

GUJARAT UNIVERSITY

B.E. Sem IV (Mech./Auto.) (New) Examination

Computer Programming & Numerical Methods

Thursday, 19th June, 2008]

[Time : 3 Hours

Max. Marks : 100

- Instructions :** (1) Attempt **all** questions.
 (2) Answer to the two sections must be written in **separate** answer books.
 (3) Figures to the right indicate **full** marks.
 (4) Assume suitable data if necessary.

SECTION I

- 1 a. Write a C program to compute $1 - \frac{1}{1!} + \frac{2}{2!} - \frac{3}{3!} + \dots + \frac{n}{n!}$ using a function [16]
- b. Write a program to check the input string is palindrome or not
- c. Explain switch statement. How it differs from if statement

OR

- 1 a. The Fibonacci numbers are defined as follows:-
 0,1,1,2,3,5,8,13..... [16]
- $F_1 = 1, F_2 = 1, F_n = F_{n-1} + F_{n-2}, n > 2.$
- Write a recursive function that will generate and print the first n Fibonacci numbers
- b. Write a program which will read the string " C is a programming language" and replace "C" with "C++" in the string.
- c. Differentiate between 'Do-While' and 'While' loop

- 2 a. Create a structure salary and assign the members [16]
 Dept_name
 Basic_pay
 City_allowance
 Accept an array of 10 elements for the above structure and display the total salary and other details
- b. Write a program to sort given array in ascending order
- c. Define pointer. How do you initialize a pointer

OR

- 2 a. Write a program to calculate total and average marks of 100 students . Create a structure student with members IDNO, Mark1, Mark2, Mark3, Total, Avg and display the details. [16]
- b. Write a C program to read 3x3 matrix and print the original matrix and its transpose
 Example :
- | | | | | | |
|------|---|---|--------------------|---|---|
| 1 | 2 | 3 | 1 | 4 | 7 |
| A= 4 | 5 | 6 | A ^T = 2 | 5 | 8 |
| 7 | 8 | 9 | 3 | 6 | 9 |

- c. How do you declare a pointer variable? Explain with an example

[P.T.O.]

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3 Attempt Any SIX

[18]

- a. Give the output of the following program

```
Void main()
{
    int s=10;
    int *p;
    p=&s;
    printf ("s=%d", s);
    (*p)++;
    printf ("After *p++, s =%d ", s);
}
```

- b. Write a program to print following output

```
*****
***
**
*
```

- c. Explain with suitable examples
1. break
 2. continue
 3. goto()
- d. Explain fprintf() and fscanf() function
- e. Explain the benefits of object oriented programming
- f. Explain the difference between "Call by value" and "Call by reference"
- g. Explain command line arguments- argc and argv
- h. Explain the format of fseek function

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SECTION – II

- 4 a. Write a C++ program to calculate the perimeter of a rectangle [16]
- b. Write a C++ program to calculate
 $1+2+3+\dots+n$
- c. Write a C++ program to generate the output
1
22
333
4444
55555

OR

- 4 a. Write a C program for interpolation using Newton's Backward Formulae [16]
- b. Draw a flow chart for Gauss-Siedal method for solving linear simultaneous equations
- 5 a. Usin Newton-Rahpson Method find a root of equation: $x\sin x - \cos x = 0$, which is near $x = \pi$, correct upto 3 decimal places [16]
- b. Find a root correct up to 3 decimal places for the following equation using method of false position $4\sin x - e^x$
- c. Using Trapezoidal and Simpson's 1/3 formula find the value of $\int_1^6 \frac{dx}{x^2}$ and hence compare the result with actual value

OR

- 5 a. Write a C program for 4th order Ranga-Kutta method and using this method, compute $y(0.2)$ and $y(0.4)$ from [16]
 $10 \frac{dy}{dx} = x^2 + y^2, y(0) = 1, \text{ taking } h = 0.1$
- b. Using Gauss-Jordan method solve the following equations
 $x + y + z = 9$
 $2x - 3y + 4z = 13$
 $3x + 4y + 5z = 40$

[P.T.O.]

6 Attempt Any SIX

[18]

- a. The following table gives the values of x&y:

x	1.2	2.1	2.8	4.1	4.9	6.2
y	4.2	6.8	9.8	13.4	15.5	19.6

- Find the value of x corresponding to y=12 using Lagrange's Technique
- b. Find the absolute error and percentage error if $2/3$ is approximated to 0.667
- c. Draw a flow chart for trapezoidal rule
- d. Find by Taylor's series method, the value of y at x=0.1 if
 $\frac{dy}{dx} = x - y^2$ and $y = 1$ at $x = 0$
- e. Write an algorithm of Gauss Elimination method for solution of Linear simultaneous equation
- f. Write an algorithm for bisection method
- g. Write a C program for Simpson's 1/3 rule of Numerical Integration