U.G. 1st Semester Examination - 2023
COMPUTER SCIENCE
[MAJOR]
Course Code : BCOSMAJ01C
Course Title : Computer Fundamentals and Programming using C
[NEP-20]

Full Marks : 60 Time : 3 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** of the following questions: 2×10=20

a) What is syntax error? Give one example in of C programming.

b) What is the output of the following code?

```
#include <stdio.h>
int main(void>
{
    int num=10
    printf("%d\n", ++num);
    printf("%d\n", num++);
    printf("%d\n", num--);
    printf("%d\n", num);
    return 0;
}
```

c) What is numerical value of each of the following expressions?

i) 5>2

ii) 3+4>2&&3<2

d) Define storage class in C.

e) Discuss about the usage of logical operators in C with example.

f) Discuss the working principle of for loop with an example.

g) Identify the differences between compiler and interpreter.

h) Identify the differences between integer, float and character pointers in C.

i) Discuss about array of pointers in C with an example.

j) Write the differences between loader and linker.

k) Differentiate between recursion and iteration.

l) Identify the advantages and disadvantages of using functions in C.

m) Identify the usage of structure in C.

n) Find 'n' : $(24)_n + (25)_n = (52)_n$

o) What output does the following program fragment produce? (Assume that i is an integer variable)

```
i=1;
switch (i % 3)
{
        case 0: printf("zero");
        case 1: printf("one");
        case 2: printf("two");
}
```

Find the error in the following program fragment and fix it.

```
if (n % 2==0);
printf ("n is even\n");
```

2. Answer any **six** of the following questions $5\times6=30$

a) Give a note on the generations of computers.

b) Perform the following base conversions:

i) $(1100110)_2 = (?)_{16}$

ii) $(174636)_8 = (?)_{16}$

c) i) State the absorption and distributive laws of Boolean Algebra

ii) Subtract 00111 from 10101 using both 1's and 2's complement methods. 3+2

d) Explain the differences between "Call by Value" and "Call by Reference" with proper examples.

e) Write a program in C to display all the prime numbers from 1 to 100.

f) Illustrate the working principle of macro in C using a program.

g) Write a program to find out whether a user given string is palindrome or not.

h) Analyze the working principle of break and continue keywords in C with the help of programs.

i) Write a program in C to find the sum of digits of a number repeatedly till we get a single digit number.

Ex: 9721 -> 9+7+2+1=19->1+9=10->1+0=1

3. Answer any **one** of the following questions: $10 \times 1 = 10$

a) Write a program that generates the positions of whitespaces in a string that you input. For example, if the input string is "It is a sunny day", the program will generate the positions 2, 5, 7 and 13.

b) What is the use of the keyword 'typedef'? What are the differences between array and structures? Explain self-referential structures briefly. What do you mean by dynamic memory allocation? 2+3+3+2

c) Construct a case study on the selection sort algorithm to sort 10 integer numbers with the help of a program.
