

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

P. Pages : 2

Time : Three Hours



GUG/W/18/2239

Max. Marks : 80

1. Either

- a) Discuss False Position method for determination of zero. 8
- b) How the accuracy of 10^{-5} obtained in iterative method. 8

OR

- e) Find the roots of the equation of the form $f(x) = 0$, using Bisection method. 8
- f) Describe Gaussian elimination method for solution of simultaneous linear equation. 8

2. Either

- a) Derive and discuss Lagrange's interpolation formula. 8
- b) Derive Newton's Forward difference interpolation formula. 8

OR

- e) Explain interpolation and polynomial interpolation. 8
- f) Derive Newton's backward difference interpolation formula. 8

3. Either

- a) State and explain trapezoid rule. 8
- b) Explain Simpson's $\frac{1}{3}$ rd rule. 8

OR

- e) State and explain Numerical differentiation and numerical integration. 8
- f) Explain polynomial least squares method. 8

4. Either

- a) Describe Euler's method to yield the solution of 2nd order differential equation. 8
- b) Obtain 2nd order Runge-Kutta method. 8

OR

- e) Explain Laplace equation as an elliptic type. 8
- f) What is mean by differentiation? Discuss classification of partial differential equations. 8

5. Attempt all the following equations:

a) By using the Newton-Raphson Method, find the roots of the equation, $x^3 - 2x - 5 = 0$ 4

b) The function $y = \sin x$ is tabulated below. 4

x	y = sin x
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0	0
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$\frac{\pi}{4}$	0.71711
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$\frac{\pi}{2}$	1.0
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By using Lagrange's interpolation function, find the value of $\sin\left(\frac{\pi}{6}\right)$.

c) Derive the formulae for Jacobi and Gauss-Seidal methods. 4

d) Derive predictor and Corrector formulae by using Milne method. 4
