[Short Questions]

1. **What is Identifier**
   - Identifier is a name given to a variable, constant, function or label in the program
   - A Good identifier name should be descriptive but short
   - Length of identifier can be up- to 31 character
2. **Identifier naming rules**
   - First character of the name must be alphabet or underscore (_)
   - Identifier name may contain alphabets, digits or underscores
   - **Reserve word** cannot be used as identifier name
3. **What is Standard identifier**
   - Name given to different operations already defined in the standard C library.
   - They have special meaning in C language, if they are re-defined they cannot be used for original purpose.
   - **Example:** printf , scanf are examples of standard identifier
4. **What is user defined identifier**
   - A type of identifier that is defined by the programmer
   - A name given by the programmer to a variable, constant and a function is called user defined identifier.
   - **Example :** marks ,avg , factorial are some examples
5. **What is keyword**
   - **Keyword** or **Reserve word** is a word in C language that has a predefined meaning and purpose.
   - Meaning and purpose of keywords are defined by the developer of the language.
   - Keywords cannot be redefined. There are total 32 keywords in C language.
   - **Example:** void, if and for are some examples of Keyword.
6. **What is variable?**
   - Variable is named memory location or memory cell .It is used to store program's input data and its computational results.
   - Value of variable may change during program execution, however the name of variable cannot be changed
   - Variables are created in RAM.
7. **What is variable declaration, give syntax and example**
   - Process of specifying the variable name and its type is called variable declaration.
   - C is **strongly type** language, it means that all variables must be declared in the program before their use
   - Declaration provides information to compiler, to allocate memory according to the **data type** of variable.

Syntax:	**Example:**
Data-type variable-name;	int marks; float avg; int a,b,c;

8. **What is variable initialization, give syntax and example**
   - The process of assigning a value to a variable at the time of declaration is known as variable initialization.
   - Variable is written on the left side of assignment operator = and value is written on the right side

Syntax:	**Example:**

Data-type variable-name = value;	int marks = 80;
	float avg = 50.6;
	int a=5,b=6,c=8;

9. **What is garbage value**
   - When a variable is allocated a memory, this memory location may already contain some data.
   - This data is meaningless; This meaningless data is known as garbage value.
   - It may produce unexpected results in computations.
   - Variable should be initialized to avoid such problems.

10. What is "Variable-definition"

- Variable definition specifies the name and type of the variable as well as allocates the memory location to store the data in the variable
- In C language variable definition is automatically performed when a variable is declared.

11. Define Constant

- A constant is a quantity that cannot be changed during program execution.
- Constant is a named value.

12. Integer constant

- Integer constants are numeric values without fraction or decimal point.
- Integer constants represents values that are **counted.**
- Both **+ve and –ve** values are used as integer constant
- **Example: 45 -76 23 -55**

13. Floating point constant

- Floating-point constants are numeric values with fraction or decimal point.
- Floating-point constants represents values that are **measured.**
- Both +ve and –ve Floating-point constant are used .
- **Example: 45.4 -76.23 23.1 -55.0**

14. Character Constant

- Any character written within single quotation mark is known as character constant.
- All alphabets ,digits and special symbols can be used as character constants.
- Maximum length of a character constant is 1 character
- **Example:** 'A' '3' '#' 'e'

15. String Constant

- A collection of characters written in double quotations mark is called String Constant.
- It may consist of any alphabetic characters, digits and special symbols
- **Example: "C Programming" "Class#" "99-Mall Road ,Lahore"**

16. What is data type?

- Data type specifies the type of data that can be stored in a variable
- Data type is used to declare variables.
- Every data type has a range of values and requires different amount of memory
- Compiler allocates memory to variables according to its data-types.

17. What are different data types to store Integer data?

Name of data type	Size in bytes	Type of value	Range in 2 power	Range
short	2	Both +ve and –ve	-2^{15} to $2^{15}-1$	-32768 to + 32767
int	2 or 4	Both +ve and –ve	-2^{15} to $2^{15}-1$	-32768 to + 32767
unsigned int	2	only +ve	0 to $2^{16}-1$	0 to + 65,535
long int	4	Both +ve and –ve	-2^{31} to $2^{31}-1$	-2,147,483,648 to + 2,147,483,648
unsigned long int	4	only +ve	0 to $2^{32}-1$	0 to + 4,294,967,295

18. What are different data types to store float or real data?

Data type	Size in bytes	Description (range)	Precision
float	4	1.2×10^{-38} to $3.4 \times 10^{+38}$	6 decimal places
double	8	2.3×10^{-308} to $1.7 \times 10^{+308}$	15 decimal places
long double	10	3.4×10^{-4932} to $1.1 \times 10^{+4932}$	19 decimal places

19. Data types to store character data.

- **char** data type is used to store character value. It takes 1 byte in memory.
- It is used to represent a letter, number and symbols
- Character values are normally given in a single quotes
- **Example: char g;**

20. What is overflow and underflow?

- An **overflow** occurs when the value assigned to a variable is more than the maximum possible value.
- An **underflow** occurs when the value assigned to a variable is less than the minimum possible value.

21. Cancellation error

- The cancellation error occurs due to the manipulation of very large and very small floating-point number
- Manipulation may show unexpected result
- **Example :** if we add 34.0 and 0.00000056 , and store it in float variable the result will be 34.000000
- The larger number has canceled the smaller number.

22. What is Arithmetic overflow?

- Arithmetic overflow occurs when arithmetic calculation is performed on two very large numbers
- The result may be too large to be represented in a particular variable
- A **garbag**e value appear in this situation

23. What is Arithmetic underflow?

- Arithmetic underflow occurs when arithmetic calculation is performed on two very small numbers
- The result may be too small to be represented in a particular variable
- A garbage value appear in this situation

24. Exponential notation

- Exponential notation represents large floating point numbers in a short way.
- It consists of two parts : Mantisa and Exponent
- General form for exponential notation is : **±m e ±n** OR **±m E ±n**

25. Range and precision

- **Precision :** it is the number of digits after the decimal point
- **Range :** It is the exponential power of 10.
- **Example :** 34.528423×10^3 :Precision of this value is 6 and range is 3

26. What are operators in C

- Operators are symbols that are used to perform certain operations on data
- C provides a variety of operators
- **Example:** Arithmetic operators, Relational Operators etc.

27. What is Expression

- A statement that evaluates to a value is called expression, Expression gives a single value.
- Expression consist of **operator** and **operands**
- **Operator** is a symbol that performs some operation and **operand** is the value on which operation is performed.
- **Example :** A*B Here * is operator and A,B are operand

28. What is Arithmetic operator

- Arithmetic operator is a symbol that performs mathematical operation on data
- Five types of arithmetic operators in C language are **+ , - , * , / , %**

29. Working of Modulus operator %

- Modulus operator is also called **remainder operator**
- Modulus operator works only with integer value
- **Example:** 10%3 will give result 1
  - 0 % 5 will give result 0
  - 3%5 will give result 3

30. Working of division operator /

- the result of division operator is always integer in both divisor and dividend are integer
- **Example:** 7/ 2 Answer is 3
- result of 7.0 / 2.0 is 3.5 , floating point numbers must be used to get accurate result.

31. What is arithmetic Expression

- Arithmetic expression contain **arithmetic operator** with constants and variables
- These expressions are used to perform arithmetic operations
- Example: A+B , a* 5

32. What is use of assignment operator =

- assignment operator is used to store a value or computational result in a variable
- the symbol = is an assignment operator and used at right side of a variable
- **Example:** a = b+c;

33. What is use of assignment statement

- a statement that assigns a value to a variable is known as assignment statement
- assignment operator = is used to assign a value or computational result to a variable

Syntax:	**Example:**
Variable = expression;	A = 100; **X = b - c * 20;**

34. what is Lvalue and Rvalue

- Lvalue is a only a single variable written on the left side of a assignment operator =
- Rvalue is a operand that is written on the right side of an assignment operator
- All Lvalues can be used as Rvalues , but all Rvalues cannot be used as Lvalues
- **Example :** x=5 is valid but 5=x is invalid

35. what is unary and binary operator

- a type of operator that works with one operand is called unary operator
  - Different types of unary operators are - ,++ ,-- , !
- a type of operator that works with Two operands is called binary operator
  - Different types of binary operators are * , % , /

36. What is compound assignment statement

- compound assignment statement assigns a value to many variables at a time
- assignment operator is used to assign values
  - **Example :** x = y = z = 20;

37. Describe compound assignment operator

- Combine assignment operator with arithmetic operators
- they perform mathematical operations more easily

Syntax:	**Example:**
Variable op = expression;	a + = 100; **Increases the value of a by 100**

38. what is use of increment operator ++

- increment operator is used to increase the value of variable by one
- it is unary operator and works with single variable
- increment operator is can be used as prefix (++ n)and postfix form (n++)

39. what is use of decrement operator --

- decrement operator is used to decrease the value of variable by one
- it is unary operator and works with single variable
- decrement operator is can be used as prefix (-- n)and postfix form (n--)

40. difference between A= ++ B and A= B ++

In statement A= ++ B	In statement A= B ++
• It increases the value of B by 1 • And then assign the value of B to A	• It assign the value of B to A • and then increases the value of B by 1

41. what is difference between prefix and postfix increment

- the result of A++ and ++A is same, when it is used independently
- but the result of A= ++B and A= B++ will be different

42. What is relational operator

- The relational operators are used to specify conditions in the program
- Relational operator compare two values and produce result as **true or false**
- Six type of relational operators in C language are >, < ,==, >= ,<= and != .

43. what is difference between x = 2 and x = = 2

- The expression **x= 2** is assignment statement and assigns the value 2 to variable x.
- The expression **x = = 2** is relational expression and compare if the value of x is equal to 2

44. What is relational expression

- Relational expression uses relational operators to compare two values.
- Examples of relational expressions are A> B, A< B , A<=B, A>=B, A==B , A!=B

45. What is compound condition

- A type of comparison in which more than one conditions are evaluated is called compound condition
- It executes a statement or set of statements by testing many conditions.

46. What are Logical operator

- The **logical operators** are used to evaluate compound conditions
- There are three types of logical operators : AND , OR , NOT

47. What is AND (&&) operator

- The symbol used for and is **&&** .
- it is used to evaluate two conditions
- It gives **true** result if both conditions are **true** , it gives **false** result if any one condition is **false**

48. What is OR (||) operator

- The symbol used for **OR** operator is (||).
- it is used to evaluate two conditions.
- It gives **true** result if either condition is **true** , it gives **false** result if both conditions are **false**

49. What is NOT (!) operator

- The symbol used for NOT operator is (!). it is used to reverse the result of a condition.
- It gives **true** result if the condition is **false** , it gives **false** result if the conditions is **false**

50. What is Operator precedence

- The order in which different types of operators in an expression are evaluated is known as operator precedence. It is also known as hierarchy of operator
- The operators with higher precedence are evaluated before the operators with lower precedence
- **Example:** 2 + 2 * 2 answer of this expression is 6 , 8 is wrong answer.

51. What is Precedence of different operators

- Any expression given in parentheses is evaluated first. in case of parentheses within parentheses inner parentheses will be evaluated first
- Then multiplication * and division /
- Then plus + and minus -

52. What is associativity of operator

- The order in which operators of same precedence are evaluated is known as operator associativity
- If an expression contains some operators that have same precedence level , the expression is evaluated either from **left-to-right** or **right-to-let**

53. What are comments in C

- Comments are the lines of program that are not executed, compiler ignores these lines.
- They increase the readability of the program.
- Comments are notes that explain the purpose of code
- Comment don't affect the size of executable program
- **Two types of comments:** single-line comment *and* multi-line comment.

54. Single-line comments

- Single line comments are added by using double slash //
- Anything written on the right side of double slash is considered as comments and is ignored by compiler
- **Example:** //practice makes a man programmer

55. Multi-line comment

- Multi-line comments are written in the code by placing **/*** ate the start and ***/** at the end
- **Example:** /* ----------
  ---------- */

56. What is type casting

- The process of converting the data type of a value during execution is known as type casting
- Type casting is of two types : implicit and explicit

57. What is implicit type casting

- Implicit type casting is performed automatically by C compiler
- When an expression contains different types of operands, the value with lower data types is converted into higher data type.
- **Example:** if **x + y** is an arithmetic expression and x is **int** and y is **long** ,then the value of x will be converted into **long** during evaluation of expression .

58. What is explicit type casting?

- It is a type casting that is performed by the programmer by using cast operator
- Cast operator tells the compiler to convert the data type of a value

Syntax:	**Example:** suppose x and y are two float variables and we want to find the remainder **, the expression will be written as:**
(type) expression;	**int r = (int) x % (int) y ;**

59. what is difference between = and = =

- = is assignment operator
- = = is a relational operator
- **Example:**
  - **x= 2** assigns the value 2 to variable x.
  - **x = = 2** compare if the value of x is equal to 2

60. what is difference between these two operators & , &&

- & is address operator , used in scanf() function
- && is and operator ,used to check compound condition

61. what is difference between 5 , '5'

- 5 is an integer constant and '5' is a character constant

62. what is difference between 'E' , "E"

- 'E' is a character constant and "E" is a String Constant