B.Tech. (Chemical Engineering) Third Semester (C.B.S.)
Numerical Methods & Computer Programming

P. Pages : 2

Time : Three Hours

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2001

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. Use of non programmable calculator is permitted.

1. a) Write a program to implement menu driven program for various arithmetic operations follow the below criteria. **13**
menu :
i) Addition   ii) Subtraction
iii) Division   iv) Modulus
v) Multiplication

OR

2. a) Write a program in C to check given number is palindrome or not. **5**

b) Write a program to calculate factorial of a number using for loop. **4**

c) Write a program in C to find largest of three numbers using ternary operator. **4**

3. a) Write a program to find 10 terms of Fibonacci series using recursion. **7**

b) What is difference between Macro and function. **6**

OR

4. a) What is pointer ? What are advantages of pointer. **6**

b) What is file ? Explain different mode of operations perform on a file. **7**

5. a) Write a program in C to find the position of an element in the list using binary search technique. **6**

b) Write a C program to calculate mean, variance and standard deviation of n numbers using array. **7**

OR

6. a) Write a program to sort a set of given number in ascending order by using bubble sort algorithm. **6**

b) Write a program in C for finding determinant of a matrix of order 3×3. **7**

7. a) Write a program to find roots of equation $x^3 - x^2 - 1 = 0$ by using bisection method. **7**

b) Write a program to find f(5) using Lagrange's interpolation formula from following data : **7**

x	1	2	6	7
y	2.5	5.4	7.8	8.2

OR

8. a) Write a program to find roots of equation $x \log_{10}(x) - 1.2 = 0$ by using Newton-Raphson method. **7**

b) Write a program to calculate f(4.5) using Newton backward difference interpolation formula from following data : **7**

x	1	2	3	4	5
y = f(x)	2.38	3.65	5.85	9.95	14.85

9. a) Write a program using Euler's modified method to solve the following differential equation **7**

$\dfrac{dy}{dx} = \log(x + y)$ at x = 1.2 and x = 1.4 given that y(1) = 2 ; take h = 0.2

b) Write a program to evaluate $\displaystyle\int_0^2 \sqrt{\sin x}\, dx$ **7**

using Simpson's $1/3^{rd}$ rule, divide the interval in eight equal parts.

OR

10. a) Write a program to fit a straight line to the following data : **7**

x	0	5	10	15	20	25
y	12	15	17	22	24	30

b) Write a program to evaluate $\displaystyle\int_0^2 \dfrac{dx}{x}$; take h = 0.25 using Trapezoidal rule. **7**

11. a) Explain the type of integer programming problem. **6**

b) Write a short note on two key attributes that a problem must have to apply dynamic programming. **7**

OR

12. a) What is optimization ? Explain different optimization techniques. **6**

b) Show Graphically **7**

Maximize $\quad Z = 3x_1 + 4x_2$

subject to $\quad 4x_1 + 2x_2 \le 80$

$\quad\quad\quad\quad\quad 2x_1 + 5x_2 \le 180$

$\quad\quad\quad\quad\quad x_1 \ge 0 \,,\; x_2 \ge 0$

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