

GANPAT UNIVERSITY

B. TECH SEM- 4th(IV) (ME) CBCS (NEW) REGULAR EXAMINATION- MAY-JUNE 2017
2ME403: NUMERICAL METHODS & COMPUTER PROGRAMMING

TIME: 3 HRS

TOTAL MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.

(2) Figures on right indicate marks.

(3) Be precise in answering with Neat and Clean work.

SECTION: I

Q.1 Answer the following questions. 10

(a) Using the bisection method, find an approximate root of the equation $\sin x = 1/x$, that lies (05)
between $x=1$ and $x=1.5$ (measured in radians). Carry out computations upto the 7th stage.

(b) Find the real root of the function $x^3+x-1=0$ using false position method upto three (05)
decimal and 5th stage.

OR

Q.1 (a) How secant method differs from false position method? Find the root of the equation (05)
 $xe^x = \cos x$ using secant method correct to four decimal and 5th stage.

(b) Find the negative root of equation $x^3-21x+3500=0$ correct to 2 decimal places by (05)
newton's method upto root become same in next stage.

Q.2 Answer the following questions. 10

(a) Apply cramer's rule to solve (10)

$$10x-7y+3z+5u=6,$$

$$-6x+8y-z-4u=5,$$

$$3x+y+4z+11u=2$$

OR

Q.2 (a) Apply gauss elimination method to solve equations (05)

$$x+4y-z=-5,$$

$$x+y-6z=-12,$$

$$3x-y-z=4$$

(b) Apply gauss Jordan method (05)

$$x+y+z=9,$$

$$2x-3y+4z=13,$$

$$3x+4y+5z=40$$

Q.3 Attempt any two from the following. 10

(a) Write a script of C++ program for Runge-Kutta method, Draw algorithm for the same.

(b) Find out solution of three algebraic equation using gauss elimination method by C++
Program

(c) Prepare a C++ program for euler's method to find out root.

SECTION: II

- Q.4 Answer the following questions** 10
- (a) Mention all the laws to convert non-linear equation into linear equation in curve fitting. (05)
- (b) Derive equation of method of least square using differential method. (05)

OR

- Q.4 (a) Using method of least square fit a second degree parabola to the following data.** (10)

x	1989	1990	1991	1992	1993	1994	1995	1996	1997
y	352	356	357	358	360	361	361	360	359

- Q.5 Answer the following questions** 10
- (a) Solve by Taylors series method of third order the equation $\frac{dy}{dx} = \frac{x^3+xy^2}{e^x}$ $y(0)=1$ at $x=0.1, x=0.2$ and $x=0.3$ and find out the value of y (05)

- (b) Find the value of y for $x=0.1$ by picard's method that $\frac{dy}{dx} = \frac{y-x}{y+x}$, $y(0)=1$ (05)

OR

- Q.5 (a) Solve the following by Eulers's modified method** (05)

$$\frac{dy}{dx} = \log(x+y), y(0)=2 \text{ at } x=1.2 \text{ and } 1.4 \text{ with } h=0.2.$$

- (b) Apply runge-kutta method to find approximate value of y for $x=0.2$, in steps of 0.1 if (05)

$$\frac{dy}{dx} = x+y^2, \text{ given that } y=1 \text{ where } x=0.$$

- Q.6 Attempt any two from the following questions.** 10

- (a) Prepare a C++ program for method of least square.
- (b) Make a C++ program for the matrix multiplication.
- (c) Develop C++ program for the bisection method.

END OF PAPER