7. Discuss the theory of Taylor series method for solving differential equation and find Y(0.2) from equation Y'= 1 – 2XY, Y(0) = 0.

8. (a) Discuss the RK fourth order method for solving the differential equation.

(b) Using Eulers method find an approximate value of Y corresponding to X = 1, given that Y' = X + Y, Y(0) = 1 with step size = 0.2.

AA283

M. Sc. EXAMINATION, 2020

(First Semester)

(B Scheme) (Re-appear)

PHYSICS

PHY505B

Computational Physics

Time : 2½ *Hours*] [*Maximum Marks :* 100

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

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. Describe the functions of the following units in computer :

(a) Input/output Unit

(b) Memory Unit

(c) Central Processing Unit

(d) Control Unit.

2. Describe the following Fortran stratements with suitable examples :

(a) Input and output statement

(b) Arithmetic if statement

(c) Subroutine

(d) Array statement.

3. (a) What do you mean by Round off error ? Discuss with example.

(b) Discuss the theory of Newton-Raphson method and find the root of equation $X^3 - 3X + 1 = 0$.

4. (a) Using the Langrange's interpolation formula find the value of y when $x = 10$, if the following values of x and y are given :

x	:	5	6	9	11
y	:	12	13	14	16

(b) Discuss the theory of least quare curve fitting.

5. (a) Discuss the Newton's forward difference method of numerical differentiation.

(b) Using Gauss-Legendre formula find the following integration using $n = 3$

$$\int_{-1}^{1} \frac{dx}{1 + x^2}.$$

6. (a) Discuss the theory of Simpson 1/3 method of numerical integration.

(b) Discuss the theory of Strilling formula of numerical differentiation.