LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **MATHEMATICS**

SIXTH SEMESTER – **NOVEMBER 2015**

MT 6605 - NUMERICAL METHODS

Date : 26/09/2015 Dept. No. Max. : 100 Marks
Time : 01:00-04:00

PART-A

Answer ALL questions (10X2=20 marks)

1. Explain Cramer's rule of solving AX=B.
2. What are iterative methods?
3. State Newton-Raphson formula.
4. State the sufficient condition for convergence of iteration.
5. Form the divided difference table for the following data

X:	5	15	22
F(x):	7	36	160

6. State Newton's forward interpolation formula.
7. Write Gauss's forward
8. Write the Everett's formula.
9. Write the derivatives using Stirling's formula.
10. State the Trapezoidal rule.

PART-B (5X8=40marks)

Answer any FIVE questions.

11. Solve by Gauss elimination method: 2x+y+4z=12, 8x-3y+2z=20, 4x+11y-z=33.
12. Compute the real root of $2x^3$ -3x-6=0 by Newton-Raphson method correct to three decimal places.
13. Write a C-program to interpolate Newton backward interpolation formula.
14. Find the value of f(656) using Newton's divided difference formula from the following data:

X :	654	658	659	661
F(x):	2.8156	2.8182	2.8189	2.8202

15. Using Bessel's formula find f'(7.5)from the following table:

X :	7.47	7.48	7.49	7.50	7.51	7.52	7.53
F(x):	0.193	0.195	0.198	0.201	0.203	0.206	0.208

16. Apply Gauss's forward formula estimate f(32)from the table:

X :	25	30	35	40
F(x):	0.2707	0.3027	0.3386	0.3794

17. Evaluate integral of $\int_0^1 x e^x dx$ using Simpson's one-third rule correct to three places of decimals taking four intervals.
18. Using Taylor series method, find y(1.1) and y(1.2) correct to four decimal places given dy/dx=x+y and y(1)=0.

PART-C

Answer any TWO questions. (2X20=40)

19. a) Solve the system of equations 6x+3y+12z=35,8x-3y+2z=20,4x+11y-z=33,using Gauss-Seidal method.

b) Solve x logx=1.2,correct to 4 decimal places by iteration method. (10+10)

20. a) Given

X :	1	2	3	4	5	6	7	8
F(x):	1	8	27	64	125	216	343	512.

Estimate $f(7.5)$ by Newton's formula.

b) Given the values:

X :	5	7	11	13	17
F(x):	150	302	1452	2366	5202.

Evaluate $f(a)$ using Lagrange's formula. (10+10)

21. a) Find the value of f'(0.5) using Stirling's formula from the data:

X :	0.35	0.40	0.45	0.50	0.55	0.60	0.65
F(x):	1.521	1.506	1.488	1.467	1.444	1.418	1.389.

b) Obtain the value of f'(0.04) using Bessel's formula given the table below:

X :	0.01	0.02	0.03	0.04	0.05	0.06
F(x):	0.1023	0.1047	0.1071	0.1096	0.1122	0.1148.

(10+10)

22. Obtain the values of y at x=0.1,0.2 using Runge-Kutta method of(i)second order,and(ii)fourth order for the differential equation y'= –y, given y(0) =1.

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