

GANPAT UNIVERSITY
B.TECH. SEM. – III MECHATRONICS ENGINEERING
REGULAR EXAMINATION NOVEMBER-DECEMBER 2011
NUMERICAL ANALYSIS AND COMPUTER PROGRAMMING : 2MC301

TIME:-3 HOURS

TOTAL MARKS: 70

INSTRUCTIONS:

- (1) Attempt all questions
- (2) Answer to two sections must be written in separate answer books.
- (3) Use of programmable calculator is prohibited

Section – I

- Q.1 a. Derive formula of Newton Raphson method 4
 b. Solve 4
 $X + 2Y + 3Z - U = 10$; $2X + 3Y - 3Z - U = 1$; $2X - Y + 2Z + 3U = 7$;
 $3X + 2Y - 4Z + 3U = 2$ By Gauss elimination method.
 c. Explain nonlinear equation with suitable example 4

OR

- Q.1 a. Solve the following equation by Gauss – Jordan method 4
 $X + 3Y + 3Z = 16$; $X + 4Y + 3Z = 18$; $X + 3Y + 4Z = 19$
 b. Solve the following equation by Gauss – Seidel method 4
 $10X + 2Y + Z = 9$; $2X + 20Y - 2Z = -44$; $-2X + 3Y + 10Z = 22$
 c. Solve the following equation by Jacobi's method 4
 $20X + Y - 2Z = 17$; $3X + 20Y - Z = -18$; $2X - 3Y + 20Z = 25$

- Q.2 a. What is divided difference ? Derive newton's divided difference formula. 4
 b. Derive formula for Simpson's 1/3 rd rule. 3
 c. Use the Trapezoidal rule to estimate the integral $\int_0^2 e^{x^2} dx$ taking the number 4
 10 intervals.

OR

- Q.2 a. Derive formula for Simpson's 3/8 th rule. 5
 b. Fit a straight line to the following data 6

x	6	7	7	8	8	8	9	9	10
y	5	5	4	5	4	3	4	3	3

- Q.3 a. Apply Euler's modified method to solve $y' = 1 - Y$, $y(0) = 0$, and obtain y at 6
 $X = 0.1, 0.2, 0.3$
 b. Using Runge – Kutta method of fourth order, Compute $y(0.2)$ and $y(0.4)$ from 6
 $10 \frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$, taking $h = 0.1$

Section – II

- Q.4 a. Give advantages of C++ language 4
b. Explain data hiding and data encapsulation in OOP 4
c. Give application of Object oriented programming 4
- OR**
- Q.4 a. Give difference between assembly level Machine level language 4
b. Explain OOP in detail 8
- Q.5 a. What do you mean by dynamic initialization of object ? Why do we need to do this? 3
b. Write a C++ program in which you declare a variable that holds an hourly wage. Prompt the user to enter an hourly wage. Multiply the wage by 40 hours and print the standard weekly pay. 4
c. Write the sample OOP program that show the use of friend function. 4
- OR**
- Q.5 a. Write a program for a bank that allows the user to enter an amount of money in cents. Display the number of whole dollars the bank will give the customer in exchange. 3
b. Write a program that allows the user to enter two values. Display the results of adding the two values, subtracting them from each other, multiplying them, and dividing them. 3
c. Write the flow chart for Gauss Jordan method 5
- Q.6 a. What are the different type of inheritances are used in OOP ? Explain each of them in detail. 6
b. What is inline function ? Explain with sample program in C ++ 6

END OF PAPER