STANDARD 10

COMPUTER SCIENCE

UNIT 01

CHAPTER 02

INTRODUCTION TO C LANGUAGE

1. What is C language?
A: C is a structured, high-level, machine independent programming language.

2. Who created the C language?
A: C language is created by Dennis Ritchie at Bell Laboratories during the 1970s.

3. What are the uses of C language?
A: C language is used to write programs for numerical, commercial and graphical applications.

4. What do you mean by the term "character set"?
A: All the characters available in C that can be used to form words, numbers and expressions form the character set in C.

5. What are the different categories of characters used in C?
A: The different categories of characters used in C are
(a) Letters e.g., a, A, etc.
(b) Digits e.g., 0, 1, etc.
(c) Special characters e.g., :, ;, etc.
(d) White spaces e.g., blank space, new line, etc.

6. What are C tokens?
A: The smallest individual units in a C program are called tokens.

7. What are the different types of tokens in C?
A: There are six types of tokens. They are
(a) keywords (float, while, etc.)
(b) identifiers (main, amount, etc.)
(c) constants (-15.5,100, etc.)
(d) strings ("ABC", "year", etc.)
(e) special symbols ({}, ;, etc.)
(f) operators (+, *, etc.)

8. What is a keyword in C?
A: A keyword is a predefined word which is used to perform a function. A keyword cannot be used as an identifier. E.g., auto, break, etc.

9. How many keywords are supported by C Language?
A: 32 keywords are supported in C language.

10. What is an identifier?
A: Identifiers refer to the names of variables, functions and arrays. E.g., num, sum, etc.

11. Write the rules for naming an identifier.
A: The rules for naming an identifier are
(a) First character must be an alphabet.
(b) Must consist of only letters, digits or underscore.
(c) Only first 31 characters are significant.
(d) Cannot use a keyword.
(e) Must not contain white space.

12. What are constants?
A: Constants in C refer to fixed values that do not change during the execution of a program.

13. What is a variable? How are the variables declared in C?
A: A variable is an identifier or a name which is used to refer to a value and this value varies or changes during the program execution.
Syntax: data type variable;
E.g., int num;, float n;, etc.

14. Define the scope and lifetime of a variable.

A: Scope of a variable is the part of the program within which the value can be used and lifetime of a variable is the time through which the value of the variable is legal.

15. Differentiate between global variables and local variables?

A:

Global Variables	Local Variables
1. Global variables are those variables which are declared outside of all the functions or blocks.	1. Local variables are those variables which are declared within or inside function block.
2. They are recognised within the entire program.	2. They are recognised only in the block where it is declared.

16. What are data types?

A: Data types in C refer to a system that specifies the type of data that a variable can store such as integer, floating, character, etc.

17. What are the three main classes of data types in C?

A: The three classes of data types are
(a) Primary data types
(b) Derived data types
(c) User-defined data types.

18. Explain the different basic data types in C.

A: The different basic data types in C are
(a) char: It refers to character. It can hold one letter/symbol.
(b) int: It refers to integer. It can hold a signed or unsigned whole number within the specified range.
(c) float: It refers to floating point or real number. It can hold a real number with six decimal digits in decimal or exponential form.
(d) double: It also refers to floating point real number. It can hold a real number in double precision.

19. Write the value range and bytes occupied in RAM for the basic data types.

A:

Data type	Bytes occupied in RAM
char	1 byte
Int	2 bytes
float	4 bytes
double	8 bytes

20. What is an expression? What are the oper-ators in C?

A: An expression consists of variables and constants separated by operators.
The operators in C are
(a) Arithmetic operators: /, *, %, +, -
(b) Relational operators: >, <, >=, <=, ==, !=
(c) Logical operators: && (AND), || (OR), ! (NOT)
(d) Assignment operators: =, (+=, -=, *=, /=, %=)
(e) Increment/decrement operators (unary operators): ++, --
(f) Ternary/Conditional operators: (? :)
(g) Bitwise operators: |, ^, <<, >>
(h) Special operators: sizeof operator, & (address of) operator, * (indirection) operator

21. What are arithmetic operators?

A: The operators that are used to perform arithmetic operations are called arithmetic operators. E.g., +, -, *, /, %, etc.

22. What are relational operators?

A: The operators that are used to compare the values of operands (expressions) to produce a logical value are called relational operators. E.g., <, >, >=, <=, == and !=.

23. What are logical operators?

A: The operators that are used to connect more relational operations to form

complex expression are called logical operators. E.g., &&, || and !.

24. Define bitwise operator. Explain the functions of the different bitwise operators.

A: A bitwise operator is an operator which performs operations on individual bits of binary numbers.

Operator	Meaning
<<	shifts the bits to left
>>	shifts the bits to right
~	bitwise inversion
&	bitwise logical and
|	bitwise logical or
^	Bitwise exclusive or

25. Discuss increment and decrement operators available in C and the rules associated with them.

A: Increment operator (++) is used to increase the value of an integer or char variable by 1. Decrement operator (--) is used to reduce the value of an integer or char variable by 1.
Some rules associated with increment and decrement operators are
(a) Prefix increment (++n) and decrement (--n) operators are applied before the variable is used in an expression.
(b) Postfix increment (n++) and decrement (n--) operators are applied after the variable is used in an expression.

26. Define unary and binary operators.

A: Unary operator:
The operator used in an expression having only one operand is called Unary operator. E.g. -a, -b, a++, - - b etc.
Binary operator:
The operator used in an expression having two operands is called Binary operator. E.g., a + b, b – c etc.

27. Give and explain the general format of Ternary operator.

A: The general format of ternary operator (?:) is:
conditional expression ? expression_1 : expression_2
If the 'conditional expression' returns true, it performs the 'expression_1' otherwise it performs 'expression_2'.

28. Construct logical expression to represent the following conditions:
(a) weight is greater than or equal to 50 but less than 70
(b) n is even and a multiple of 7
(c) x is negative value greater than y
(d) ch is a lowercase letter.
(e) n is exactly divisible by m
(f) x is a vowel
(g) k is a letter(alphabet)

A: (a) (weight >= 50 && weight < 70)
(b) (n%2==0 && n%7==0)
(c) (x < 0 && x > y)
(d) (ch >= 'a' && ch <= 'z') or (ch >= 97 && ch <= 122)
(e) (n%m==0)
(f) (x=='a'||x=='e'||x=='i'||x=='o'||x=='u'||x=='A'||x=='E'||x=='I'||x=='O'||x=='U')
(g) (k >= 'a' && k <= 'z' || k >= 'A' && k <= 'Z')

29. Convert the following mathematical expressions into C expressions.
(a) $\frac{a+b}{c+d}$
(b) $\frac{ab}{c^2+d}g$
(c) $\sqrt{1+x}\frac{log\ cos\ 2x}{1+|y|}$
(d) $z = e^x + \log y + pqr(s-t)$
(e) $T = \sin(a)\cos(b) - |g-h| + \sqrt{ab}$
(f) $2\frac{\alpha+\beta}{sin\ x^\circ} + \frac{a^b + c^d}{a+b}$
(g) $y = sin\ \omega\pi\ cos\ \frac{\omega\pi}{t}$

A: (a) (a + b) / (c + d)
(b) (a * b) / (c * c + d) * g

(c) sqrt (1 + x) * (log (cos (2x))) / (1 + fabs (y))
(d) z = exp (x) + log (y) + P * q * r (s – t)
(e) T = sin (a) * cos (b) – fabs (g – h) + sqrt (a * b)
(f) 2 * $(\alpha + \beta)$ / $sin\ (x)$ + (pow (a , b) + pow (c , d)) / (a + b)
(g) y = sin $(\omega * \pi)$ * cos $((\omega * \pi)/t)$

30. What is a library function? Mention its use.

A: Library functions are built in programs available with the compiler. They are used to perform specific functions such as mathematical operations like square root (e.g., $\sqrt{x}$), absolute value (e.g., |x|) and so on.

31. Define preprocessor directives.

A: Preprocessor directives are instructions that are processed by the preprocessor before the actual compilation of the code begins.

32. What is a header file?

A: A header file is a file containing C declarations and macro definitions that are meant to be shared between several source files. (It allows programmers to declare functions, data types, and macros in one place, which can then be included in other source files using the #include directive.)