B.Tech. Third Semester (Chemical Engineering) (C.B.S.)
Numerical Method & Computer Programming
Paper - IV

P. Pages : 2

Time : Three Hours

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TKN/KS/16/7819

Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Use of non programmable calculator is permitted.

1. a) What is variable & constant? Explain rules for defining variable in C? **6**

b) Write a program in C, to find out factorial of a number. **7**

OR

2. a) Write a program in C to find out sum of five digit number (use modular function). **6**

b) Write a program to check whether the entered year is leap year or not. **7**

3. a) What is string ? Write a program to interchange names at second and third position from given list. **7**
```
{
    "Ram",
    "Sham",
    "Raman",
    "Shrinivas",
    "Vasu",
    "Ganesh",
};
```

b) Write a program to calculate power of a number using user defined function. **6**

OR

4. a) Write a program to change upper case to lower case and vice versa using function. **6**

b) What is pointer ? Write a program to swap two numbers using pointer. **7**

5. a) Write a program in C by using Binary search technique. Take an integer array of ten dimension. **7**

b) Write a program to find determinant of a matrix of order 3x3. **7**

OR

6. a) Write a program to check whether the entered matrix on order 3x3 is symmetric or not. **7**

b) Write a program to sort an array of ten dimension in descending order by any sorting technique. Print least and greatest element. **7**

7.	a)	Write a program in C to find out root of equation $x^4 - x - 10$ by Regular-falsi method.	**6**
	b)	Write a program in C on Lagrange's interpolation formula.	**7**

OR

8.	a)	Write a program in C to find out root of equation $x^3 - x - 1 = 0$ by Bisection method.	**6**
	b)	Write a program in C to find out root of equation $x^3 - 24 = 0$ by Newton -Raphson method.	**7**
9.	a)	Write a program to solve differential equation $\dfrac{dy}{dx} = x - y$ by euler method, y = 1, x = 0.	**7**
	b)	Write a program in C to solve differential equation $\dfrac{dy}{dx} = x + y^2$ by using runge-kutta second order method. Given y = 1 at x = 0.	**7**

OR

10.	a)	Write a program in C for numerical integration $\displaystyle\int_0^1 \dfrac{1}{1+x} dx$ by Trapezoidal rule. Take n=8.	**7**
	b)	Write a program in C on modified Euler's method for $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}$ with condition $y_0 = 1 \,\& \, x_0 = 0$ find y for x = 0.1.	**7**
11.	a)	Define optimization technique ? Which are the numerical methods for optimization.	**7**
	b)	Explain dynamic programming terminology.	**7**

OR

12.	a)	Explain the types of Integer programming problem.	**7**
	b)	Show graphically the linear programming problem.	**7**

$$\text{Max} \quad Z = 6x_1 + x_2$$

Subject to constraints

$$2x_1 + x_2 >= 3$$
$$x_1 - x_2 <= 0$$
$$x_1 >= 0 \,\& \, x_2 \geq 0$$

Find feasible region.

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