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WINTER – 2019 EXAMINATION MODEL ANSWER

Subject: Programming in 'C'

Subject Code: 22226

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q.	Sub		A	Answer	Marking
No	Q.N.				Scheme
1.	(a) Ans.	Attempt any FI Define array. Li Array is a fixed	st its type.	wing: al collection of elements of the same	10 2M
	1220	type. Types: 1. One dimension 2. Multi dimension	onal	a concensi or elements or the same	Definitio n 1M Types 1M
	(b)	Draw & label di	fferent symbol	ls used in flowcharts.	2M
	Ans.	Symbol	Name Start/end	Function An oval represents a start or end point	Any 4 symbols ½M
		—	Arrows	A line is a connector that shows relationships between the representative shapes	each



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Subject: Programming in 'C'	Subject Code:	22226
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	Input/Output A parallelogram represents input or output Process A rectangle represents a process Decision A diamond indicates a decision	
(c)	Find the output of the following program: #include <stdio.h> void main() { int x = 10, y = 10, v1, v2; v1 = x++; v2 = ++y; printf("value of v1: %d, v1); printf("value of v2: %d, v2); }</stdio.h>	2M
Ans.	Output: value of v1:10value of v2:11	Correct output 2M
(d) Ans.	State the syntax & use of strlen () & strcat () function.	2M 1M for
	<pre>strlen(): calculates the length of the string Syntax: strlen(s1);</pre>	correct syntax
	<pre>strcat():concatenates two strings Syntax: strcat(s1,s2)</pre>	1M for use
(e) Ans.	State the Relational operators with example. == - returns true if the values of two operands are equal else return false. E.g: if (A==B){ } != - returns true if values of two operands are not equal, else return	



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	false E.g. if (A! = B){ } From returns true if the first energy is less than the second also returns	4
	<- returns true if the first operand is less than the second, else returns false.	Any four
	E.g. if (A< B){ }	operator
	>- returns true if the first operand is greater than the second, else	$s^{1/2}M$
	returns false.	each
	E.g. if (A>B){ } <= returns true if the first operand is less than or equal to the second,	
	else returns false.	
	E.g. if $(A \le B)$ }	
	>= returns true if the first operand is greater than or equal to the	
	second, else returns false.	
(B)	E.g. if $(A > = B)$ }	23.4
(f) Ans.	State the syntax to declare pointer variable with example.	2M <i>Correct</i>
Alis.	General syntax to declare pointer.	syntax
	datatype *var_name;	<i>1M</i>
		Correct
	Eg: int var = 20;	example
		1M
(g)	Draw flow chart for addition of two numbers.	2M
Ans.		
	zatt	Correct
	77.92	sequenc
	Input two numbers a.b.	e 1M
	declare variable sum=0	
	sum = a+b	Correct
	3300 - 3600	symbol
		1M
	Display sum	
	(200	



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2.		Attempt any THREE of the following:	12
	(a)	State the importance of flow chart.	4M
	(a) Ans.	State the importance of flow chart. A flowchart is a type of diagram that represents an algorithm. It is a visual representation of a sequence of steps to complete the process. A flow chart describes a process using symbols rather than words. Computer programmers use flow charts to show where data enters the program, what processes the data goes through, and how the data is converted to output. -can be used to quickly communicate the ideas or plans that one programmer envisions to other people who will be involved in the process. - aid in the analysis of the process to make sure nothing is left out and that all possible inputs, processes, and outputs have been accounted for. -help programmers develop the most efficient coding because they can clearly see where the data is going to end up. - help programmers figure out where a potential problem area is and helps them with debugging or cleaning up code that is not working. - are a useful tool in visualizing a module's flow of execution before writing any code. This allows developers to do three things: verify the algorithm's correctness before writing code, visualize how the code will ultimately be written, and communicate and document the algorithm with other developers and even non-developers. -may be used in conjunction with other tools, such as pseudo-code, or	Any 4 points IM each
		may be used by itself to communicate a module's ultimate design,	
		depending on the level of detail of the flowchart.	
	(b) Ans.	Write a program to declare structure student having rollno, name & marks. (Note: Any other correct logic shall be considered). Accept and display data for three students.	4M
		<pre>#include<stdio.h> #include<conio.h> void main() { int i; struct student{ int rollege</conio.h></stdio.h></pre>	Correct logic 3M
		int rollno; char name[20]; int marks; } s[3];	Correct syntax 1M



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	clrscr(); for(i=0;i<3;i++) { printf("Enter rollno, name and marks\n"); scanf("%d%s%d",&s[i].rollno,&s[i].name,&s[i].marks); } for(i = 0; i<3;i++) { printf("\nThe details of student %d\n",i+1); printf("Roll no %d\n",s[i].rollno); printf("Name is %s\n",s[i].name); printf("Marks %d\n",s[i].marks); } getch(); }	
(c)	Explain pointer arithmetic with example. (Note: Code snippet shall be considered). The pointer arithmetic is done as per the data type of the pointer. The	4M
Ans.	The pointer arithmetic is done as per the data type of the pointer. The basic operations on pointers are: Increment It is used to increment the pointer. Each time a pointer is incremented, it points to the next location. Eg, for an int pointer variable, if the current position of pointer is 1000, when incremented it points to 1002 because for storing an int value it takes 2 bytes of memory. Decrement It is used to decrement the pointer. Each time a pointer is decremented, it points to the previous location. Eg, if the current position of pointer is 1002, then decrement operation results in the pointer pointing to the location 1000. Addition and subtraction: When addition or subtraction operation is performed on the pointer variable, it shows that particular location in the memory. Eg: int *ptr; -say address is 1000. If -> ptr+n- then ptr+n*2. #include <stdio.h> #include<conio.h></conio.h></stdio.h>	Any two operator s Each operator with explanat ion 1M 1M for each example



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	int $i = 10$;	
	int *ptr=&i	
	clrscr();	
	printf("%x%d",ptr,i);	
	ptr++;	
	printf("\n%x%d",ptr,i);	
	<pre>printf("\n% x",ptr+2);</pre>	
	printf("\n%x",ptr-2);	
	getch();	
	}	
(d)	Explain nested if-else with example.	4M
	(Note: Any example shall be considered)	
Ans.	When a series of decision is required, nested if-else is used. Nesting	
	means using one if-else construct within another one. If the condition	
	in the outer if, is true, then only the inner if-else will get executed.	
	Further the statements in the inner if will get execute only if the	
	condition of inner if, evaluates to true. If it is false, the statements in	Explana
	inner else will get executed.	tion 2M
	If the outer if evaluates to false, then the statements in outer else get	
	executed.	
	Conoral curatary	
	General syntax:	
	<pre>if(condition) { if(condition) {</pre>	
	, , ,	
	statements } else {	
	statements	
	} else {	
	statements	
	}	
	statements	
	Example:	
	#include <stdio.h></stdio.h>	
	#include <conio.h></conio.h>	
	void main() {	Example
	int val;	2M
	clrscr();	•
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		printf("Enter a number");	
		scanf("%d",&val);	
		if(val>=5) {	
		if(val>5) {	
		printf("Number is greater than 5");	
		} else {	
		printf("Number is equal to 5");	
		printi(Number is equal to 5),	
) also (
		} else {	
		printf("Number is less than 5");	
		}	
		getch();	
		}	
3.		Attempt any THREE of the following:	12
	(a)	Describe the following terms:	4M
		(i) Keyword	
		(ii) Identifier	
		(iii) Variable	
		(iv) Constant	
	Ans.	(i) Keyword: Keywords are special words in C programming which	
		have their own predefined meaning. The functions and meanings of	
		these words cannot be altered. Some keywords in C Programming	
		are if, while, for, do, etc	Each
		(ii) Identifian Identifians are user defined names of variables	term 1M
		(ii) Identifier: Identifiers are user-defined names of variables,	
		functions and arrays. It comprises of combination of letters and digits.	
		Example	
		int age1;	
		float height_in_feet;	
		Here, age1 is an identifier of integer data type.	
		Similarly <i>height_feet</i> is also an identifier but of floating integer data	
		type,	
		(iii) Variable: A variable is nothing but a name given to a storage	
		area that our programs can manipulate. Each variable in C has a	
		Example: add, a, name	
		(iv) Constant:	
		specific type, which determines the size and layout of the variable's memory; the range of values that can be stored within that memory; and the set of operations that can be applied to the variable. Example: add, a, name	



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(b)	Constants refer to fixed values that the program may not change during its execution. These fixed values are also called literals . Constants can be of any of the basic data types like an integer constant, a floating constant, a character constant, or a string literal. There are enumeration constants as well. Example: 121 234 3.14 Differentiate between call by value and call by reference.	4M
Ans.	Sr. Call by value Call by reference	
	No.	
	When function is called by by passing values then it is called by passing address of variable then it is called as call by reference.	
	Copy of actual variable is created when function is called. No copy is generated for actual variable rather address of actual variable is passed.	Any four
	In call by value, memory required is more as copy of variable is created. In call by reference, memory required is less as there is no copy of actual variables.	differen ces 1M each
	4 Example:- Function call - Swap (x,y); Calling swap function by passing values. Example:- Function call - Swap (&x, &y); Calling swap function by passing address.	
	5 Original (actual) Actual parameters change as parameters do not change. Changes take place on the copy of variable. Actual parameters change as function operates on value stored at the address.	
(c)	Explain conditional operator with example.	4M
Ans.	Conditional Operator (Ternary Operator):	
	It takes the form "?:" to construct conditional expressions	Explana
	The operator "?:" works as follows:	tion 2M
	exp1 ? exp2 : exp 3 Where exp1 axp2 and exp3 are expressions exp1 is evaluated first. If	
	Where exp1, exp2 and exp3 are expressions.exp1 is evaluated first, If it is true, then the expression exp2 is evaluated and becomes the value	Example



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becomes the value of the expression. E.g. int a=10,b=5,x; x=(a>b)? a:b; (d) List the categories of functions and explain any one with example. Different categories of function: 1) Function with no arguments and no return value. 2) Function with arguments and return value. 3) Function with no arguments and return value. 4) Function with arguments and return value. 1) Function with no arguments and no return value. This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void. Ear argumals:			
Cid Ans. List the categories of functions and explain any one with example. Different categories of function: 1) Function with no arguments and no return value. 2) Function with no arguments and return value. 3) Function with no arguments and return value. 4) Function with no arguments and return value. 1) Function with no arguments and no return value: This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void. For example: void add() { inta,b,c; a=5; b=6; c=a+b; printf("%d",c); } It should be called as add(); 2) Function with arguments and no return value: This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type. For example: void add(intx,int y) { int z; z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		E.g. int a=10,b=5,x;	2M
Ans. Different categories of function: 1) Function with no arguments and no return value. 2) Function with no arguments and return value. 3) Function with no arguments and return value. 4) Function with arguments and return value. 1) Function with no arguments and no return value: This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void. For example: void add() { inta,b,c; a=5; b=6; c=a+b; printf("%d",c); } It should be called as add(); 2) Function with arguments and no return value: This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type. For example: void add(intx,int y) { int z; z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5	(4)		43.4
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This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void. For example: void add() { inta,b,c; a=5; b=6; c=a+b; printf(""%d",c); } It should be called as add(); 2) Function with arguments and no return value: This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type. For example: void add(intx,int y) { int z; z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5	Ans.	 Function with no arguments and no return value. Function with arguments and no return value. Function with no arguments and return value. 	List 2M
This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void. For example: void add() { inta,b,c; a=5; b=6; c=a+b; printf("*96d",c); } It should be called as add(); 2) Function with arguments and no return value: This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type. For example: void add(intx,int y) { int z; z=x+y; printf("96d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		1) Function with no arguments and no return values	
void add() { inta,b,c; a=5; b=6; c=a+b; printf("%d",c); } It should be called as add(); 2) Function with arguments and no return value: This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type. For example: void add(intx,int y) { int z; z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		This category of function cannot return any value back to the calling program and it does not accept any arguments also. It has to be declared as void.	
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{ int z; z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		This category of function cannot return any value back to the calling program but it takes arguments from calling program. It has to be declared as void. The number of arguments should match in sequence, number and data type.	
z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		-	
z=x+y; printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		{	
printf("%d",z); } It should be called as add(4,5); where x will take 4 and y will take 5		int z;	
It should be called as add(4,5); where x will take 4 and y will take 5		<u> </u>	
		printf("%d",z);	
		} 	



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	I		
		3) Function with no arguments and return value:	
		This category of function can return a value back to the calling	
		program but it does not take arguments from calling program. It has	
		to be declared with same data type as the data type of return variable.	
		For example:	
		int add()	
		{	
		inta,b,c;	
		a=5;	
		b=6;	
		c=a+b;	
		return(c);	
		It should be called as int $x = add()$; where x will store value returned	
		by the function.	
		4) Function with arguments and return value:	
		This category of function can return a value back to the calling	
		program but it also takes arguments from calling program. It has to be	
		declared with same data type as the data type of return variable.	
		For example:	
		int add(intx,int y)	
		int z;	
		z=x+y;	
		return(z);	
		}	
		It should be called as int $s = add(4,5)$; where x will have 4 and y will	
		have 5 as their values and s will store value returned by the function.	
4.		Attempt any THREE of the following:	12
	(a)	Write an algorithm to determine the given number is odd or	4M
		even.	
	Ans.		
		Step 1- Start	
		Step 2- Read / input the number.	Correct
		Step 3- if n%2==0 then number is even.	algorith
		Step 4- else number is odd.	m 4M
		Step 5- display the output.	
		Step 6- Stop	
	(b)	Illustrate the use of break and continue statement with example.	4M



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Ans.	(Note:- Any other example shall be considered) Break: It breaks the execution of the loop which allows exiting from any loop or switch, such that break statement skips the remaining part of current iterations of the loop. Syntax: break; while (testExpression) (Use of each 1M Example of each 1M
	Continue: It is used when it is required to skip the remaining portion of the loop without breaking loop it will transfer control directly to next iteration Syntax: continue; In given program sequence if "break" executes then execution control will jump out of loop & next statement after loop will be executed. In given program sequence if "continue" executes then execution control will skip remaining statements of loop & will start next iteration of loop	
(c)	Write a program to add, subtract, multiply and divide two numbers, accepted from user switch case. (Note: Any other correct logic shall be considered). #include <stdio.h></stdio.h>	4M
	<pre>#include<conio.h> void main() { int a,b,ch,add,sub,mul,div; clrscr();</conio.h></pre>	Correct logic 2M
	<pre>printf("\n1 for addition \n2 for substraction"); printf("\n3 for multiplication \n4 for division"); printf("\nEnter two numbers:");</pre>	Correct syntax 2M



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		scanf("%d%d",&a,&b); printf("\nEnter your choice:");	
		scanf("%d",&ch);	
		switch(ch)	
		{	
		case 1:	
		add=a+b;	
		printf("Addition of a & b=%d",add);	
		break;	
		case 2:	
		sub=a-b;	
		printf("Substraction of a & b=%d",sub);	
		break;	
		case 3:	
		mul=a*b;	
		printf("Multiplication of two numbers=%d",mul);	
		break;	
		case 4:	
		div=a/b;	
		printf("Division of two numbers=%d",div);	
		break;	
		default:	
		printf("Invalid choice");	
		} cotab ()	
		getch();	
	(-1)		41/4
	(d)	Illustrate initialization of two dimensional array with example.	4M
	Ans.	Two dimensional array: The array which is used to represent and store data in a tabular form	
		is called as two dimensional array. Such type of array is specially	Two dim
		used to represent data in a matrix form.	
		Initialization can be done as design time or runtime.	array 1M
		1. Design time: This can be done by providing "row X column"	1171
		number of elements to the array. Eg for a 3 rows and 4 columns array	Declarat
		, 3X4=12 elements can be provided as:	ion 1M
		$arr[3][4]=\{ \{2,3,4,6\},$	VOIV 1171
		$\{1,4,6,3\},$	
	1		
ı		1 {6.6.4.3}.	
		{6,6,4,3}, {6,7,8,9}	



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	2. Runtime: For this loop structures like "for" can be used in a nested form, where outer loop will increment row and inner loop will increment column. $Eg:$ for(i=0;i<3;i++) { for(j=0;j<4;j++)	Initializ ation by any one type 1M
	<pre>{ scanf("%d", &arr[i][j]); } Example: main() { int arr[2][2]={{1,2},{4,5}}); int i,j; for(i=0;i<2;i++) { for(j=0;j<2;j++) { printf("%d", arr[i][j]); } printf("\n"); }</pre>	Example 1M
(e)	Write a program to read two strings and find whether they are	4M
Ans.	equal or not. (Note: Any other correct logic shall be considered). #include <stdio.h> #include<string.h> void main() { char st1[20],st2[20]; printf("enter string 1"); scanf("%s",st1); printf("enter second string"); scanf("%s",st2);</string.h></stdio.h>	Correct logic 2M Correct syntax 2M
	if(strcmp(st1,st2)==0)	



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		<pre>printf("\nboth strings are equal");</pre>	
		else	
		printf("\nstrings are not equal");	
		}	
5.		Attempt any TWO of the following:	12
	(a)	Write a program to calculate sum of all the odd numbers between	6M
	\	1 to 20.	
		(Note: Any other correct logic shall be considered).	
	Ans.	#include <stdio.h></stdio.h>	
		#include <conio.h></conio.h>	Finding
		void main()	odd
		{	numbers
		inti,sum=0;	2M
		clrscr();	
		for(i=1;i<=20;i++)	Calculat
		{	ing sum
		if(i%2!=0)	1M
		{	11/2
		sum=sum+i;	Display
		}	sum 1M
			50000 11/1
		printf("Sum=%d",sum);	Correct
		getch();	syntax
		}	2M
	(b)	Write a program for addition of two 3 x 3 matrices.	6M
	(~)	(Note: Any other correct logic shall be considered).	01/1
	Ans.	#include <stdio.h></stdio.h>	
	11100	#include <conio.h></conio.h>	
		void main()	
		{	Decelera
		int a[3][3],b[3][3],c[3][3],i,j;	tion of
		clrscr();	variable
		<pre>printf("\n Enter first matrix");</pre>	s 1M
		for(i=0;i<3;i++)	
			Input
		for(j=0;j<3;j++)	matrices
		\[\{ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	2M
		scanf("%d",&a[i][j]);	
		}	
		'	<u> </u>



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		r
	<pre>printf("\n Enter second matrix"); for(i=0;i<3;i++) { for(j=0;j<3;j++) { scanf("%d",&b[i][j]); } for(i=0;i<3;i++) { for(j=0;j<3;j++) { c[i][j]=a[i][j]+b[i][j]; } } printf("\n Addition:\n"); for(i=0;i<3;i++) { for(j=0;j<3;j++) { printf("%d\t",c[i][j]); } printf("\n"); } getch();</pre>	Calculat ing addition 2M Display addition 1M
(c)	Write a program to compute the sum of all elements stored in an	6M
Ans.	array using pointers. (Note: Any other correct logic shall be considered). #include <stdio.h></stdio.h>	
	#include <conio.h> void main()</conio.h>	Variable
	{ int a[5],sum=0,i,*ptr;	declarati on 1M
	<pre>clrscr(); printf("\n Enter array elements:");</pre>	Input
	for(i=0;i<5;i++) scanf("%d",&a[i]);	array 1M



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		<pre>ptr=&a[0]; for(i=0;i<5;i++) { sum=sum+(*ptr); ptr=ptr+1; } printf("\n Sum= %d",sum); getch(); }</pre>	Pointer Initializ ation IM Sum calculati on 2M Display
6.		Attempt any TWO of the following:	1M 12
0.	(a)	Write a program to sort elements of an array in ascending order.	6M
		(Note: Any other correct logic shall be considered).	
	Ans.	#include <stdio.h> #include<conio.h></conio.h></stdio.h>	
		void main()	Input
		{	array
		int a[5],i,j,temp;	1M
		clrscr();	G
		<pre>printf("\n Enter array elements:"); for(i=0;i<5;i++)</pre>	Sorting logic 4M
		scanf("%d",&a[i]);	logic 4m
		for(i=0;i<5;i++)	
		{	Display
		for(j=0;j<4-i;j++)	sorted
		$ \{ if(a[j]>a[j+1]) $	list 1M
		{	
		temp=a[j];	
		a[j]=a[j+1];	
		a[j+1]=temp;	
		\ \{ \}	
		for(i=0;i<5;i++)	
		printf("\n %d",a[i]);	
		getch(); }	
	(b)	Write a function to print Fibonacci series starting from 0, 1.	6M
		(Note: Any other correct logic shall be considered).	



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	11701	
Ans.	void Fibbo()	
	\{	
	inta,b,c,limit,i;	
	<pre>printf("\n Enter number:");</pre>	Correct
	scanf("%d",&limit);	function
	a=0;	with
	b=1;	syntax
	printf("%d\t%d",a,b);	6M
	for(i=0;i <limit-2;i++)< th=""><th></th></limit-2;i++)<>	
	{	
	c=a+b;	
	printf("\t%d",c);	
	a=b;	
	b=c;	
)))	
	}	
		0.5
(c)	Calculate factorial of a number using recursion.	6M
	(Note: Explanation/algorithm/program shall be considered)	
Ans.	#include <stdio.h></stdio.h>	
	#include <conio.h></conio.h>	
	int factorial(int no)	
	{	
	if(no==1)	
	return(1);	
	else	Recursiv
	return(no*factorial(no-1));	e
	}	function
	void main()	<i>4M</i>
	{	
	intfact,no;	
	clrscr();	Main
	printf("\n Enter number");	function
	scanf("%d",&no);	2M
	fact=factorial(no);	2172
	printf("\n Factorial number=%d",fact);	
	getch();	
	geten(),	
	}	