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MODEL ANSWER

SUMMER – 2018 EXAMINATION

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. No.	Sub Q.N.	Answer	Marking Scheme
1.	**(a)**	**Attempt any FIVE of the following:** **Define:** **(i) Two dimensional array** **(ii) Multi-dimensional array**	**10** **2M**
	Ans.	**(i) Two dimensional array** Two dimensional array is a collection of similar type of data elements arranged in the form of rows & columns. *E.g.* Array can be declared as int arr[3][3]; In this there can be 9 elements in an array with 3 rows and 3 columns. **(ii) Multi-dimensional array:** An array with more than one dimension is called as multi-dimensional array. *For example,* float x[3][4]; Similarly, you can declare a three-dimensional (3d) array. For example, float y[2][4][3];	*Definition of two-dimensional array* *1M* *Multi-dimensional array* *1M*

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		Here, The array y can hold 24 elements.	
(b) **Ans.**		**Give any four advantages of pointer.** **Advantages of pointer:** 1. Pointers reduce the length and complexity of a program. 2. They increase execution speed. 3. A pointer enables us to access a variable that is defined outside the function. 4. Pointers are more efficient in handling the data tables. 5. The use of a pointer array of character strings results in saving of data storage space in memory. 6. It supports dynamic memory management.	**2M** *Any four advanta ges ½M each*
(c) **Ans.**		**Define type casting. Give any one example.** **Definition type casting:** The conversion of one data type to another is known as type casting. The values are changed for the respective calculation only, not for any permanent effect in a program. *For example*, x=int (7.5) means 7.5 is converted to integer by truncating it i.e. 7 b=(int) 22.7/(int) 5.3 means 22.7 will be converted to 22 and 5.3 to 5 so answer will be 22/5=4 c=(double) total/num means the answer will be in float value. p=sin((int)x) means x will be converted to integer and then sine angle will be calculated.	**2M** *Definitio n of type casting 1M* *Any one correct Example 1M*
(d) **Ans.**		**State any four decision making statement.** **Decision making statement:** 1. if statement 2. if-else statement 3. if-else-if ladder 4. Nested if-else statement 5. switch statement 6. conditional operator statement (? : operator)	**2M** *Any four correct decision making statemen ts - ½ M each*
(e) **Ans.**		**State any four math functions with its use.** *(Note: Any other relevant math function shall be considered)* **Math Functions:** sqrt() - square root of an integer abs() - absolute value of an integer	**2M** *Any four correct math*

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		sin() - compute the sine value of an input value cos()- compute the cosine value of an input value pow()- compute the power of a input value floor()- round down the input value ceil()- round up the input value	*function with its use ½M each*
	(f)	**State the use of following symbols used for flowchart drawing:**	**2M**
	Ans.	(i)　▭　　　　　　　　　　(ii)　◇ (iii)　▱　　　　　　　　　(iv)　⬭ (i)　▭　　　　　General processing (ii)　◇　　　　Decision making (iii)　▱　　　Input/ Output statements (iv)　⬭　　　Start / Stop	*Correct use of symbols ½M each*

	(g)
	Ans.
		State use of while loop with syntax.
		While loop is used in programming to repeat a specific block of statement until some end condition is met.
		
		The *syntax* of a while loop is:
		while (test Expression)
		{
		　　Statements…
		　　statements….
		}
			2M
			
			Use of while loop 1M
			
			Syntax of while loop 1M

2.		**Attempt any THREE of the following:**	**12**
	(a)	**Develop a simple 'C' program for addition and multiplication of two integer numbers.** *(Note: Any other relevant logic shall be considered)*	**4M**
	Ans.	#include<stdio.h> #include<conio.h> void main() { 　　int a,b,add,mul;	*Correct Logic 2M*

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		clrscr();
		printf("Enter value for a and b:");
		scanf("%d%d",&a,&b);
		add=a+b;
		mul=a*b;
		printf("\nAddition of a and b=%d\n",add);
		printf("\Multiplication of a and b=%d",mul);
		getch();
		}
			Correct syntax 2M

	(b)
	
	Ans.
		Explain how to pass pointer to function with example.
		(Note: Any other example showing pointer as a parameter in function shall be considered)
		When pointer (addresses) is passed to the function as an argument instead of value then function is called as call by reference.
		
		Example:
		#include<stdio.h>
		#include<conio.h>
		int add(int *);
		void main()
		{
		    int *ptr,pos=0;
		    clrscr();
		    printf("Enter position:");
		    scanf("%d",&pos);
		    ptr=&pos;
		    printf("\nSum=%d",add(ptr));
		    getch();
		}
		int add(int *p)
		{
		    int i=0;
		    int sum=0;
		    for(i=1;i<=(*p);i++)
		    {
		        sum=sum+i;
		    }
		    return sum;
		}
			4M
			
			Explanation 2M
			
			Example 2M

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		In the above program function passes the address of 'pos' to the ptr. The value of ptr is passed while calling the function. In function definition in *p it takes value of ptr instead of address for performing addition of numbers up to specific position.	

	(c)	**Explain following functions:**
		    getchar( )
		    putchar( )
		    getch( )
		    putch( )
		with suitable examples.
			4M

	Ans.	**getchar( ) -**
		It is function from stdio.h header file. This function is used to input a single character.
		The enter key is pressed which is followed by the character that is typed. The character that is entered is echoed.
		
		Syntax:
		    ch=getchar();
		Example:
		void main()
		{
		char ch;
		ch = getchar();
		printf("Input Char Is :%c",ch);
		}
		During the program execution, a single character gets or read through the getchar(). The given value is displayed on the screen and the compiler waits for another character to be typed. If you press the enter key/any other characters and then only the given character is printed through the printf function.
		
		putchar( ) -
		It is used from standard input (stdio.h) header file.
		This function is the other side of getchar. A single character is displayed on the screen.
		Syntax:
		putchar(ch);
		void main()
		{
			Explanation of each function 1M

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		char ch='a';
		putchar(ch);
		getch();
		}
		
		getch( ) -
		It is used from the console (conio.h) header file.
		This function is used to input a single character.
		The character is read instantly and it does not require an enter key to be pressed.
		The character type is returned but it does not echo on the screen.
		Syntax:
		ch=getch();
		Where, ch - assigned the character that is returned by getch().
		void main()
		{
		char ch;
		ch = getch();
		printf("Input Char Is :%c",ch);
		}
		During the program execution, a single character gets or read through the getch(). The given value is not displayed on the screen and the compiler does not wait for another character to be typed. And then, the given character is printed through the printf function.
		
		putch( )-
		It is used from console input output header file (conio.h) This function is a counterpart of getch().
		Which means that it will display a single character on the screen.
		The character that is displayed is returned.
		Syntax:
		    putch(ch); Where, ch - the character that is to be printed.
		void main()
		{
		    char ch='a';
		    putch(ch)
		}	

	(d)	**Develop a program to accept an integer number and print whether it is palindrome or not.**	**4M**

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	Ans.	*(Note: If string is considered instead of number for palindrome checking, then that logic shall be considered)*
		#include<stdio.h>
		#include<conio.h>
		void main()
		{
		    int n,num,rev=0,digit,i;
		    clrscr();
		    printf("Enter the number: ");
		    scanf("%d",&num);
		    n=num;
		    for(i=0;num!=0;++i)
		    {
		        digit=num%10;
		        rev=rev*10+digit;
		        num=num/10;
		    }
		    if(n==rev)
		        printf("Number is palindrome");
		    else
		        printf("Number is not palindrome");
		    getch();
		}
			Correct Logic 2M
			
			Correct syntax 2M

3.	**(a)** **Ans.**	**Attempt any THREE of the following:** **State the use of printf( ) & scanf( ) with suitable example.** **printf( ) & scanf( ):** printf() and scanf() functions are library functions in C programming language defined in "stdio.h". **printf()** function is used to print the character, string, float, integer, octal and hexadecimal values onto the output screen. **scanf()** function is used to read character, string, numeric data from keyboard. %d format specifier is used in printf() and scanf() to specify the value of an integer variable. %c is used to specify character, %f for float variable, %s for string variable, and %x for hexadecimal variable.	**12** **4M** *Explanation of printf, scanf 1M each*

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		Example:
		#include<stdio.h>
		#include<conio.h>
		void main() {
		   int i;
		   clrscr();
		   printf("Enter a number");
		   scanf("%d",&i);
		   printf("Entered number is: %d",i);
		   getch();
		}
			Example 2M

(b) **Ans.**		**Explain any four library functions under conio.h header file.** clrscr() -This function is used to clear the output screen. getch() -It reads character from keyboard getche()-It reads character from keyboard and echoes to o/p screen putch - Writes a character directly to the console. textcolor()-This function is used to change the text color textbackground()-This function is used to change text background	**4M** *Any 4 function 1M each*

(c)
Ans.
		Explain how formatted input can be obtain, give suitable example.
		Formatted input:
		When the input data is arranged in a specific format, it is called formatted input. scanf function is used for this purpose in C.
		General syntax:
		scanf("control string", arg1, arg2..);
		
		Control string here refers to the format of the input data. It includes the conversion character %, a data type character and an optional number that specifies the field width. It also may contain new line character or tab. arg1, arg2 refers to the address of memory locations where the data should be stored.
		Example:
		scanf("%d",&num1);
		
		Eg:
		#include<stdio.h>
		#include<conio.h>
		void main()
		{
			4M
			
			Explanation 2M
			
			Example 2M

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		int i;
		clrscr();
		printf("Enter a number");
		scanf("%d",&i);
		printf("Entered number is: %d",i);
		getch();
		}	

	(d)
	
	Ans.
		Develop a program to find factorial of a number using recursion.
		(Note: Any other relevant logic shall be considered)
		#include<stdio.h>
		#include<conio.h>
		int factorial(int num)
		{
		if(num==1)
		{
		return 1;
		 }
		 else
		 {
		return(num*factorial(num-1));
		 }
		}
		void main() {
		int num;
		int result;
		clrscr();
		printf("Enter a number");
		scanf("%d",&num);
		result=factorial(num);
		printf("Factorial of %d is %d",num,result);
		getch();
		}
			4M
			
			Correct syntax 2M
			
			Correct logic 2M

4.	**(a)** **Ans.**	**Attempt any THREE of the following:** **Write a program to sweep the values of variables a = 10, b = 5 using function.** *(Note : Read sweep as swap in the question)* *(Note: Any other logic using function shall be considered)* #include<stdio.h> #include<conio.h>	**12** **4M**

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		void swapvalues(int *i, int *j)
		{
		    int temp;
		    temp=*i;
		    *i=*j;
		    *j=temp;
		}
		void main() {
		    int a=10;
		    int b=5;
		    clrscr();
		    printf("The values before swaping:\na=%d, b=%d",a,b);
		    swapvalues(&a,&b);
		    printf("\nThe values after swaping:\na=%d, b=%d",a,b);
		    getch();
		}
			Correct syntax 2M
			
			Correct logic 2M

	(b)
	
	Ans.
		Develop a program using structure to print data of three students having data members name, class, percentage.
		(Note: Any other relevant logic shall be considered)
		#include<stdio.h>
		#include<conio.h>
		void main() {
		struct student
		{
		char name[20];
		char c[20];
		int per;
		} s[3];
		int i;
		clrscr();
		for(i=0;i<3;i++)
		{
		printf("Enter name, class, percentage");
		scanf("%s%s%d",&s[i].name,&s[i].c,&s[i].per);
		}
		for(i=0;i<3;i++)
		 {
		printf("%s %s %d\n",s[i].name,s[i].c,s[i].per);
		}
			4M
			
			Correct syntax 2M
			
			Correct logic 2M

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		getch(); }	

	(c)
	
	Ans.
		Design a program to print a message 10 times.
		(Note: Any other relevant logic shall be considered)
		#include<stdio.h>
		#include<conio.h>
		void main()
		{
		   int i;
		   clrscr();
		   for(i=0;i<10;i++)
		   {
		      printf("Welcome to C programming\n");
		   }
		   getch();
		}
			4M
			
			Correct syntax 2M
			
			Correct logic 2M

	(d) **Ans.**	**Draw a flowchart for checking whether given number is prime or not.** *(Note: Any correct flowchart shall be considered)* 	**4M** *Correct symbols 1M* *Correctness of flowchart 3M*

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	(e)	**Implement a program to demonstrate logical AND operator.** *(Note: Any other relevant logic shall be considered)*	**4M**
	Ans.	```c #include<stdio.h> #include<conio.h> void main() { int i; int j; clrscr(); printf("Enter the values of i and j"); scanf("%d%d",&i,&j); if(i==5 && j==5) { printf("Both i and j are equal to 5"); } else { printf("Both the values are different and either or both are not equal to 5"); } getch(); } ```	*Correct Syntax 2M* *Correct logic 2M*
5.		**Attempt any TWO of the following:**	**12**
	(a)	**Draw a flowchart of Do-while loop and write a program to add numbers until user enters zero.**	**6M**
	Ans.	**Flowchart of Do-while loop:** Figure: Flowchart of do...while Loop	*Correct Flowcha rt 3M*

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		Program:-
		```#include<stdio.h>```
		```#include<conio.h>```
		```void main()```
		```{```
		```int no,sum=0;```
		```clrscr();```
		```do```
		```{```
		```printf("\n Enter a number:");```
		```scanf("%d",&no);```
		```sum=sum+no;```
		```}while(no!=0);```
		```printf("\n Sum of entered numbers =%d",sum);```
		```getch();```
		```}```
			Correct program 3M

	(b)
	
	Ans.
		Give a method to create, declare and initialize structure also develop a program to demonstrate nested structure.
		Declaration of structure:-
		```struct structure_name```
		```{```
		```data_type member 1;```
		```data_type member 2;```
		.
		.
		.
		```data_type member n;```
		```} structure variable 1, structure variable 2,..., structure variable n;```
		
		Example:-
		```struct student```
		```{```
		```int rollno;```
		```char name[10];```
		```}s1;```
		
		Initialization:-
		```struct student s={1,"abc"};```
		structure variable contains two members as rollno and name. the
			6M
			
			Creation, declaration 2M
			
			Initializ ation 1M

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		above example initializes rollno to 1 and name to "abc".
		
		Program:-
		#include<stdio.h>
		#include<conio.h>
		struct college
		{
		int collegeid;
		char collegename[20];
		};
		struct student
		{
		int rollno;
		char studentname[10];
		struct college c;
		};
		
		void main()
		{
		struct student s={1,"ABC",123,"Polytechnic"};
		clrscr();
		printf("\n Roll number=%d",s.rollno);
		printf("\n Student Name=%s",s.studentname);
		printf("\n College id=%d",s.c.collegeid);
		printf("\n College name=%s",s.c.collegename);
		getch();
		}
			Program 3M

	(c)
	
	Ans.
		Implement a program to demonstrate concept of pointers to function.
		(Note: Any other relevant program shall be considered)
		Pointer to function:
		include<stdio.h>
		int sum(int x, int y)
		{
		return x+y;
		}
		int main()
		{
		int s;
			6M
			
			Correct logic 3M
			
			Correct syntax 3M

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		int(*fp)(int, int);
		fp = sum;
		s = fp(10,12);
		printf("Sum = %d",s);
		return 0;
		}		

6.		**Attempt any TWO of the following:**	**12**	
	(a)	**Develop a program to swap two numbers using pointer and add swaped numbers also print their addition.** *(Note: Any other relevant logic shall be considered)*	**6M**	

	Ans.	```c
		#include<stdio.h>
		void swap(int *a,int *b)
		{
		   int temp;
		   temp=*a;
		   *a=*b;
		   *b=temp;
		}
		void main()
		{
		int x,y,sum;
		printf("\n Enter value for x:");
		scanf("%d",&x);
		printf("\n Enter value for y:");
		scanf("%d",&y);
		swap(&x,&y);
		printf("\nx=%d",x);
		printf("\ny=%d",y);
		sum=x+y;
		printf("Sum of x+y = %d",sum);
		}
		``
				Correct logic for swapping using pointer 4M
				
				Correct logic for addition & display 2M

	(b)	**Design a programme in C to read the n numbers of values in an array and display it in reverse order.** *(Note: Any other relevant logic shall be considered)*	**6M**	

	Ans.	```c
		#include<stdio.h>
		#include<conio.h>
		#define max 50
		void main()
		{
		``
				Correct logic for input array 3M

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		int a[max],i,n;
		clrscr();
		printf("\n Enter number of elements:");
		scanf("%d",&n);
		printf("\n Enter array element:");
		for(i=0;i<n;i++)
		scanf("%d",&a[i]);
		printf("\n Array elements in reverse order:");
		for(i=n-1;i>=0;i--)
		printf("\t%d",a[i]);
		getch();
		}
			Correct logic to display in reverse 3M

	(c)
	
	Ans.
		Develop a program to find diameter, circumference and area of circle using function.
		(Note: Any other relevant logic shall be considered)
		#include<stdio.h>
		#include<conio.h>
		void circle(float r)
		{
		float diameter,circumference,area;
		diameter=2*r;
		printf("\n Diameter=%f",diameter);
		circumference=2*3.14*r;
		printf("\n Circumference=%f",circumference);
		area=3.14*r*r;
		printf("\n Area=%f",area);
		}
		
		void main()
		{
		float radius;
		clrscr();
		printf("\n Enter radius:");
		scanf("%f",&radius);
		circle(radius);
		getch();
		}
			6M
			
			Correct logic using function to find diameter 2M,circumference 2M, area 2M