C Programming – Sessional Exam (Solved Paper)

Baba Mastnath University
Faculty of Engineering & Technology
Mechanical Engineering Department

Subject: C Programming
Max. Marks: 75
Time: 3 Hours

Part-A (15 × 1 = 15 marks)

Answer all questions briefly.

Q.1(a) Type casting is the conversion of one data type into another. Example: float x = (float)10/3;

Q.1(b) Relational operators are used to compare values: >, <, >=, <=, ==, !=

Q.1(c) For loop syntax: for(init; condition; inc/dec) {}
While loop: while(condition) {}
Do-while: do {} while(condition);

Q.1(d) While checks condition before loop; Do-while checks after execution, so it runs at least once.

Q.1(e) Pseudocode is an informal high-level description of a program using plain language.

Q.1(f) Flowchart notations: Start/End (oval), Process (rectangle), Decision (diamond), Arrows (flow lines).

Q.1(g) int a[5] = {1,2,3,4,5};
int b[2][2] = {{1,2},{3,4}};

Q.1(h) Recursion is when a function calls itself to solve smaller sub-problems.

Q.1(i) #include adds header files, #define defines constants/macros.

Q.1(j) Syntax: return_type function_name(parameters) { //code }

Q.1(k) Pointer array is an array storing addresses. Example: int *arr[3];

Q.1(l) Array of strings: char names[3][10] = {"Ram", "Shyam", "Hari"};

Q.1(m) puts() outputs a string, gets() reads a string (unsafe, replaced by fgets).

Q.1(n) Use strcmp(str1, str2) to compare strings. Returns 0 if equal.

Q.1(o) Data types: int, float, double, char, etc. Used to declare variable types.

Part-B (5 × 5 = 25 marks)

Attempt any five questions. Each question carries 5 marks.

Q.2. Structure of C Program: Header files, main() function, variable declarations, statements.
Program (swap without temp):

```
int a=5, b=10;
a = a + b;
b = a - b;
a = a - b;
```

Q.3. Algorithm: Step-by-step process to solve a problem.
Pseudocode: Informal code representation.
Example: Factorial Algorithm using loop.

Q.4. Branching statements: if, if-else, switch.
Program: Use for loop and if to print primes between 1 and n.

Q.5. Array: Collection of similar elements.

```
int arr[5] = {1,2,3,4,5};
```

Sort program: Use two nested loops to compare and swap elements.

Q.6. Pointers store address of variables.
Program:

```
int a = 10;
int *p = &a;
printf("%u", p);
```

Q.7. Structure: Group of variables.
Syntax:

```
struct student {int id; char name[20];};
```

Copy with assignment; Compare using strcmp for strings.

Part-C (15 × 2 = 30 marks)

Attempt any two questions. Each question carries 15 marks.

Q.8. Computer Diagram: Show CPU, Memory, Input/Output.
Functional Units:
1. Input (keyboard, mouse)
2. CPU (CU, ALU, registers)
3. Memory (RAM, ROM)
4. Output (monitor, printer)

Q.9. Algorithm – Exact steps.
Pseudocode – Near-code steps.
Flowchart – Diagram.

Prime check flowchart: Start → Input n → Check divisibility → If divisible, not prime → Else prime → End

Q.10. Function types: Built-in (printf), User-defined.
Syntax:
int sum(int a, int b) { return a+b; }
Call by value: Copies passed.
Call by reference: Uses pointers.

Q.11. Pointer stores address.
char *str[5];
C program: Use gets/scanf to read strings into array, then sort using strcmp.
Initialization:
char str[3][10] = {"Banana", "Apple", "Cherry"};