GUJARAT TECHNOLOGICAL UNIVERSITY

BE-1 SEMESTER – OLD PAPER– S22 TO W24 - QUESTION BANK

Subject Name & Code:

Programming for Problem Solving- 3110003

Unit 1: Introduction to Computers & Programming

Repeated Questions:

1. **Computer Block Diagram & Components:**
   - **Q.1 (a) - SUM 23 (03 Marks):** Design block diagram of computer and explain functionalities of various components.
   - **Q.1 (c) - WIN 23 (07 Marks):** Briefly explain different components of Computer system.
   - **Q.1 (a) - SUM 24 (03 Marks):** Draw neat Block Diagram illustrating the Anatomy of a Computer System.
   - **Q.3 (c) OR - SUM 22 (07 Marks):** Draw block diagram of computer system and explain the functions of each component.
2. **Algorithms & Flowcharts:**
   - **Q.1 (b) - WIN 23 (03 Marks):** Write an algorithm to check whether the entered number is Even or Odd.
   - **Q.1 (b) - SUM 24 (04 Marks):** Illustrate an Algorithm to check whether the given year is a leap year.
   - **Q.1 (b) - WIN 24 (07 Marks):** Write an algorithm and draw the flowchart to calculate the sum of digits of a number.
   - **Q.1 (b) - WIN 22 (04 Marks):** Describe various symbols used for preparing a flowchart.
   - **Q.1 (c) - SUM 24 (07 Marks):** Define Flowchart, list rules for designing, and state merits/demerits.

Other Important Questions:

- **Q.1 (a) - SUM 23 (Marks NA):** Write an algorithm to find the maximum of three given numbers.
- **Q.1 (b) - WIN 23 (04 Marks):** Draw a flowchart to find the factorial of a number.
- **Q.1 (a) - WIN 24 (03 Marks):** What is Software? List various types of Software.
- **Q.1 (b) - WIN 24 (04 Marks):** Define: Compiler, Runtime Error, Dynamic Memory Allocation, Recursion.
- **Q.1 (a)1 - SUM 22 (03 Marks):** Define: Compiler.
- **Q.1 (a)7 - SUM 22 (07 Marks):** Define Interpreter.
- **Q.1 (b)1 - SUM 22 (07 Marks):** Define Algorithm.

Unit 2: Fundamentals of C

Repeated Questions:

1. **Structure of a C Program:**
    - **Q.2 (b) - SUM 24 (04 Marks):** Illustrate the basic structure of a C Program and highlight usual sections of main function.
    - **Q.2 (a) - WIN 24 (03 Marks):** Explain the basic structure of a C program with an example.
2. **Tokens & Data Types:**
    - **Q.2 (c) - WIN 23 (07 Marks):** Explain C tokens in detail.
    - **Q.1 (c) - WIN 22 (07 Marks):** List and explain different data types available in C.
3. **Operators & Expressions:**
    - **Q.2 (a) - WIN 23 (03 Marks):** Give the output of C code involving relational, logical, and modulus operators.
    - **Q.2 (b) - WIN 24 (04 Marks):** Evaluate given C programming expressions (arithmetic, logical, etc.).
    - **Q.2 (a) - SUM 22 (03 Marks):** Write outputs of expressions involving %, /, (int), ||, &&.

Other Important Questions:

- **Q.2 (a) - SUM 24 (03 Marks):** List the rules to assign a name to an Identifier (Variable).
- **Q.1 (a)2 - SUM 22 (03 Marks):** Justify, 2 and '2' are not the same in C.
- **Q.1 (a)3 - SUM 22 (03 Marks):** What is the role of the sizeof operator?
- **Q.1 (b)2 - SUM 22 (04 Marks):** What do you mean by an enumerated data type?
- **Q.1 (b)3 - SUM 22 (04 Marks):** Difference between char *p and char p[].
- **Q.1 (b)4 - SUM 22 (04 Marks):** What do you mean by a function prototype?
- **Q.3 (a) - WIN 23 (03 Marks):** Demonstrate the use of the ternary operator with an example.
- **Q.3 (a) - SUM 22 (03 Marks):** Explain the ternary (?:) operator in detail with an example.

Unit 3: Control Structures in C

Repeated Questions:

1. **Loop Patterns:**
    - **Q.4 (b) - SUM 23 (04 Marks):** Write a program to print a pattern (e.g., *, numbers).
    - **Q.2 (c) OR - WIN 22 (07 Marks):** Write a program to print a number pattern.
    - **Q.3 (c) - WIN 23 (07 Marks):** Write a program to print a descending number pattern.
    - **Q.3 (c) OR - SUM 24 (07 Marks):** Write a program to print a consecutive number pattern.
    - **Q.2 (c) - WIN 24 (07 Marks):** Write a program to print a character pattern (A, B C, D E F...).
2. **Loop Types (while vs. do-while):**
    - **Q.2 (b) - WIN 22 (04 Marks):** Differentiate while and do..while loop.
    - **Q.3 (a) - WIN 24 (03 Marks):** Differentiate while loop and do..while loop with example.
    - **Q.4 (b) OR - SUM 22 (04 Marks):** Explain while loop and do-while loop with example.
3. `break` **and** `continue`**:**
    - **Q.3 (a) OR - WIN 23 (03 Marks):** Differentiate between `break` and `continue`.
    - **Q.3 (b) - SUM 22 (04 Marks):** Discuss the need for `break` and `continue` statements with an example.
    - **Q.3 (b) - WIN 22 (04 Marks):** Examine code and give output involving `continue`.

Other Important Questions:

- **Q.2 (a) - SUM 23 (03 Marks):** Differentiate: Exit controlled Loop and Entry controlled Loop.
    - **Q.3 (a) - SUM 24 (03 Marks):** Contrast the Entry Control loop and Exit Control loop.
- **Q.3 (b) - WIN 23 (04 Marks):** Give output of while and do-while code snippets.
- **Q.3 (a) - WIN 22 (03 Marks):** Find error in code using break outside loop.
- **Q.3 (a) OR - WIN 22 (03 Marks):** Find error in code using % on floats.
- **Q.3 (b) OR - WIN 22 (04 Marks):** Examine for loop code and give output.
- **Q.3 (a) - SUM 24 OR (03 Marks):** Debug a for loop code snippet.
- **Q.3 (b) - SUM 24 OR (04 Marks):** Explain nested if-else statement with a suitable example.
- **Q.4 (b) OR - SUM 22 (04 Marks):** Compare and contrast goto and switch statements.
- **Q.3 (c) - WIN 24 (07 Marks):** Write a program for student grade calculation based on percentage using control structures.
- **Q.2 (c) OR - WIN 24 (07 Marks):** Write a program to find roots of a quadratic equation.

Unit 4: Arrays & Strings

Repeated Questions:

1. **1D & 2D Array Operations:**
    - **Q.5 (c) - WIN 23 (07 Marks):** Write a C program to find the maximum and minimum from an array of 10 elements.
    - **Q.4 (c) - WIN 22 (07 Marks):** Write a C program to make the sum of array elements.
    - **Q.4 (c) OR - WIN 22 (07 Marks):** Write a C program to sort an array in ascending order.
    - **Q.4 (c) - SUM 24 (07 Marks):** Construct a C program to multiply two 3X3 matrices.
    - **Q.4 (c) OR - WIN 24 (07 Marks):** Write a C program which takes two NxN matrices and performs matrix multiplication.
2. **String Operations & Functions:**
    - **Q.4 (c) - SUM 23 (07 Marks):** Write a C program to copy one string to another without using string handling functions.
    - **Q.5 (a) - SUM 23 (03 Marks):** Explain string handling functions: strcat(), strcmp(), strlen().
    - **Q.4 (b) - WIN 24 (04 Marks):** Explain the significance of strcat(), strlen(), strcpy(), strcmp().
    - **Q.5 (c) OR - WIN 22 (07 Marks):** Explain any four string handling functions with an example.

Other Important Questions:

- **Q.4 (a) - SUM 24 (03 Marks):** List the types of Array.
- **Q.4 (b) - SUM 24 (04 Marks):** Summarize the methods for initialization of a One-Dimensional array.
- **Q.4 (a) - WIN 24 (03 Marks):** What is a string? How to declare a string in C?
- **Q.4 (c) - WIN 24 (07 Marks):** Write a C program that reads a statement and prints the frequency of each distinct character (a-z).
- **Q.2 (c) OR - SUM 22 (07 Marks):** List out and describe various string functions with syntax and example.
- **Q.4 (a) - SUM 24 OR (03 Marks):** List the application of gets, getchar, and puts functions.
- **Q.4 (b) - SUM 24 OR (04 Marks):** Summarize the method for Declaration, initialization, and Printing on screen of a String.

Unit 5: Functions

Repeated Questions:

1. **Call by Value vs. Call by Reference:**
    - **Q.4 (a) - WIN 23 (03 Marks):** Differentiate between call by value and call by reference.
    - **Q.3 (a) OR - SUM 23 (03 Marks):** What is a function? Differentiate: Call by value and Call by reference.
    - **Q.3 (a) - WIN 24 (03 Marks):** How do Call by value and Call by reference pass arguments in a function?
    - **Q.5 (a) OR - SUM 22 (03 Marks):** Differentiate call by value and call by reference.
2. **Recursion:**
    - **Q.2 (c) - SUM 23 (07 Marks):** Write a C program to find the factorial of a number using recursion.
    - **Q.4 (b) - WIN 23 (04 Marks):** Demonstrate the use of recursion with an example.
    - **Q.3 (c) OR - WIN 24 (07 Marks):** Write a program in C to calculate the power of any number using recursion.
    - **Q.4 (c) OR - SUM 22 (07 Marks):** Write a recursive program to find the factorial of a given number.

Other Important Questions:

- **Q.4 (c) - WIN 23 (07 Marks):** Write a C program to find the sum of digits using a User Defined Function (UDF).
- **Q.3 (c) - SUM 23 (07 Marks):** Write a function to return 1 if a number is prime, otherwise return 0.
- **Q.1 (b)4 - SUM 22 (04 Marks):** What do you mean by a function prototype?
- **Q.3 (b) - WIN 24 (04 Marks):** What are the steps in writing a recursive function?
- **Q.5 (b) - SUM 24 (04 Marks):** List the categories of User Defined Functions and discuss any one.
- **Q.5 (c) - SUM 24 (07 Marks):** Write a C program that uses a UDF to return the square and cube of an integer.
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Unit 6: Recursion

Repeated Questions:

(This unit is deeply integrated with Unit 5: Functions in the papers. All recursion questions from Unit 5 are also relevant here.)

Other Important Questions:

- **Q.1 (b)4 - WIN 24 (04 Marks):** Define: Recursion.
- **Q.1 (b)6 - SUM 22 (07 Marks):** What do you mean by recursion?

Unit 7: Pointers

Repeated Questions:

1. **Pointer Basics & Advantages:**
    - **Q.5 (a) - SUM 23 (03 Marks):** What is a Pointer in C and how is it initialized? State its advantages.
    - **Q.5 (a) - WIN 24 (03 Marks):** What is a pointer? What are the advantages of using a pointer?
    - **Q.1 (b)5 - SUM 22 (07 Marks):** What is a pointer?

Other Important Questions:

- **Q.4 (a) - WIN 23 (03 Marks):** Give output of code involving pointers (int val=20, *p; p=&val;).
- **Q.5 (a)1,2,3 - SUM 24 OR (03 Marks):** True/False questions on pointer basics.
- **Q.5 (a) OR - SUM 24 (03 Marks):** What are the arithmetic operators permitted on pointers?
- **Q.5 (c) - WIN 24 (07 Marks):** Write a C program to find the sum and mean of all elements in an array using a pointer.
- **Q.3 (a) OR - SUM 22 (03 Marks):** What is meant by an array of pointers? Explain with an example.

Unit 8: Structures

Repeated Questions:

1. **Structure vs. Union:**
    - **Q.5 (a) - WIN 23 (03 Marks):** Differentiate between structure and union.
    - **Q.5 (b) - SUM 23 (04 Marks):** What is a structure? How is it different from a union? Explain nested structure with an example.
    - **Q.5 (b) - WIN 22 (04 Marks):** Compare structure and union.
    - **Q.4 (a) - WIN 24 (03 Marks):** Compare Array, Structure, and Union.
2. **Defining and Using Structures:**
    - **Q.4 (c) OR - SUM 23 (07 Marks):** Define a structure personal containing person name, DOJ, salary. Read and print for 5 people.
    - **Q.4 (c) OR - SUM 24 (07 Marks):** Define a Structure for a Cricketer (Name, Team, Runs, Average).
    - **Q.5 (b) OR - SUM 22 (04 Marks):** Explain structure within structure with an example.

Other Important Questions:

- **Q.4 (b) - WIN 24 (04 Marks):** Define Union. Describe how to declare, initialize, and access members with an example.
- **Q.5 (a) OR - SUM 22 (03 Marks):** Define Union in ‘C’ with an example.

Unit 9: Dynamic Memory Allocation (DMA)

Repeated Questions:

1. **DMA Functions (**malloc**,** calloc**,** free**,** realloc**):**
    - **Q.5 (a) - SUM 23 (03 Marks):** What is DMA? Show the use of malloc() and calloc().
    - **Q.5 (b) - WIN 24 (04 Marks):** Explain the need for DMA. Compare malloc(), calloc(), and realloc().
    - **Q.5 (b) OR - SUM 24 (04 Marks):** Show the use of Malloc, Calloc, Free, and Realloc.
    - **Q.5 (b) OR - SUM 22 (04 Marks):** Define DMA. Explain malloc() and calloc().
    - **Q.5 (a) OR - WIN 22 (03 Marks):** List down and briefly explain methods for DMA.

Other Important Questions:

- **Q.1 (b)3 - WIN 24 (04 Marks):** Define: Dynamic Memory Allocation.

Unit 10: File Management

Repeated Questions:

1. **File Handling Functions:**
    - **Q.5 (b) - WIN 23 (04 Marks):** Briefly explain any two file handling functions with an example.
    - **Q.5 (b) OR - WIN 24 (04 Marks):** Explain the significance of fseek(), ftell(), open(), fread().
    - **Q.5 (c) OR - SUM 22 (07 Marks):** Explain File Handling functions: fseek(), ftell(), fread(), fwrite(), fscanf(), fprintf(), rewind().
    - **Q.5 (c) OR - SUM 24 (07 Marks):** List and discuss file handling functions used in C.
2. **Programs to Operate on Files:**
    - **Q.5 (c) - WIN 23 (07 Marks):** Write a C program to copy one file to another.
    - **Q.5 (c) OR - WIN 22 (04 Marks):** Write a C program to copy content of one file to another.
    - **Q.5 (c) OR - WIN 24 (07 Marks):** Write a C program to read ID and marks of n students and store them in a file.

Other Important Questions:

- **Q.5 (a) - WIN 24 OR (03 Marks):** What is a File Pointer? What is its significance?
- **Q.4 (a) - WIN 22 (03 Marks):** Give the significance of getc(), getw(), fscanf().
- **Q.1 (b)5 - SUM 22 (07 Marks):** What is the role of getc() and getw() file functions?
- **Q.5 (c) OR - SUM 22 (07 Marks):** Explain error handling in the file system with an example.
- **Q.4 (a) - SUM 23 (03 Marks):** Explain: break statement, getch() function, getchar() function.
- **Q.4 (a) - WIN 23 (03 Marks):** Give the significance of puts(), getchar(), getch().