LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc.DEGREE EXAMINATION – **MATHEMATICS**

FOURTHSEMESTER – APRIL 2018

16PMT4MC02- NUMERICAL METHODS USING C++

Date: 20-04-2018
Time: 01:00-04:00

Dept. No.

Max. : 100 Marks

Answer all the questions. Each question carries 20 marks.

I a)1) Find the real root of the equation $x^3 + x^2 - 1 = 0$ by iteration method.
OR
a)2) Find an iterative formula to find square root of N.   (5)

b)1) Solve $\sin x = 1 + x^3$ using Newton-Raphson method.
b)2) Find the root of the equation $x\,e^x = 3$ by false position method correct to three decimal places. .
                                                                                                (6+9)

OR
c) Find the root of the equation $x^3 - x - 11 = 0$ correct to four decimal places using bisection method.
                                                                                                (15)

II a)1) Solve the system of equation $3x + y - z = 3$, $2x - 8y + z = -5$ and $x - 2y + 9z = 8$ using gauss elimination method.
OR
a)2) How does Gauss Seidel method differ from Gauss elimination method   (5)
b) Solve the system using Triangularisation method
$3x + y + 2z = 16$, $2x - 6y + 8z = 24$ and $5x - 4y - 3z = 2$
OR
c) Solve the following equations by Gauss Seidel method method.
 $8x - 3y + 2z = 20$
$6x + 3y + 12z = 35$
$4x + 11y - z = 33$ (15)

III a)1) Find the cubic polynomial which takes the following values

x	1	3	5	7	9	11
y	3	14	19	21	23	28

OR

a)2) The following table gives the normal weight of a baby during the six months of life:

Age in months	0	2	3	5	6
Weight in Kgs	5	7	8	10	12

                                                                                                (5)
b) Using Gauss's forward formula find the value of log 337.5

x	310	320	330	340	350	360
log x	2.4914	2.5051	2.5185	2.5315	2.5441	2.5563

                                                                                                (15)

OR

c)1) Apply Stirling's formula to find y$_{35}$ given that y$_{10}$ = 600; y$_{20}$ = 512; y$_{30}$ = 439; y$_{40}$ = 346 and y$_{50}$ = 243

c)2) Apply Bessel's formula to find y$_{25}$ given that y$_{20}$ = 2854, y$_{24}$ = 3162, y$_{28}$ = 3544, y$_{32}$ = 3992

(8+7)

IV a)1) How will you refine your answer while using Trapezoidal rule.

OR

a)2) When will you apply Simpson's one - third rule and three by eighth rule?   (5)

b) Evaluate the $\int_{0}^{1} \frac{dx}{1+x^2}$ by using

   i.   Trapezoidal rule
   ii.   Simpson's 1/3 rule
   iii.   Simpson's 3/8 rule
   iv.   Weddle's rule   (15)

OR

c) From the following table, find the value of x and y and obtain $\frac{dy}{dx}$ and $\frac{d^2 y}{dx^2}$ at x = 1.2

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
y	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

(15)

V a)1) State Gregory –Newton's formula for unequal intervals.

OR

a)2) State Lagranges formula for unequal intervals.   (5)

b) Solve $\frac{dy}{dx} = y - \frac{2x}{y}$, y(0) = 1 in the range $0 \le x \le 0.2$ using (i) Euler's method (ii) Improved Euler's method and (iii) Modified Euler's method.

OR

c) Given y' = x^2 – y, y(0) = 1, find y(0.1) , y(0.2) using Runge-Kutta methods of (i) second order and (ii) third order.   (15)

$$$$$$$$