for simple sieve of size n=8? A) 2 3 5 7 8 B) 2 3 5 7 C) 1 2 3 4 5 D) 1 2 3 5 7 Ans:	1
21	How is the segmented sieve better than a simple sieve 1. Has better time complexity 2. Has better locality of reference A) Only 1 B) Both1 and 2 C) Only 2 D) Neither of 1 and 2 Ans:	1

22	The phi-function $\phi(n)$ does the following A) Finds the HCF and LCM of the numbers B) Outputs the coprime number of n C) Outputs the coprimes or the count of coprimes between 1 and n D) None of the Above Ans:	1
23	Which of the following is NOT a Strobogrammatic number? A) 8008 B) 8969 C) 8968 D) 1961 Ans:	1
24	Which of the following are NOT a problem of simple sieve a) It consumes exponential space b) It is not cache friendly c) It crashes frequently d) None of the Above Ans:	1

1961

25	The function func converts a given integer 'n' to its binary format. What are the values that the strings X, Y and Z can take so that the function func can print the binary equivalent of 'n'?
	
	static void func(int n)
	{
	long i;
	System.out.print(X);
	for (i = 1 << 30; i > 0; i = i / 2)
	{
	if((n & i) != 0)
	{
	System.out.print(Y);
	}
	else
	{
	System.out.print(X);
	}
	}
	}
	
	A) 110
	B) 001
	C) 100
	D) 101
	
	Ans:
		1

26	In a step of segmented sieve, it finds primes smaller than or equal to a) Sqrt(n) b) Sqrt(logn) c) N d) N/2 Ans:	1

27	We have been given an array A of 'N' numbers which are _____. We also have been given with another array B of size N which denote the _____ when divided by a number 'p'. According to the remainder theorem, how do we find the minimum possible value of the number 'p' which produces the given array B? Fill in the blanks with the options given below A) Pairwise coprime, remainders of the numbers in array A B) Divisible by 'x', pairwise coprime C) Divisible by 'x', remainders of the numbers in array A D) remainders of the numbers in array A, pairwise coprime with array A Ans:	1
28	The space complexity of Sieve of Eratosthenes is _____ (Consider the input as N and the size of input as K) A. Log(k) B. N^(0.5) C. K^(N/2) D. KLogK Ans:	1
29	Which of the following sets is does NOT contain all Strobogrammatic numbers? Set 1: 8008 1001 9006 6009 8888 1881 Set 2: 8888 1881 9886 6889 1691 Set 3: 8888 1881 9886 6889 1961 A)Set 1 B)Set 1 and 2 C)Set 2 and 3 D)All sets contain only Strobogrammatic numbers Ans:	1

30	In regular multiplication, there are ____ subproblems and Karatsuba Algorithm reduces the number of subproblems in multiplication to _____. What are the values for the above blanks? A) 2 and 1 B) 4 and 2 C) 4 and 3 D) 3 and 2 Ans:	1
31	In Karatsuba multiplication of 47 * 78, which of the following is NOT a subproblem? A) 4*7 B) (11*15) - 28 - 56 C) 7*8 D) All of the above are the subproblems of the multiplication of the numbers Ans:	1
32	Given num = 01100100, fill in the below equation to swap the two nibbles (x __0xF0) __ 4 || (x __ 0x0F) __ 4. (Fill in the blanks to complete the equation) A) &, <<, >>, & B) &&, <<,>>, && C) &, >>, <<, & D) None of the above Ans:	1
33	The best solution for the maximum product subarray has the limitations of that 1. The array cannot contain negative numbers 2. The array cannot contain 0 3. The array cannot contain repeated elements Which of the following is true A) 1 Only B) 1 and 2 Only C) All of 1,2 and 3 D) 2 Only Ans:	1

34	According to _____ algorithm, We keep on subtracting the smaller number from the larger number repeatedly to obtain the _____ A)Euclid, LCM B)Euler, Greatest Common Divisor C)Euclid, Highest Common Factor D)Manacher, Greatest Common Divisor Ans:	1
35	Given an string "apple", which of the following represents a subarray, a subset string and a subsequence. Note: Set cannot contain duplicates A set string is the members of the set represented as a string (in any order) 1. apel 2. ape 3. apple 4. pp Which of the following option best matches with the above list? A) 1 - subsequence, 2 - subset, 3 - subset B) 1 - subset, 2 - subsequence, 3 - subset C) 1 - subsequence, 2- subsequence, 3 - substring D) 1 - subset, 2 - sequence, 3 - substring Ans:	1
36	The iterative and recursive solutions of block swap algorithms have a _____ time complexity A) Constant B) Logarithmic C) Quadratic D) Linear Ans:	1
37	Consider the following array arr[] = {65, 32, 53, 132, 34 ,31, 42 ,53}; Which of the following are the elements of the leader array A){132, 53} B){65, 132, 42, 53} C){65, 132, 53} D)None of the following Ans:	1

38	Given the following 2D matrix, what is the maximum sum of hourglass. int arr[i][j] = [[1, 1, 1, 0, 0, 0], [0, 1, 0, 0, 0, 0], [1, 1, 1, 0, 0, 0], [0, 0, 2, 1, 1, 0], [0, 0, 0, 2, 0, 0], [0, 0, 1, 2, 4, 0]] A) 6 B) 8 C) 9 D) 11 Ans:	1
39	Give an integer n. We can flip exactly one bit. Write the output to find the length of the longest sequence of 1 s you could create if n = 59 A) 6 B) 3 C) 2 D) 1 Ans:	1
40	What is the solution for the Josephus problem if the value of n and k are 7 and 3 respectively? A) 3 B) 2 C) 6 E) 4 Ans:	1

41	Suppose we have a O(n) time algorithm that finds median of an unsorted array. Now consider a QuickSort implementation where we first find median using the above algorithm, then use median as pivot. What will be the worst case time complexity of this modified QuickSort. A) O(n^2 Logn) B) O(n^2) C) O(n*n Logn) D) O(nLogn) Ans:	1
42	Why is the Kadane's Algorithm used? A)To find the LCM of the given two numbers B)To find the subsequence of an array with the largest sum C)To find the maximum product subarray out of an array D)To find the maximum product subsequence out of an array Ans:	1
43	What is the meaning of an in-place sorting algorithm? A) It needs O(1) or O(logn) memory to create auxiliary locations B) The input is already sorted and in-place C) It requires additional storage D) It requires additional space Ans:	1
44	What is the condition for the worst case scenario of Quicksort? A) When the sum of differences between consecutive array elements is the largest B) When the choosen pivot is in the middle C) When the pivot is largest or the smallest D) None of the above Ans:	1

45	Which of the following are the true statements with respect to the two lists where each number 'n' is such that 1<=n<21 List-1: 1 10 11 12 2 20 21 3 4 5 6 7 List-2: 1 2 3 4 5 6 7 10 11 12 20 21 A) List-1 is naturally sorted and List-2 is sorted sorted alphanumerically B) List-1 is sorted according to ASCII values and List-2 is alphanumerically sorted C) List-1 is naturally sorted and List-2 is sorted alphanumerically D) List-1 is sorted alphanumerically and List-2 is sorted naturally Ans:	1
46	Given a character string, Which algorithm is used to find the longest palindromic substring? A) Hamacher's algorithm B) Josephus Algorithm C) Manacher's Algorithm D) Kruskal's Algorithm Ans:	1
47	Given a list of characters and you want to list out all the combinations of the characters. A solution for this problem can be derived from _____ identity. A) Manacher's B) Newton's C) Singular D) Pascal's Ans:	1
48	In Dynamic Programming, if a problem can be broken into subproblems which are reused several times, the problem possesses _____ property. A) Overlapping subproblems B) Optimal substructure C) Memoization D) Greedy	1

49	The following represents the structure of the Josephus problem. josephus(n, k) = (josephus(n - 1, k) + k-1) % n + 1 What is the significance of n an k here? Select the options of the true statements accordingly? 1.N people in a circle and k-1th person is killed 2.N people in a circle and kth person is killed 3.N people in a circle and k-1 people spared A)Only 1 is True B)2 and 3 are true C)1 and 2 are True D)1 and 3 are true Ans:	1
50	Which of the following sorting algorithms in its typical implementation gives best performance when applied on an array which is sorted or almost sorted. A) Quicksort B) Heap Sort C) Merge Sort D) Insertion Sort Ans:	1