

M.Sc. F.Y. (Physics) Sem-II (Old)  
**0141-Paper-II : Numerical Methods**

P. Pages : 2

Time : Three Hours



**GUG/S/19/2239**

Max. Marks : 80

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1. Either.
- a) Describe Gaussian Elimination method for solution of simultaneous linear equations. 8
- b) Explain Newton Raphson method. 8

**OR**

- e) Find a real root of the equation  $x^3 - 2x - 5 = 0$  by Bisection method. 8
- f) Find the real root of the equation  $x^3 + x^2 - 1 = 0$  on the interval  $[0, 1]$  with an accuracy of  $10^{-4}$  by Iteration method. 8
2. Either.
- a) Derive and discuss Newton's Forward difference interpolation formula. 8
- b) Certain corresponding values of  $x$  and  $\log_{10} x$  are (300, 2.4771), (304, 2.4829), (305, 2.4843) and (307, 2.4871). Find  $\log_{10} 301$ . 8

**OR**

- e) Derive and discuss Newton's backward difference interpolation formula. 8
- f) Explain interpolation formula with unequal spaced points. 8
3. Either.
- a) Explain Jacobi's method of iteration. 8
- b) Derive Simpson's  $1/3$ -rule using the method of undetermined coefficients. 8

**OR**

- e) Evaluate. 8
- $$I = \int_0^1 \frac{1}{1+x} dx.$$
- correct to three decimal places. Solve this by using trapezoidal rule with  $h = 0.5, 0.25$  and  $0.125$  respectively.
- f) Explain Romberg integration. 8
4. Either.
- a) What is predictor? How Milne's method is used as predictor? 8

- b) Discuss Adams Moulton method. 8

**OR**

- e) Discuss classification of partial differential equations and explain its significance. 8

- f) Solve Laplace equation using finite difference method. 8

**5.** Attempt all the following questions.

- a) Write a note on secant method. 4

- b) Explain Stirling interpolation method. 4

- c) Give an account of Simpson's  $3/8^{\text{th}}$  rule. 4

- d) Briefly explain numerical solution of differential equations. 4

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