Student Exam No._____

GANPAT UNIVERSITY

B. Tech. Semester: 3rd Mechatronics Engineering

Regular Examination November – December 2013

2MC301 Numerical Analysis & Computer Programming

Time: 3 Hours **Total Marks: 70**

Instruction: 1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data if necessary.

Section - I

Q– 1 (a) Using Newton's Divided differences formula, evaluate f (8) and f (15) given **[06]**

X	4	5	7	10	11	13
F(x)	48	100	294	900	1210	2028

(b) Using Euler' Method, Find an approximate value of Y corresponding to X = 1, given that $\frac{dy}{dx} = x + y$ and Y = 1 when x = 0. **[06]**

OR

Q – 1 (a) If P is the pull required to lift a load W by means of a pulley block, Find a linear law of the form P = mω + C connecting P and W, Using the following data: **[06]**

P	12	15	21	25
W	50	70	100	120

Where P and W are taken in Kg-wt. Compute P when W= 150 kg.

(b) Solve, by Jacobi's iteration method up 6th iteration, the equations **[06]**
20X+Y-2Z = 17; 3X + 20Y-Z = -18; 2X -3Y+20Z = 25.

Q – 2 (a) Derive formula for Simpson's l/ 3 rd rule. **[05]**

(b) F(x) = x^3-x-1 =0 find real root up to two place decimal. **[04]**

(c) What is basic difference between Euler's method & Modified Euler's method and Find X from x^2-5 = 0. **[02]**

OR

Q – 2 (a) Derive Newton's forward formula. **[05]**

(b) Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking the 10 intervals. **[04]**

(c) Explain Interpolation and Curve fitting with small Graph. **[02]**

Q – 3 Write Any THREE questions. **[12]**

(a) Apply R-K fourth order method to find an approximate value of y when x=0.2 given that $\frac{dy}{dx} = x + y$ and y = 1 when x= 0.

(b) Find by Taylor's series method, the values of y at x = 0.1 and x = 0.2 to five places of decimals from $\frac{dy}{dx} = x^2y - 1$, Y (0) = 1.

(c) Apply Gauss elimination method to find to x, y, z.
X+4Y-Z = -5 , X+Y-6Z = -12 , 3X-Y-Z = 4

(d) For given the values evaluate f (9), using Lagrange's formula

x	5	7	11	13	17
F(x)	150	392	1452	2366	5202

Section – II

Q – 4 (a) Explain Static Data member and Static member Function in details. [06]

(b) Write a program to print the Fibonacci series. [06]

OR

Q – 4 (a) Explain Enumerated Data Type with appropriate program. [06]

(b) Write a program to find out mean value of given two numbers using friend function concept in class. [06]

Q – 5 (a) Explain Overloading of Unary Operators in details. [05]

(b) Write a program in C++ to convert given feet distance into inches using + operator. [06]

OR

Q – 5 (a) What are the inheritance are used in OOP? Explain Any one in Detail. [05]

(b) Write a program in C++ which read student roll number, two subject marks and [06]

Q - 6 **Write Any THREE questions.** [12]

(1) Explain the difference between POP and OOP. Enlist applications of OOP.

(2) Explain following terms:
   a) Constructor
   b) Destructor
   c) Copy constructor

(3) Explain following terms:
   a) Polymorphism
   b) Data Abstraction and Encapsulation
   c) Dynamic Binding
   d) Object And Class

(4) Write a Program to print following output using looping:

5 5 5 5 5
5 5 5 5
5 5 5
5 5
5

END OF PAPER