

General Instructions:

- **ASCII Table values range from 0-127 of which 0-31 are non printable characters; 32-126 are printable characters out of which 48-57 are numerals; 65-90 capital alphabets; 97-122 small alphabets; 127 is the DEL character.**
- **Neatness counts. 2 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. Declare a string of length 10.
2. Define a constant for the value of Pi.
3. Declare a pointer to an integer array.
4. 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.
5. In C, $17 / 2$ will yield and $5.6 / 2$ will give
6. is used to determine the size of a data type on a computer
7. Write a macro that reverses the sign of a non-zero integer.
8. Write the bitwise expression to divide *i* by 2.
9. Write an enum variable called *boolean* to store OR, AND, XOR and NOT.
10. Complete the recursive call below to the factorial function `int fact(int n)`
 return (.....);
11. `int x; func(x);` *x* here is passed by and in `func(&x)` *x* is passed by

Answer any 5 - 2 marks each

What is output of the following pieces of C code?

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

13.

```
#include <stdio.h>
int main() {
    int c = 8 ^ 6;
    printf("%d\n", c);
}
```
14.

```
#include <stdio.h>
void main() {
    int x = 0, y = 2, z = 3;
    int a = x & y | z;
    printf("%d", a);
}
```
15.

```
#include <stdio.h>
int main() {
    if (7 | 8)
        printf("The best way to finish an unpleasant task is to");
    if ((~7 & 0x000f) == 8)
        printf("get started.\n");
}
```
16.

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

```
#include <stdio.h>
void main() {
    int ar[] = {1, 2, 3, 4};
    int *p = ar;
    int *k = p++;
    p+=2;
    int r = *p - *k;
    printf("%d", r);
}
```

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

18. Write an *if-else-if* block to test if a character is a number, alphabet or non-printable character. Hint: Use the ASCII table.
19. Write a *While* loop that iterates through an alphanumeric array and counts the numerals in the array.

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Total Marks 100

Duration: 3 hours

20. Write a *do-while* loop that calculates the factorial of a number

21. Write a nested for loop to print out the elements of a table of 5 rows and 5 columns.

22. Write a Switch-case statement to determine if an operator is +, -, * or /. Print "Not an arithmetic operator" if non-of the above match.

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

23. 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 rotate the array to the right by 2.

24. Write a recursive function to find the sum of the digits of a number.

25. Write a recursive function that finds the gcd of two numbers.

26. Write a recursive function to convert a given integer from decimal to binary

27. Write a recursive function that determines if a string is a palindrome

28. Write a program that reads a string using gets() and prints using puts().

Part IV: Answer the following - 9 marks each

29. Design and write a function to determine the number of factors of a number. Use this function in a program to determine if a number is a prime number.

30. Design and write a function that takes two char arrays, arr1[] and arr2[] as input and returns 0 if arr2 is a substring of arr1; else returns -1. Write a main program to call this function and test it.

Part V: Neatness and Organization - 2 marks