LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **PHYSICS**

THIRD SEMESTER – NOVEMBER 2010

# PH 3812 - NUMERICAL METHODS AND C PROGRAMMING

Date : 03-11-10 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART - A**

**Answer ALL questions. (10 x 2 = 20)**

1. Dsitingush between Trapezoidal and Simpson’s rules of integration.
2. Reduce y = aebx to linear form.
3. Give the use of the ***comma*** operator in C.
4. Write a simple C program to find whether a given number is even or odd.
5. List the logical operators in C.
6. Explain operator precedence in C language.
7. With an example explain “array initialization”.
8. Explain the use of ***break*** statement in C with an example.
9. Mention any two advantages of **pointers**.
10. Give the general format of a ***union***.

**PART - B**

**Answer any FOUR questions. (4 x 7.5 = 30)**

1. Evaluate using Lagrange’s interpolation formula the value of *f* (9) from the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X** | 2 | 5 | 8 | 11 |
| ***f*(x)** | 94.8 | 87.9 | 81.3 | 75.1 |

1. Evaluate the integral using Trapezoidal rule with h=0.05.
2. Solve by Modified Euler’s method, dy/dx = 1 - y, for x=0.2, given y(0)=0, h=0.1.
3. Solve the following simultaneous equations by Gauss-Jordan method:

2x + 3y - z = 5

4x + 4y - 3z = 3

2x - 3y + 2z = 2

1. Use the method of least squares to fit a straight line to the following data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **X** | 0 | 1 | 2 | 3 | 4 |
| **Y** | 1 | 1.8 | 3.3 | 4.5 | 6.3 |

Hence estimate the value of Y when X=2.5.

**PART - C**

**Answer any FOUR questions. (4 x 12.5 = 50)**

1. Develop a program to compute a missing value using Lagrange’s Interpolation.
2. Write a program in C to solve a differential equation using the fourth order Runge-Kutta method.
3. Develop C programs to
   * 1. find the greatest of three numbers (5)
     2. to find whether a number is Armstrong (7)
4. Design a C program to multiply two 3 x 3 matrices.
5. Using **switch…case** design a program in C to determine the overall grade obtained by a student

based on scores in 5 subjects.

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