Important Questions: KCA102 (Problem Solving Using C)

UNIT -I

1. Discuss the various approaches to problem solving.
2. Explain the various phases of SDLC(Software Development Life Cycle) or PDLC(Program Development Life Cycle)
3. What is an Algorithm? Write down the characteristics of a good algorithm.
4. What is a flowchart? Explain the various symbols used in the flow chart.
5. What are the three main principles of Structured Programming?
6. Discuss the salient features of C language.
7. Explain the basic structure of a C Program with a suitable example.
8. Discuss the various stages involved in executing a C program.
9. What is a Token? Discuss the various types of tokens available in C language.
10. What are the rules of naming an Identifier in C?
11. Explain the working of various operators in C language using suitable examples.
12. Discuss the various data types available in C language. Write a program to print the sizes of all the primitive data types in C.
13. Write down the precedence table of operators along with their associativity.
14. Explain the difference between Precedence and Associativity with suitable examples.
15. What is Type casting? Explain the difference between Implicit and Explicit typecasting with suitable example.
16. Explain the working of scanf and printf functions in C. Discuss the various format specifiers used with these functions.

UNIT -II

1. Explain the working of if-else if-else ladder using diagram and suitable example.
2. Write a program to print the grades of students in class using if-else if-else.
3. Write a program to print the electricity bill using if-else if-else.
4. Explain the working of switch-case control statement through an example. Also explain utility of break and default keywords in swith-case.
5. Write a program to check whether a given year is a leap year or not using if-else if-else and ternary operator through switch-case control statement.
6. Write a program to implement a basic arithmetic calculator using switch-case.
7. What are the different kinds of loops available in C language? Explain their working with suitable examples.
8. Explain the working of break and continue keywords in a nested-loop example.
9. Write a program to print prime numbers in a given range.
10. Write a program to print perfect numbers in a given range.
11. Write a program to print Armstrong numbers in a given range.
12. Write a program to reverse a given number.
13. Write a program to print the sum of the digits of a given number.
14. What is a function? Discuss the various components of a function? Explain the following in context of functions: function declaration or function prototype, function definition and function calling.
15. Discuss the various categories of functions with suitable examples.
16. What is recursion? What are the advantage and disadvantage of using recursion?
17. Write programs using Iteration and Recursion through switch-case for the following:
    a. Factorial of given number
    b. GCD of two numbers
    c. x raised to the power y (x^y)
    d. Printing Fibonacci series
    e. Sum of first n natural numbers

18. What is Call-by-value and Call-by-reference? Explain the difference through an example.
19. Write a program to swap the values of two variables using call-by-value and call-by-reference.
20. Can a function return more than one value at a time? Justify your answer with example.

UNIT -III

1. What is an array? Explain the importance of base address in an array with an example.
2. What is a pointer? Explain the difference between * and & operators in context of pointers.
3. What the different arithmetic operations possible with pointers? Write a program to implement it using an array through switch-case.
4. Is array a pointer in C? Justify your answer with an example.
5. Write a program to print the elements of an array using pointers.
6. How do we pass an array to a function? Explain with an example.
7. Write a program to implement Linear or Sequential search in C.
8. Write a program to copy the contents of an array to another.
9. Write a program to find the largest and the smallest element in an array.
10. Explain the meaning of a[i], &a[i], a+i, *(a+i), *a+i, i[a] in context of an array.
11. Explain the concept of Array of Pointers, Function Pointers and Pointer to Pointer with suitable example.
12. How a multidimensional array is declared, initialized and accessed.
13. Write a program to implement an array of variable size.
14. Write programs for the following:
    a. Transpose of a Matrix
    b. Addition and Subtraction of two matrices
    c. Multiplication of two matrices of different orders
    d. Sum of the elements on the Principal diagonal(Top Left to Right Bottom) of a Square matrix
15. What is a String in C? How do we declare, initialize and access elements of a String in C?
16. Explain the working of the following string manipulation functions in C: strlen(), strcpy(), strcat(), strcmp(), strrev().
17. Write a program to implement the working of the above string functions.
18. How a string is passed to a function. Explain with an example.
19. Write your own implementation of the following library functions : strlen(), strcpy(), strcat(), strcmp(), strrev()
20. Illustrate how array of Strings is represented in C.
21. Explain the concept of Array of String Pointers with suitable example. What is its advantage and what is its limitation?

UNIT -IV

1. What is a structure in C? How is it different from an array? Write a program to declare, initialize and access a structure in C.
2. Explain array of structures with an example.
3. Explain with an example how structures can be nested
4. How can we pass a structure to a function? Give example.
5. What is a structure pointer? Explain the difference between .(dot) and ->(arrow) operator with an example.
6. Explain the difference between Structure and Union.
7. Write a short note on enumerated data type in C.
8. What is advantage of using Storage classes? Discuss the various storage classes in C with proper examples.

UNIT -V

1. What is Static and Dynamic memory allocation? Explain with the help of an example the working of various Dynamic memory allocation functions available in C.

2. What is a File? Explain the concept of streams in C.
3. Discuss the various file opening modes in C.
4. Explain the following file handling functions with suitable examples: fopen(), fclose(), fgetc(), fputc(), fgets(), fputs(), feof(), fscanf(), fprintf(), fread(), fwrite().
5. What is Random access to a file? Discuss the random access file handling functions with examples: fseek(), ftell() and rewind().
6. What are command line arguments? Explain with an example the process of running a program using command line arguments.
7. Write a program to find the sum of two numbers passed as command line arguments.(Use the function atoi() to convert string to int)
8. Write a program to display the contents of a file on the screen using command line arguments.
9. Write a file-copy program using command line arguments.
10. Write a graphics program in c to display a red circle inside a blue square.
11. Discuss some graphics library functions for drawing and filling.
12. How GUI interaction is done in a graphics program?