

**Bachelor of Construction Engineering Supplementary Examination, 2017**  
**(1<sup>st</sup> Year – 1<sup>st</sup> Semester)**  
**Sub: Numerical Methods and Computer Programming**

Time: 3 hours

Full Marks: 100

Answer all

Answer all the parts of a question in contiguous location

1. Answer any 4 (4x5)

- What are the different *logical* operators used in C language?
- With a suitable example justify the advantages of *array*.
- How *if-else* is different from *switch-case*?
- What are the different *data types* used in C language?
- C is a *high-level* and *modular* programming language: clarify.
- Mention some merits and demerits of *Bisection* method.

2. Explain, what will happen if you try to run the following codes. (any 4) (4x5)

a.  

```
#include<stdio.h>
void main()
{
    int x = 10, y = 10;
    printf("%d", ++x + y);
}
```

b.  

```
#include<stdio.h>
void main()
{
    int i;
    for(i = 0; i = 0; i++)
    printf("Inside loop\n");
}
```

c.  

```
#include<stdio.h>
void main()
{
    int x = 1, y = 1, z = 1;
    x = y>z;
    printf("%d", x);
}
```

d.  

```
#include<stdio.h>
void main()
{
    int x = 8, y = 3;
    float z;
    z = x/y;
    printf("%f", z);
}
```

e.  

```
#include<stdio.h>
void main()
{
    int x = 11, y = 10;
    if( x = y)
        printf("E");
    else
        printf("NE");
}
```

f.  

```
#include<stdio.h>
void main()
{
    int a = 1, b = 1;
    while(x < 10)
    {
        b = a/b; a++;
        printf("%d %d\n", a, b);
    }
}
```

3. Write a C program using switch-case statement where three cases are there: find the area and circumference of a 1) circle, 2) triangle and 3) rectangle. (10)
4. Write down the C program for *Secant* OR *Regula-Falsi* method to find out the root of non-linear equation. (10)
5. Derive *Gauss-Seidel* OR *Gauss-Elimination* method to solve linear simultaneous equations. What are the advantages and limitations of this method? (6+4)
6. Solve the following initial value problem using Euler's method:

$$y' = -2y, y(0) = 1$$

Find a value for the solution at  $x = 0.8$  using step size  $h = 0.1$ . (10)

7. Derive the *Newton's forward* OR *backward* difference interpolation formula with suitable example. (10)
8. Solve the following equations using *Gauss Elimination* OR *Gauss-Seidel* method. If you use *Gauss-Seidel* method your answer should be correct up to 3 decimal points.

$$x - 2y + z = 0$$

$$2x + y - 3z = 5$$

$$4x - 7y + z = -1$$

(10)