 PG/IIIS/A.MATH/MA - 2111/ 09(Pr.)

# M.Sc 3rd Semester Examination 2009

## APPLIED MATHEMATICS WITH OCEANOLOGY AND COMPUTER PROGRAMMING

PAPER—MA - 2111

(Practical)

(*Practical on Advanced Numerical and Statistical Lab.*)

*Full Marks* : 25

*Time* : 2 hours

Answer any **one** question

*The figures in the right-hand margin indicate marks*

Problem : 20 Marks; Lab. note book and Viva : 5 Marks

Question will be selected by lottery

1. Write a program to evaluate a determinant by Gauss elimination method, using partial pivoting.

2. Write a program to find the inverse of a matrix by partial pivoting.

3. Write a program to solve a system of linear equations by Gauss Seidal iteration method.

4. Write a program to solve a system of linear equations by matrix inverse method.

5. Write a program to solve a system of linear equations by LU decomposition method.

6. Write a program to solve a system of linear equations by Gauss elimination method.

7. Write a program to solve a system of tri-diagonal equations.

8. (*a*) Write a program to find the integration of a function $f(x)$ by Gauss-Legendre quadrature (6-point) formula.

   (*b*) Write a program to solve a first order first degree ODE by Euler's method.

9. Write a program to solve a first order first degree ODE by Runge-Kutta ($2^{nd}$ and $4^{th}$ order) methods.

10. Write a program to solve pair of first order first degree ODEs by $4^{th}$ order Runge-Kutta method.

11. Write a program to solve a first order first degree ODE by Milne predictor-corrector methods.

12. Write a program to solve a second order PDE by finite difference method.

13. Write a program to find the largest eigenvalue of a square matrix by power method.

14. Write a program to find the correlation coefficient for a bivariate sample.

15. Write a program to find the multiple correlation coefficient for the sample $(x_i, y_i, z_i)$, $i = 1, 2, \ldots, n$.

16. Write a program to find the regression lines for a bivariate sample.

17. Write a program to fit a linear curve for a bivariate sample.

18. Write a program to fit a quadratic curve for a bivariate sample.

19. Write a program to find two partial correlation coefficient for the sample $(x_i, y_i, z_i)$, $i = 1, 2, \ldots, n$.