

Roll No.

41276

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B. Sc. (Hons.) Physics 4th Semester
Examination – May, 2019

COMPUTER FUNDAMENTALS AND
PROGRAMMING - II

Paper : Phy-406

Time : Three hours] [Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting at least two questions from each Unit.

UNIT - I

- 1. (a) Differentiate between round off and truncation error. Give examples. 4
- (b) Explain why Newton-Raphson method is also called method of tangent ? 4
- 2. (a) Solve the following equations using gauss elimination method : 4

P. T. O.

$$x_1 + 2x_2 + x_3 = 1$$

$$2x_1 - x_2 + 2x_3 = -3$$

$$x_2 + 3x_3 = 1$$

- (b) Find a solution of $f(x) = x^3 - x - 1 = 0$ by iteration. 4
- 3. (a) Find the positive solution of $f(x) = x - 2\sin(x) = 0$ by the secant method, starting from $x_0 = 2, x_1 = 1.9$. 4
- (b) Discuss the comparison and error estimation between bisection and Newton-Raphson method. 4
- 4. (a) Solve the following equations using Gauss Seidel method (perform only three iterations with initial Guess as $x_0 = 0, y_0 = 0, z_0 = 0$) 4
 - $27x + 6y - z = 54$
 - $26x + 15y + 2z = 72$
 - $x + y - 54z = 110$
- (b) Under what conditions the Gauss Seidel method converge. 4

UNIT - II

- 5. (a) Deduce the final expression of trapezoidal rule for numerical integration. 4
- (b) Given $\frac{dy}{dx} = -y$ with $y(0) = 1$. Using step size $h = 0.01$. Find $y(0.01)$ and $y(0.02)$ by Euler method. 4

(2)

6. (a) Apply the Runge-Kutta method of second order to solve $\frac{dy}{dx} = x + y$ with $y(0) = 0$ by using step size $h = 0.2$ to compute five values of y .
- (b) Give geometrical interpretation of Runge-Kutta fourth order method.
7. (a) Using Newton backward difference formula compute $f(4.5)$ from the following set of data :

x	$f(x)$
1	14
2	27
3	40
4	55
5	68

- (b) Describe the brief about the Gauss quadrature formulas.
8. (a) Evaluate $I = \int_0^1 e^{-x^2} dx$ using the Simson's 1/3 rule with $2m = 6$ and estimate the error. 4
- (b) Evaluate $I = \int_0^1 e^{-x^2} dx$ using the Trapezoidal rule with $n = 6$ and estimate the error. 4