Q.1  
a. Explain the difference between program testing and debugging.

b. Write a program to swap two numbers using pointers.

c. What is an unsigned integer constant? What is the significance of declaring a constant as unsigned?

d. Are the following two statements identical?
   char str[6] = "Kicit";
   char *str = "Kicit";

e. What will be the output of the following code segment, if any?

   myfunc (struct test t) {
       strcpy(t.s, “world”);
   }

   main() {
       struct test { char s[10]; } t;
       strcpy(t.s, “Hello”);
       printf("%s", t.s);
       myfunc(t);
       printf("%s", t.s);
   }

f. Develop your own function to compare two strings of same size.

g. What is the use of randomize( ) and srand( ) function? (7×4)

Q.2  
a. Write a C program to input N numbers (integer or real) and stores them in an array. Conduct a linear search for a given key number and report success or failure in the form of a suitable message. (6)
b. Write a C program to delete duplicates from an array of integers. (8)

c. Write a C program to calculate $X^Y$ using recursion where values of $X$ and $Y$ are entered through keyboard. Don’t use pow() function. (4)

Q.3 a. Write a C program that counts the number of characters and lines in a program. Lines are designated by a new line. Also note that the program guards against a file that ends without a newline for the last line. (9)

b. Write a C program that reads values from keyboard into a two-dimensional array. Create two one-dimensional arrays that contains row and column averages. (9)

Q.4 a. A C program contains the following declaration.
static int x[8] = { 10, 20, 30, 40, 50, 60, 70, 80};
i. What is the meaning of x
ii. What is the meaning of (x + 2)
iii. What is the value of *x
iv. What is the value of (*x + 2)
v. What is the value of *(x + 2)

b. Using multidimensional array, write a program in C to sort a list of names in alphabetical order. (8)

Q.5 a. Write an appropriate declaration for each of the following situations involving pointers.
i. Declare a function that accepts an argument which is a pointer to an integer quantity and returns a pointer to a six-element character array.
ii. Declare a function that accepts an argument which is an integer array and returns a pointer to a character.
iii. Declare a function that accepts an argument which is a pointer to an integer array and returns a pointer to a character.
iv. Declare a pointer to a function that accepts an argument which is a pointer to an integer array and returns a character.
v. Declare a pointer to a function that accepts an argument which is an array of pointers to integer quantities and returns a pointer to a character. (5×2)

b. Write a function that accepts two strings str1 and str2 as arguments and find which of the two is alphabetically greater (without using the library functions). The function should return 1 if str1 is greater than str2, 0 if str1 is equal to str2, and -1 if str1 is smaller than str2. (8)

Q.6 a. Explain the different types of memory allocations in C. (8)

b. Write a complete C program for reading an employee’s file containing {emp_number, name, salary, address}. Create an output file containing the names of those employees along with their salary and address whose salary is > 15,000. (10)
Q. 7  a. Predict the output or error(s) for the following. (Support your answer with proper explanation).

(i) main() {
    int c[] = {2.8, 3.4, 4, 6.7, 5};
    int j, *p = c, *q = c;
    for(j = 0; j < 5; j++) {
        printf("%d ", *c);
        ++q;
    }
    for(j = 0; j < 5; j++) {
        printf("%d ", *p);
        ++p;
    }
}

(ii) main() {
    main();
}

(iii) enum colors {BLACK, BLUE, GREEN}
    main() {
        printf("%d..%d..%d", BLACK, BLUE, GREEN);
        return(1);
    }

(iv) #define square(x) x*x
    main() {
        int i;
        i = 64/square(4);
        printf("%d", i);
    }

b. Write a C function for Sorting and Reversing a linked list.