

Reg No

Deemed- to -be -University under Section 3 of the UGC Act, 1956

DEPARTMENT OF SCIENCES M.Sc (Physics) - II SEMESTER END SEMESTER EXAMINATION, 2017 SUBJECT: Numerical Methods and Computational Physics [PHY 604] (REVISED CREDIT SYSTEM)

Time: 3 Hours

MAX. MARKS: 50

Answer any 5 full questions. All questions carry equal marks

- 1 (a) Write a C program to find sin(x) using the following series. $sin(x) = x - (x^3/3!) + (x^5/5!) - (x^7/7!) + ...$
- 1 (b) Solve the following system of equations by Gauss-Jordan method

$$x + y + z = 5$$

$$2x + 3y + 5z = 8$$

$$4x + 5z = 2$$

- **2 (a)** Obtain a 2 order polynomial fit for the following set of data (1, 0.63), (3, 2.05), (4, 4.08), (6, 10.78)
- **2 (b)** Find f(0.3), by interpolation using Lagrange's formula, from the following set of data: (0,1), (1,3), (3, 49), (4, 129), (7, 813)
- **3 (a)** Write a C program to simulate radioactive decay by Monte Carlo method. Store the results of the simulation in a file d:\radio.txt
- **3 (b)** Solve the equation (dy/dx) = 3x + (y/2) for x=0.2 with the condition y(0)=1 using II order Runge Kutta method
- **4** (a) Solve $(\partial u/\partial t) = (1/2)(\partial^2 u/\partial x^2)$ with the conditions $u(x,0) = 4x x^2$ and u(0,t) = u(4,t) = 0
- **4 (b)** Write a C program to find the integral for a given set of data using Simpson's 1/3rd rule
- 5 (a) From Taylor series method find y(0.1) if $(dy/dx) = x y^2$ and y(0) = 1
- **5** (b) Write a C program to find the roots of an equation by secant method
- **6** (a) Write a C program to find $\int_0^3 x^4 dx$ by Monte Carlo crude integration method
- **6 (b)** Find a real root for the equation $x^3 x 1 = 0$ using bisection method (with an accuracy 3 decimal places)
