U.G. 1st Semester Examination - 2020
COMPUTER SCIENCE
[HONOURS]
Course Code : Com.Sc-H-CC-L-T-101
(Computer Fundamentals and Programming using C)

Full Marks : 60   Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **ten** questions: 2×10=20

    a) What do you mean by data and information?

    b) State the De Morgan's theorem.

    c) What do you understand by base or radix? Explain with example.

    d) Find the complement of $F = AB + C'D' + B'D$.

    e) Perform binary arithmetic operation on 8-bit numbers using 2's complement notation (−24+38).

    f) Find the value of base b where $(112)_b=(512)_{10}$.

    g) Find the 9's complement and 10's complement of 459.

    h) What is the difference between #include<stdio.h> and #include"stdio.h"?

    i) What are the differences between type casting and type conversion?

    j) Find the output of the following snippet considering all the header files are included properly:

        ```
        void main()
        {
            char arr[] = {1, 2, 3};
            char *p = arr;
            if(&p == &arr)
                printf("Same");
            else
                printf("Not same");
        }
        ```

    k) What is pre-processing? Explain with example.

    l) Is main() a predefined function? – Justify your answer.

m) What are the advantages and disadvantages of using recursive functions?

n) What are the differences between type casting and type conversion?

o) What is a pointer variable? How are pointer variables different from normal variables?

2. Answer any **four** questions: 5×4=20

a) Minimize the following Boolean function $F(A,B,C,D) = \Sigma(0,1,2,6,8,9,10)$ using K-map. Realize the minimized function using any universal gate.   3+2

b) Represent the number $(2112)_{10}$ into

   i) BCD

   ii) Excess -3

   iii) Gray Code   1.5+1.5+2

c) Explain Parity. How Parity is used to detect single bit errors? Design a logical diagram for any parity bit generator and checker.
          1+1+3

d) What is fall-through? How can it be resolved in switch-case statement? Evaluate the value of n, if value of p = 5, q = 19 and p, q and n are of int type.

   $n = (q-p) > (p-q)? (q-p) : (p-q)$;   1+2+2

e) Differentiate between external and static variables. Design a function to convert an N-bit binary number into decimal number. Take N as an input.   2+3

f) Design a function that inserts an element into a sorted array of integers.   5

3. Answer any **two** questions: 10×2=20

a) i) Perform 0.5 + (−0.4375) using floating point arithmetic.

   ii) What are the differences between machine language, assembly language, and high-level language?

   iii) How compilers are different from interpreters?

   iv) What is hamming code?   3+3+3+1

b) i) What is a conditional operator? Give example.

   ii) What are the differences between entry control loop and exit control loop?

   iii) What are the differences between identifiers and variables?

   iv) Convert the following if…else block to a conditional statement using ternary operates:

```
if(a>b){
    if(a%2 == ){
        x = b *a;
    }
    else{
        x += a;
    }
}else{
    x *=b;
}                           2+3+2+3
```

c) i) What is function prototype? Give an
        example.

    ii) Design a function that takes an integer
        array as an argument and returns the sum
        of maximum and minimum number from
        the array.

    iii) Write a program using a recursive
         function to print 1 to N where input N is
         passed as an argument to the recursive
         function.   (1+1)+4+4

d) i) Write a function that takes a string as an
        argument and reverses it.

    ii) What are the different file opening
        modes available in C?

    iii) Write a C code to show how data can be
         read and written from/into a binary file.
                                            4+3+3

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