I.P. College Campus-2, Bulandshahr
Department of Computer Science
Programming Principle and Algorithm (BCA -102)

Section- A (Multiple Choice Questions)

1. The #include <stdio.h> is a _____.
A.)Inclusion directive B)File inclusion directive C) Preprocessor directive D)None of the above

2. Which of these is not a relational or logical operator?
A.)= B) || C) == D) ! =

3. To clear the output screen which function is used in C?
A) clrsrc() B) clrscr() C) crlscr() D) crlscr()

4. What does a do while loop do?
A) Repeat the process infinitely B)Process the code at least once and then repeats C) Repeat only once D) All of the above

5. What float variable holds
A.)Integer value B)Unknown value C) Decimal value D) All of the above

6. In C program '\t' is used for?
A) back space B) new line C) horizontal tab D) vertical tab

7. Range of unsigned char is?
A) 0 to 255 B) 0 to 256 C) -128 to 127 D) -127 to 128

8. Which statement is used to terminate the program?
A) break B) continue C) exit D) goto

9. A 'C' program converted into machine language with the help of
A) An editor B) Operating system C) A compiler D) linker

10. What is function?
A) Looping code B) code that operate when function called C) Unknown variable D) None of the above

11. Standard input and output functions prototype are defined in which header file?
A) string.h B) dos.h C) stdio.h D) math.h

12. What is the syntax of multi-line comments in C?
A) // B) /*...*/ C) */.../* D)\\ 13. C language was develop by?

A) Dennis Rechard B) Dennis M.Ritchie C) Bjarne Stroustrup D) Anders Hejlsberg

14. How many keywords are there in C?
A) 32 B) 33 C) 44 D) 18

15. How many bytes does a char type take?
A) 1 B) 2 C) 3 D) None of above

16. Which is the correct format specifier for double
data type value in c ?
A) %d B) %f C) %lf D) %c

17. Can we execute a program without main() function?
A) yes B) no C) depends on compiler. D)none of these

18. What is sizeof() in C?

A) Operator B) Function C) Macro D) None of these

19. What is the correct Syntax to declare the variable in c?
A) data type variable_name; B) data_type as variable_name C) variable_name data type D) variable_name as data_type;

20. C language invented by Charles Babbage (T/F)

21. The gets () is an unformatted console I/O function. (T/F)

22.The types of actual and formal arguments must be same.(T/F)

23. The loop for (a=1;a<20;a++) will be executed for 20 times.(T/F)

24. A preprocessor directive must end with a semicolon. (T/F)

25. The if statement can have multiple else statements (T/F)

26. The operator "++" is known as increment operator (T/F)

27. do-whileis an exit –controlled loop.(T/F)

28. Spaces and commas are allowed in variable name.(T/F)

29. The maximum value that an integer constant can have varies from one compiler to another.(T/F)

30. A real constant in C can be expressed in both Fractional and Exponential forms.(T/F)

Section – B (Short Answer Questions)

1. What is function? Also explain the types of function.

2. What do you understand by problem solving techniques? Explain Trail &error technique with example.

3. What is flowchart? Explain with suitable example and symbols.

4. Write a program to find the maximum of three number.

5. Explain the working of 'Nested if – else' with suitable example.

6. Explain difference between do-while and while loop with suitable example.

Section – C (Long Answer Questions)

1. Define operators? Explain various types of operators available in C.

2. a) Write a program to find sum of digits of a given number.
   b) Write a program in C to calculate area of circle.

3. Explain the difference between any two :
   a) Call by value and Call by reference
   b) Break and Continue
   c) Pre-increment and post-increment operator

4. Explain the following:
   a) Keywords and identifiers b) Translators c) Swapping

5. a) Write a C Program to find whether given number is positive or negative.

b) Write a c program to find the factorial of a number

6. a) What is algorithm? Explain the characteristics of a algorithm
b) Write an algorithm to find whether the number is palindrome or not.

Answers Key By Bhavy Sharma

Section A:

1. **C) Preprocessor directive**
2. **A) =**
3. **C) clrscr()**
4. **B) Process the code at least once and then repeats**
5. **C) Decimal value**
6. **C) horizontal tab**
7. **A) 0 to 255**
8. **C) exit**
9. **C) A compiler**
10. **B) code that operates when function called**
11. **C) stdio.h**
12. **B) /*...*/**
13. **B) Dennis M.Ritchie**
14. **B) 32**
15. **A) 1**
16. **C) %lf**
17. **B) no**
18. **C) Macro**
19. **A) data type variable_name;**
20. **F**
21. **T**
22. **F**
23. **F** (It will be executed 19 times)
24. **F**
25. **T**
26. **T**
27. **T** (It is an exit-controlled loop)
28. **F** (Spaces are not allowed)
29. **T**
30. **T**

Section B:

1. A function is a block of code that performs a specific task. It can take arguments as input and can return a value. There are two types of functions: built-in and user-defined.
2. Problem-solving techniques are strategies used to find solutions to problems. Trail and error is a technique where different solutions are tried until a successful one is found. For example, you could use this technique to solve a puzzle by trying different combinations of pieces until you find the one that fits.

3. A flowchart is a graphical representation of a process or algorithm. It uses symbols to represent different steps in the process and arrows to show the flow of control. Flowcharts can be used to document a process, analyze it, and identify potential problems.
4. Here is a program to find the maximum of three numbers:

```c
#include <stdio.h>

int main() {
  int num1, num2, num3, max;

  printf("Enter three numbers: ");
  scanf("%d %d %d", &num1, &num2, &num3);

  if (num1 > num2) {
    max = num1;
  } else {
    max = num2;
  }

  if (num3 > max) {
    max = num3;
  }

  printf("The maximum number is: %d\n", max);

  return 0;
}
```

5. Nested if-else statements allow you to have multiple branches of code that can be executed depending on the condition. For example, you could have an if statement that checks if a number is even or odd, and then have nested if-else statements inside each branch to check if the number is positive or negative.

6. The main difference between do-while and while loops in C lies in their execution order:

While loop:

- Checks the condition first.
- If the condition is true, the loop body is executed.
- If the condition is false, the loop terminates.

Example :-

```
int i = 0;

while (i < 5) {

  printf("Number: %d\n", i);

  i++;
```

}

This code will print the numbers 0 to 4, inclusive, because the condition `i < 5` is true until `i` reaches 5.

Do-while loop:

- Executes the loop body at least once, regardless of the condition.
- After the execution, the condition is checked.
- If the condition is true, the loop continues.
- If the condition is false, the loop terminates.

Example:-

```
int i = 5;

do {

  printf("Number: %d\n", i);

  i++;

} while (i < 5);
```

This code will only print the number 5, even though the condition `i < 5` is false. This is because the loop body is executed once before the condition is checked.

Section C:

1. An operator is a symbol that tells the compiler to perform an operation on one or more operands. There are five types of operators in C: arithmetic, relational, logical, assignment, and bitwise.

a) **Arithmetic operators:** +, -, *, /, %, ++, -- b) **Relational operators:** >, <, >=, <=, ==, != c) **Logical operators:** &&, ||, ! d) **Assignment operators:** =, +=, -=, *=, /=, %=, >>=, <<=, &=, ^=, |= e) **Bitwise operators:** &, |, ^, ~, <<, >>

2. a) Here is a program to find the sum of digits of a given number:

```c
#include <stdio.h>

int main() {
  int num, sum = 0;
```

```
  printf("Enter a number: ");
  scanf("%d", &num);

  while (num > 0) {
    sum += num % 10;
    num /= 10;
  }

  printf("The sum of digits is: %d\n", sum);

  return 0;
}
```

b) Area of circle:

```
#include <stdio.h>

#define PI 3.14159

int main() {
  float radius, area;

  printf("Enter radius of circle: ");
  scanf("%f", &radius);

  area = PI * radius * radius;

  printf("Area of circle: %.2f", area);

  return 0;
}
```

3. Differences:

a) **Call by value:** A copy of the argument is passed to the function. Changes made inside the function do not affect the original argument.

b) **Call by reference:** The address of the argument is passed to the function. Changes made inside the function affect the original argument.

c) **Break:** Terminates the current loop and transfers control to the statement following the loop.

d) **Continue:** Skips the remaining statements in the current iteration and starts the next iteration of the loop.

e) **Pre-increment:** Increments the value of the operand and then evaluates the expression.

f) **Post-increment:** Evaluates the expression and then increments the value of the operand.

4. Explanations:

a) **Keywords:** Reserved words with predefined meanings in C language (e.g., int, for, while).

b) **Identifiers:** User-defined names for variables, functions, etc. (e.g., sum, main).

c) **Translators:** Programs that convert code written in one language to another (e.g., C compiler).

d) **Swapping:** Exchanging the values of two variables.

5a. Positive or negative:

```
#include
 <stdio.h>


int
 main()
 {
  int num;

  printf("Enter a number: ");
  scanf("%d", &num);

  if (num > 0) {
    printf("The number is positive.\n");
  } else
 if (num < 0) {
    printf("The number is negative.\n");
  } else {
    printf("The number is zero.\n");
  }

  return 0;
}
```

5b. Factorial of a number:

```
#include
 <stdio.h>


int
 main()
 {
  int num, fact = 1;
```

```
  printf("Enter a number: ");
  scanf("%d", &num);

  for (int i = 1; i <= num; ++i) {
    fact *= i;
  }

  printf("The factorial of %d is %d\n", num, fact);

  return 0;
}
```

6a. Algorithm:

- An algorithm is a step-by-step procedure for solving a problem or accomplishing a task.
- Characteristics of an algorithm:
  - Finite: Must have a finite number of steps.
  - Unambiguous: Each step must be clear and have only one interpretation.
  - Effective: Each step must be feasible and doable.
  - Input-Output: Must specify inputs and desired outputs.

6b. Palindrome algorithm:

1. Initialize two variables, start and end, pointing to the beginning and end of the string, respectively.
2. While start is less than or equal to end:
   - Compare the characters at start and end.
   - If they are not equal, the number is not a palindrome. Break the loop.
   - Otherwise, increment start and decrement end.
3. If the loop completes without breaking, the number is a palindrome.

This is just a brief overview of the solutions. Feel free to ask for further details or clarifications on any of the points.