

**General Instructions:**

- **ASCII Table values range from 0-127**
- **Answers need to be crisp and precise. There is no need to copy the question onto the answer sheets.**
- **Neatness counts. 3 extra marks overall for neat, well-organised answers.**
- **Pay attention to C syntax. You will lose marks for syntax errors especially in questions which lay emphasis on C syntax.**

**Part I: Answer any 10 of the following - 2 marks each**

1. To use C library functions to read and write from the input / output devices you will need to .....
2. Declare a variable to hold values from 0 to 1.
3. Declare a string of length 45.
4. Declare a 5x5 integer matrix (2D array).
5. Declare a function called *intOnly* that takes a pointer to a data type that can hold values such as 3, 4, 5, 100, 798, etc., as an argument and returns a data type that can hold numbers like 2.5.
6. In C,  $19 / 3$  will yield ..... and  $4.6 / 3$  will give .....
7. .... is used to determine the size of a data type on a computer
8. Write a ternary expression that reverses the sign of a non-zero integer.
9. Write the bitwise expression to multiply *i* by 4.
10. The two's complement of -13 is .....
11. `int (* itoa) (int, char)` is a .....
12. `int x; func(x);` *x* here is passed by ..... and in `func(&x)` *x* is passed by .....

**Answer any 5 - 3 marks each**

**State whether each of the statements below are True or False.**

```
13. #include <stdio.h>
    void main() {
        int i = -1;
        while (++i < 5) printf("%d ",i);
```

Output : Loop executes 5 times

**Computer Science I Midterm Exam**  
**September 2019**  
**Total Marks 100**  
**Duration: 3 hours**

**Indian Statistical Institute**

```
14. #include <stdio.h>
    void main() {
        int x = 1, y = 0, z = 2;
        int a = x && ++y || z++ && y++;
        printf("%d\n", a);
    }
```

Output : 0

```
15. #include <stdio.h>
    void main() {
        int x = 0, y = 9 z = 4;
        int a = x | y & z;
        printf("%d", a);
    }
```

Output : 4

```
16. #include <stdio.h>
    void main () {
        int x =100, y = 20, z = 399, num = 0;
        num = x / y > 0 ? (x / z > 0 ? x : z) : (y / z > 0 ? y : z);
        printf ("%d\n", num);
    }
    Output : 20
```

```
17. #include <stdio.h>
    void main() {
        int x = 4, y, z;
        y = --x;
        z = x--;
        printf("%d%d%d", x, y, z);
    }
```

Output : 2 3 3

```
18. #include <stdio.h>
    void main() {
        int ar[] = {12, 25, 32, 47, 50, 16, 74, 8};
        int *p = ar;
        int *k = p++;
        p+=4;
        int r = *p - *k;
        printf("%d", r);
    }
```

Output : 4

**Part II: Answer all five questions below- 4 marks each**

19. Write an *if-else-if* block to test if a number is greater than zero, less than zero or equal to zero.
20. Write a *While* loop that calculates the factorial of 5.
21. Write a *do-while* loop to test for a palindrome. Feel free to use a data type of your choice.
22. Write a nested for loop to print out the elements of a table of 5 rows and 5 columns.
23. Write a function that swaps two integers. The integers are parameters passed to it by reference.

**Part III: Answer any five of the following - 6 marks each**

24. Write a function that takes two parameters, an integer array as a parameter and an integer which is the length of the array. The function should find the sum of the elements of the array.
25. Write a recursive function to print the ASCII table. Print the character, a space, followed by the corresponding ASCII value.
26. Write a recursive function that calculates x raised to the power n. For example if  $x = 2$  and  $n=3$ , then the function should return 8 ( $2^3=8$ ).
27. Write a recursive function to find the length of a string.
28. Write a program that reads a string using gets and prints using printf(). Use the correct format specifier.
29. Design and write a function that declares a 2D array to print out the multiplication tables up to 10.

**Part IV: Answer the following - 12 marks each**

30. Design and write a program to print a list of primes from 0 -100.

**Part V: Neatness and Organisation - 3 marks**