Algorithm Development and Programming Fundamentals
MCA SEM-1

Problem Solving - I

[A] Write C code for following programs:

1. Prepare a flowchart to read the marks of a student and classify them into different grades. If the marks secured are greater than or equal to 90, the student is awarded Grade A; if they are greater than or equal to 80 but less than 90, Grade B is awarded; if they are greater than or equal to 65 but less than 80, Grade C is awarded; otherwise Grade D is awarded. Write a C program to demonstrate the function of this program.
2. Write a C program to swap two int numbers without using any temporary variable.
3. Write a C Program to find the ASCII value of a character entered by the user.
4. Write a C Program to Check Whether a Character is a Vowel or Consonant.
5. Write a C Program to Demonstrate the specifiers/ modifiers in C. Print the size of applicable primitive data types with long and short specifiers.[Use sizeof operator]

[B] What would be the output/ error of the following programs:
[Do the following manually and then validate with GCC output]

1	#include <stdio.h>
	void main( ) {
	int i = 65 ;
	char j = 'A' ;
	if (i == j)
	printf ("Hello!!!") ;
	else
	printf("Welcome!!!") ;
	}
		2	#include <stdio.h>
			void main( ) {
			int x = 15 ;
			printf ("\n%d %d %d", x != 15, x = 20, x < 30) ;
			}

	OUTPUT:_____		**OUTPUT:**_____

3	#include <stdio.h>
	void main( ) {
	int i = 4, z = 12 ;
	if (i = 5 || z > 50)
	printf ("\n Hello!!!") ;
	else
	printf ("\nBye !!!") ;
	}
		4	#include <stdio.h>
			void main( ) {
			int i = 4, j = -1, k = 0, w, x, y, z ;
			w = i || j || k ;
			x = i && j && k ;
			y = i || j && k ;
			z = i && j || k ;
			printf ("\nw = %d x = %d y = %d z = %d", w, x, y, z) ;
			}

	OUTPUT:_____		**OUTPUT:**_____

5	#include <stdio.h>
	void main( ) {
	int i = 4, j = -1, k = 0, y, z ;
	y = i + 5 && j + 1 || k + 2 ;
	z = i + 5 || j + 1 && k + 2 ;
	printf ("\ny = %d z = %d", y, z) ;
	}
		6	#include <stdio.h>
			void main( ) {
			int i = -3, j = 3 ;
			if (!i + !j * 1)
			printf ("\nHello!!!") ;
			else
			printf ("\nWelcome!!!") ;
			}

	OUTPUT:_____		**OUTPUT:**_____

7	#include <stdio.h>
	void main( ) {
	int i = -1, j = 1, k ,l ;
	k = i && j ;
	l = i || j ;
	printf ("%d %d", I, j) ;
	}
		8	#include <stdio.h>
			void main( ) {
			int i = -4, j, num ;
			j = (num < 0 ? 0 : num * num) ;
			printf ("\n%d", j) ;
			}

	OUTPUT:_____		**OUTPUT:**_____

9	#include <stdio.h>
	int main(){
	int x, y, z;
	x = 2 + 3 - 4 + 5 - (6 - 7);
	y = 2 * 33 + 4 * (5 - 6);
	z = 2 * 3 * 4 / 15 % 13;
	x = 2 * 3 * 4 / (15 % 13);
	y = 2 * 3 * (4 / 15 % 13);
	z = 2 + 33 % 5 / 4;
	x = 2 + 33 % - 5 /4;
	y = 2 - 33 % - 5 /- 4;
	z =-2*-3/-4%-5;
	x =50 % (5 * (16 % 12 * (17/3)));
	Y=-2*-3%-4 /-5-6+-7;
	z = 8 /4 / 2*2*4*8 %13 % 7 % 3;
	printf("x=%d \t y=%d \t z=%d\n",x,y,z);
	return 0;
	}
		10	#include <stdio.h>
			int main( ) {
			int x = 3,y = 5,z = 7,w;
			w = x % y + y % x - z % x - x % z;
			printf("%d \n", w);
			w = x / z + y / z + (x + y) / z;
			printf("%d\n", w);
			w = x / z * y / z + x * y / z;
			printf("%d\n", w);
			w = x % y % z + z % y % (y % x);
			printf("%d\n", w);
			w = z / y / y / x + z / y / (y / x);
			printf("%d\n", w);
			return 0;
			}

	OUTPUT:_____		**OUTPUT:**_____

11	#include <stdio.h>
	int main(){
	printf("%d\n", - 1 + 2 - 12 * -13 / -4);
	printf("%d\n", - 1 % - 2 + 12 % -13 % - 4);
	printf("%d \n",-4/2 - 12/4 - 13 % -4);
	printf("%d\n", (- 1 + 2 - 12) * (- 13 / - 4));
	printf("%d\n", (- 1 % - 2 + 12) %(- 13 % - 4));
	printf("%d\n", (- 4 /2 - 12) / (4 - 13 % - 4));
	return 0;
	}
		12	#include <stdio.h>
			int main(){
			int x = 3, y = 5, z = 7, w = 9;
			w += x;
			printf("w = %d\n", w);
			w -= y;
			printf("w = %d\n", w);
			x *= z;
			printf("x = %d\n", x);
			w += x + y - (z -= w);
			printf("w = %d, z = %d\n", w, z);
			w += x -= y %= z;
			printf("w = %d, x = %d, y = %d\n", w, x, y);
			w *= x / (y += (z += y));
			printf("w = %d, y = %d, z = %d\n", w, y, z);
			w /= 2 + (w %= (x += y - (z -= -w)));
			printf("w = %d, x = %d, z = %d\n", w, x, z);
			return 0;
			}

	OUTPUT:_____		**OUTPUT:**_____

13	int main()
	{
	int x = 7, y = -7, z = 11,
	w =- 11, S = 9, t = 10;
	x += (y -= (z *= (w /= (s %= t))));
	printf("x = %d, y = %d, z = %d, w = %d,
	s = %d, t = %d\n", x, y, z, w, s, t);
	t += s -= w *= z *= y %= x;
	printf("x = %d, y %d, z = %d, w = %d,
	s = %d, t = %d\n", x, y, z, w, s, t);
	return 0;
	}
		14	#include <stdio.h>
			int main()
			{
			double pi = 3.14159265;
			printf("%15f\n", pi);
			printf("%15.12f\n", pi);
			printf("%-15.12f\n", pi);
			printf("%15.4f\n", pi);
			printf("%15.0f\n", pi);
			printf("%15.3g\n", pi);
			printf("%15g\n", pi);
			printf("%15.4e\n", pi);
			printf("%15e\n", pi);
			return 0;
			}

	OUTPUT:_____		**OUTPUT:**_____