A) Very Short questions:

1. Who is the father of C language? **Ans. Dennis Richie**
2. All keywords in C are in _____. Ans. lowercase letters
3. The global variables are _____. Ans. External
4. Which language is symbolic language? Ans. Assembly language
5. _____ file contains mathematical functions. Ans. <math.h>
6. Which operator cannot be used with float operands? Ans. % (Modular divison)
7. A loop that always satisfies the test condition is known as _____ loop. Ans. Infinite
8. The _____ specification is used to read/write a hexadecimal integer. Ans. %x or %X
9. The C-preprocessors are specified with _____ symbol. Ans. #
10. The elements of an array are stored in _____ memory locations. Ans. Contiguous
11. Name of array acts as a _____ . Ans. Pointer
12. If an array is declared as arr[] = {1,3,5,7,9};
    then what is the value of sizeof(arr[3])? **Ans. 4**
13. What will be the output?

```
#include <stdio.h>
void solve()
{ int x = printf("Hello");
printf(" %d", x); }

int main()
{ solve();
return 0; }
```

Ans. Hello 5

14. Why scanf() is not preferred for string input?
    Ans. It terminates as soon as blank space appeared in input.
15. Functions can return enumeration constants in C? (True/ False) Ans. True
16. In C, parameters are always _____ Ans. Pass by value
17. What is the sizeof(char) in a 32-bit C compiler? Ans. 1 Byte
18. A structure memeber variable is generally accessed using the _____ . Ans. dot operator
19. A _____ is a collection of variables under a single name. Ans. Structure
20. when we precede *struct* name with *typedef* keyword, then the *struct* becomes _____ .
    Ans. new data type
21. The standard streams in C are _____, _____ and _____ . Ans. stdin, stdout, stderr
22. What is the return type of the fopen() function in C?
    Ans. returns a pointer to the FILE object.
23. What is the output?

```
#include <stdio.h>
#define VAL 5
int getInput()
{ return VAL; }

void solve()
{ const int x = getInput();
printf("%d", x); }

int main()
{ solve();
return 0; }
```

Ans. 5

24. The creation and operation of the buffer is automatically handled by the _____ .
    Ans. operating system
25. **# define** is a compiler directive and not a statement. (True/False) Ans. True

26. The standard input/output functions are included in the ----------header file. Ans. <stdio.h>

27. What is the range of values that can be stored by int datatype in C? Ans. -(2^31) to (2^31) – 1
28. What is the output of this statement "printf("%d", (a++))"? Ans. The current value of "a".
29. We cannot use the keyword 'break' simply within _____. Ans. if-else
30. How are String represented in memory in C? Ans. An array of characters.
31. What will be the output of the following C code?

```
#include <stdio.h>

int main()
{
float x = 23.456;
printf("%.2f",x);
return 0;
}
```

Ans. 25.46

32. What will be the output:

```
#include <stdio.h>
// Assume base address of "C-Programming" to be 1000
int main()
{
  printf(5 + "C-Programming");
  return 0;
}
```

Ans. gramming

33. What will be the output:

```
#include <stdio.h>
int main()
{
int i = 3;
printf("%d", (++i)++);
return 0;
}
```

Ans. Compile time error : l-value required

34. What will be the output?

```
#include <stdio.h>

void solve() {
int x = printf("Hello");
printf(" %d", x);
}
int main() {
solve();
return 0;
}
```

Ans. 5 (length of characters in standard output)

35. int (*p)[5];

Describe the statement. Ans. It is a pointer 'p' to an array of 5 elements.

36. What is the output?

```
#include <stdio.h>
#if X == 3
    #define Y 3
#else
    #define Y 5
```

```
#endif

int main()
{
    printf("%d", Y);
    return 0;
}
```

Ans. 5 (In the first look, the output seems to be compile-time error because macro X has not been defined. In C, if a macro is not defined, the pre-processor assigns 0 to it by default. Hence, the control goes to the conditional else part and 5 is printed.)

37.
```
struct {
   short s[5];
   union {
         float y;
         long z;
    }u;
} t;
```
Assume that objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes, respectively. How much memory will be occupied by 't'?

Ans. 18 bytes (Short array s[5] will take 10 bytes as size of short is 2 bytes. When we declare a union, memory allocated for the union is equal to memory needed for the largest member of it, and all members share this same memory space. Since u is a union, memory allocated to u will be max of float y(4 bytes) and long z(8 bytes). So, total size will be 18 bytes (10 + 8).)

38. How much percentage of memory will be saved if we use bit-fields for the given C structure as compared to when we don't use bit-fields for this very structure? (Assume the size of int to be 4).

```
struct temp
{
int m : 1;
int n : 2;
int o : 4;
int p : 4;
}s;
```

Ans. 75%

39. Which file is generated after pre-processing of a C program?

Ans. .i (After the pre-processing of a C program, a .i file is generated which is passed to the compiler for compilation.)

40. What is the return type of the fopen() function in C?

Ans. The fopen() function returns a pointer to a FILE object.

41. What will be the output:

```
#include<stdio.h>
int main()
{
int p = 1, q = 2, r = 3, s = 4, x;
e = r + s = q * p;
printf("%d, %d\n", x, s);
}
```

Ans. Syntax error

42. What will be the output?

```
#include <stdio.h>
   int main(){
    int x = 20;
```

```
    x %= 3;
    printf("%d",x);
    return 0;
```

}

Ans. 2 (In the above code, the value of x is 20 and then in the next statement, the expression is x %= 3. That will be evaluate as:
x %= 3;
x = x % 3;
x = 20 %3;
x = 2)

43. What will be the output?

```
#include <stdio.h>
void main()
{
int x = 10;
int y = x++ + 20;

printf("%d,%d",x,y);

return 0;
}
```

Ans. 11, 30 (In the above code, we are using a post-increment statement (x++), post-increment increases the value after evaluating the current expression. Thus, the value of y will be 30 and then x will be 11.)

44. what will be the output?
    #include <stdio.h>

```
int main()
{
char str1[] = { 'H', 'e', 'l', 'l', 'o' };
char str2[] = "Hello";

printf("%ld,%ld", sizeof(str1), sizeof(str2));
 return 0;
}
```

Ans. 5,6 (str1 is initialized with the characters and there are only 5 characters. Thus, the length of the str is 5. While, str2 is initialized with the string "Hello", when we initialized the string in this way - a null ('\0') character is inserted after the string. Thus, the length of str2 is 6.)

45. What will be the output?

    #include <stdio.h>

```
int main()
{
char str1[] = "Hello";
char str2[10];
 str2 = str1;
 printf("%s,%s", str1, str2);
 return 0;
}
```

Ans. D) Error (There will be a compilation error, because we cannot assign a string like this (str2 = str1). To resolve this issue, we have to use strcpy(str2,str1).)

```
#include <stdio.h>
int main()
{
  int x[5] = { 10, 20, 30 };
 printf("%ld", sizeof(x)/sizeof(x[0]));
 return 0;
}
```

Ans. 5

(The statement sizeof(x)/sizeof(x[0]) can be used to get the total numbers of elements, sizeof(x) will return the size of array while sizeof(x[0]) will return the size of first element i.e., size of the type. Their division will return the total number of elements.)

47. What will be the output?

```
#include <stdio.h>

int myFunc(int x){
return (--x);
}

int main(){
int a = myFunc(13);
printf("%d", a);
return 0;
}
```

Ans. 12

48.
```
#include <stdio.h>
int main(){
int x = 10, *ptr;
ptr = &x;
*ptr = 20;
printf("%d", x);
}
```

Ans. 20

(In the above program, x contains 10 and ptr is a pointer to x. We are changing the value of x with the help of pointer. Thus, the value will be changed and it will be 20.)

49. What is the value of EOF in C? Ans. -1
50. what will be the output?

```
#include <stdio.h>

int main()
{
int x[5] = { 10, 20, 30 };
printf("%d", x[-1]);
return 0;
}
```

Ans. Garbage value

(C language compiler does not check array with its bounds, when an index is out of the range the garbage value is printed.)

B) Short Questions:

1. Explain the basic structure of a C program with an example.
2. What is an assignment statement? Give the general form of an assignment statement.
3. Write a C program to find the largest of three numbers using ternary operator.
4. Write a "C" program to demonstrate the use of unconditional goto statement.
5. Write a C program to find the sum and average of n integer numbers.
6. Explain with syntax and example ,the different string manipulation library functions with example.
7. What are the three components of defining a user defined functions in "C"?
8. Explain the difference between array and structure.
9. Explain with example, the various constants available in "C" language.
10. Show how break and continue statements are used in a C program, with example.
11. Write a C program to find the largest element in an array.
12. Differentiate between call by value and call by reference with examples.
13. What are actual parameters and formal parameters? Illustrate with example.
14. Explain with example how to create a structure using "typedef".
15. Write short notes on fseek().
16. Write a C program that reads from the user an arithmetic operator and two operands, perform the corresponding arithmetic operation on the operands using switch statement.
17. What is dangling else problem? Explain how to handle its in C programming.
18. Write a program to replace each constant in a string with the text one except letter „z" „Z" and „a" „A" . Thus the string “Programming in C is fun” should be modified as “Qsphsannjoh jo D jt gvo”.
19. What is Recursion? Write a C program to compute polynomial co-efficient ${}^{n}C_{r}$ using recursion.
20. What is a macro ?Write a macro to determine whether the given number is odd or even.

C) Long Questions:

1. (a) Discuss about the following operators in C language with example.
   a. Bitwise operators
   b. Increment and decrement operators
   c. Logical operators 4+3+3

   (b) Write a program to perform swapping of two numbers without using temporary variable. 5

2. (a) Define algorithm. Write algorithm for finding factorial of a number.
   (b) What is flowchart? Explain different symbols used for flowchart.
   (c) Explain about type conversion in C. 4+6+5

3. (a) Explain the different types of loops in C with syntax.
   (b) Develop a C program to generate and plot the Pascal triangle. 9+6

4. (a) What are the main elements of an array declaration? How to initialize an array?
   (b) What is the difference between an array and pointer?
   (c) Write a program to print the array elements in reverse order. 5+5+5

5. (a) How to declare and initialize a Two-dimensional array? Discuss with examples.
   (b) Write a C program to print the sum of diagonal elements of 2-D matrix.
   (c) Write a C program to illustrate the use of indirection operator to access the value pointed by a pointer. 5+5+5

6. (a) Write short notes on nested functions.
   (b) Write a C program to explain call-by-reference parameter passing technique.
   (c) Write a C program to illustrate call-by-value parameter passing technique. 4+6+5

7. (a) Why C is called function oriented language? What are the different types of functions available in C? Give examples of each type.
   (b) Write a C program to find the factorial of a number using functions. (3x2)+5

8. (a) What do you mean by storage class?
   (b) What are the different types of storage classes available in C? Explain each of them. 2+(1+12)

9. (a) Write detailed notes on C data types.
   (b) What are header files? Give example. Why do we use header files? 10+(2+1+2)

10. (a) Classify the different types of decision making statements. Explain each of them.
    (b) How switch case works without break statement. Write a Program to perform arithmetic operations using switch. (6+1)+(6+2)

11. (a) Write an algorithm and develop a C program that reads N integer numbers and arrange them in ascending order.
    (b) Write a program to check whether a string is palindrome or not. 8+7

12. (a) Write a C Program to implement string copy operation that copies string str1 to another string str2 **without using library function**.
    (b) Explain with example (i) Character string (ii) String literal. 9+6

13. (a) Give the scope and life time of the following :
    (i)External variable (ii) Static variable (iii) Automatic variable (iv) Register variable.
    (b) Write a C program to check a number is a prime or not using recursion. 8+7

14. (a) Write a program to maintain a record of "n" employee detail using an array of structures with three fields(id, name , salary) and print the details of employees whose salary is above 5000.
    (b) Explain array of structure and structure within a structure with an example. 9+6

15. (a) Enlist the File Operations. Explain each operations.
    (b) List the opening modes in standard I/O. (1+8)+6

16. (a) What is Token? What are the different types of token available in C language.
    (b) What is an identifier (variable)? What are the rules to construct identifier (varible)?
    Classify the following as valid/invalid Identifiers:
    i) num2 ii) $num1 iii) +add iv) a_2 v) 199_space (1+5)+(1+3+5)

17. (a) Write a C program that takes three coefficients (a,b,and c) of a quadtatic equation ; (ax2+bx+c) as input and compute all possible roots and print them with appropriate messages.
    (b) Write a C program to find GCD of two numbers using ternary operator and for loop. 8+7

18. (a) Write an algorithm and develop a C program to search an integer from N numbers in ascending order using binary searching technique.
    (b) Write a C program to find the transpose of a given matrix. 9+6

19. (a) Write a C program to maintain a record of "n" students details using an array of structures with four fields(roll no,name,marks,and grade). Assume appropriate data type for each field. Print the marks of the student given the student name as input.
    (b) write a program to find nth term of Fibonacci series using function. 8+7

20. (a) Write the functions for random access file processing.
    1. fseek()
    2. ftell()
    3. rewind()
    (b) Write short notes on : i) fprintf() and ii) fscanf() 9+6