B.Tech./Regular/ODD Semester/2021-22

Introduction to Computing

Subject Code: CSC 01

Full Marks: 60 Time: 2 Hours

[**Instructions:** Attempt all the Questions. Read the questions carefully and answer accordingly. Different parts of a question must be written consecutively.]

- ***Do Not send answer script via E-mail.***
- ***Write your Name, Roll Number, Date, Paper Code and Paper Title on the front page.***
- ***Scan the handwritten answer scripts and save as a PDF file.***
- ***Each student must upload one single (.pdf) file saved as RollNo_Name_EndSem2022.pdf. Example: 21CS2001_Name_EndSem2022.pdf***

Group A (MCQ) 10X1=10

1. Identify the invalid variable names from the following:

   a. 18Aug
   b. Intro2C
   c. Continue
   d. _BTechCSE

2. Consider the following code segment written in C. Assume that the variables `a` and `b` are already declared as integers. What will be the value of `b` once the given segment gets executed?

```
a = 0;

b = (a = 0)? 10: -10;
```

   a. 10
   b. -10
   c. 0
   d. None of the above

3. What is the right way to initialize an array?

```
a. int num[6] = {2,4,12,5,45,5};
b. int n{}    = {2,4,12,5,45,5};
c. int n{6}   = {2,4,12};
d. int n(6)   = {2,4,12,5,45,5};
```

4. Bitwise operators can operate upon?

   a. double and char
   b. float and double
   c. int and float
   d. int and char

5. Which is the right way to declare constant in C?

```
a.  int constant var =10;
b.  int const var = 10;
c.  const int var = 10;
d.  B & C Both
```

6. In the switch statement, each case instance value must be _____?

```
a. Constant integer or constant character
b. Variable integer or variable character
c. Special Symbol
d. None of the above
```

7. Consider the following C program

```
int x = 10;
int main()
{
    int x = 0;
    printf("%d",x);
    return 0;
}
```

What would be the output?

```
a.10
b.0
c.1
d.None
```

8. Consider the following C program

```
int main()
{
    static int i=5;
    if(--i){
            main();
            printf("%d ",i);
    }
}
```

What would be the output of the program?

```
a.0 0 0 0
b.4 3 2 1
c.4 4 4 4
d.1 2 3 4
```

9. What is the output of the below program?

```
int main()
{
  int i;
  for(i=0; i<5; i++);
  {
    printf("NIT Durgapur");
  }
 return 0;
}
```

a. NIT Durgapur 5 times
b. NIT Durgapur 1 time
c. Compilation error
d. Nothing printed

10. If `str` is a character pointer defined as below

```
char* str  = "NIT DURGAPUR";
```

What does it print by the following statement?

```
printf("%s", (str+4));
```

a. NIT DURGAPUR
b. DURGAPUR
c. APUR
d. Does not print any string

Group B **15X2=30**

1. Differentiate between variable declaration and variable definition. Can a variable have multiple declarations? Justify your answer.

2. Perform conversions of the following numbers from one number system to another. Clearly show all the steps

   i. Binary to octal : 1100110101_2 to(?)$_8$
   ii. Decimal to binary: 97.375_{10} to(?)$_2$

3. What will be the output of the C program shown below? Justify your answer.

```
int main( ){
    int a[]={1,2,3,4,5};
    int b[]={1,2,3,4,5};
    if(a==b)
        printf("yes");
   else
        printf("no");
    return 0;
}
```

4. What will be the output of the C program shown below? Justify your answer.

```
int main(){
    int i=0;
    for(i=0; i<20; i++){
        switch(i){
            case 0:  i+=5;
            case 1:  i+=2;
            case 5:  i+=5;
            default: i+=4;
                     break;
        }
        printf("%d  ", i);
    }
    return 0;
}
```

5. What is a `null` Character? Is `'0'` and null character same? If not justify your answer with an example.

6. Why do we need an array?

7. What are the differences between global, auto and static variables?

8. Consider the following statement in C

```
x = 10-3%2+5*2/4%2+8/4;
```

Apply operator precedence and association rule of C programming language and show the evaluation of the expression step-by-step.

9. Write a recursive function in C to compute the following `Sum`. The recursion function would take the input as `n`.

$$Sum = 1^2+2^2+.....+n^2;$$

10. What will be the output of the C program shown below? Justify your answer.

```
void solve(){
    int first = 10, second = 20;
    int third = first + second;
    {
        int third = second - first;
        printf("%d ", third);
    }
    printf("%d", third);
}
int main() {
    solve();
    return 0;
}
```

11. Consider the following declarations

```
int array[5] = {4,5,6,7,8};

int *ip;
```

and the initialization

```
ip = (array+2);
```

What would be the array content after the operation `++*ip;` Justify your answer.

12. Rewrite the following `for loop` into `while loop`.

```
for(i=10;i>=0;i-){
      count += 5;
}
```

13. What do you mean by the association property of any operator?

14. Let `ip` be an integer pointer, which of the following operators are valid on `ip`?

i. + as unary operator
ii. + as binary operator
iii. * as binary operator
iv. == as binary operator

15. Is it possible to translate any `if-if else-else` statement to `switch-case` statement? Justify your answer.

Group C (Answer any 4) 5X4=20

1. Write a C program that finds the sum of all integers greater than `0` and less than `50` and are not divisible by `5`.

2. Write a program in C to print the following pattern

```
1
1  2
1  2  3
1  2  3  4
1  2  3  4  5
```

3. Write a program in C to find out all prime numbers in between `500` to `10000`.

4. Write a C function to append one string at the end of the other string. Use the function in `main` with proper parameter(s) to show the append of two string.

5. Write a C program that reads two square matrices of size `n×n` and print their addition. Input matrices should be passed as parameters of a user defined function `Addition(..,..);`

6. Write an algorithm of following problem statement**:**

- There are `N` students in a class who have scored some marks in Introduction to Computing (example: suppose `10` students and their marks are `45,64,39,53,34,47,56,61,59,61,` respectively).
- Increment their marks by grace of `5` to each student.
- Then segregate the marks into two categories. Below `50` is considered as not-succeed and equal or above `50` considered as succeed.
- Show the following records:
    - Original marks of each students
    - Modified marks of each students
    - No of students with Succeed marks
    - No of students with not-succeed marks: