Q-3. Using Runge-Kutta method of fourth order solve

with at and 0.4 .

OR

Using Adam-Bashforth method find , given

$dy/dx = \frac{1}{2}xy$; $y(0)=1$

$y(0.3)=1.023$.

Q-4. Draw a flowchart and write the corresponding program in FORTRAN to find the standard deviation of the following x values of 10 numbers :

x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
1	2	3	4	5	6	7	8	9	10

using the formula.

$$s\,d = \sqrt{\left(x_i - Av\right)^2 / N}$$

where $N = 10$ and $Av = \sum xi/N$.

OR

Write short notes on the following :

i) Input and output statements.

ii) Implementing loops in programming.

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Fourth Semester Examination, May 2017

M.Sc. PHYSICS

Paper - II

COMPUTATIONAL METHODS AND PROGRAMMING

Time : 3 Hrs. **Max.Marks : 80**

Note : Section 'A', consists of 10 very short answer type questions, all of which are compulsory and should be attempted first. Section 'B' consists of four short answer type questions with internal options. Section 'C' consists of four long answer type questions with internal choice.

$y(0.2)=1.022$ **Section-'A'**

$dy/dx = \frac{y^2 + x^2}{y^2 + x^2}$

Answer the following very short-answer-type questions **(2x10=20)**

Q-1. What do you mean by approximate method?

Q-2. What is Trapezoidal rule?

Q-3. What do you mean by curve fitting?

Q-4. What is difference between Euler's method and Euler's modified method?

Q-5. Evaluate $\Delta \tan^{-1} x$.

Q-6. Show that .

Q-7. Any system of linear algebric equations can be solved by direct and iterative methods. What do you mean by direct and iterative methods?

P.T.O.

Q-8. What do you mean by divided difference?

Q-9. What is flowchart?

Q-10. What are the uses of loop in programming?

Section-'B'

Answer the following short-answer-type questions with word limit 200-250. **(5x4=20)**

Q-1. Describe the geometrical interpretation of iteration method.

OR

Solve by Gauss's elimination method given :

$$6x+3y+2z=6$$
$$6x+4y+3z=0$$
$$20x+15y+12z=0$$

Q-2. Write down the principle of least squares.

OR

By means of Newton's divided difference formula, find the value of from the following table :

x :	4	5	7	10	11	13
$f(x)$:	52	110	315	960	1290	2080

Q-3. Using Picard's method of successive approximation, obtain a solution upto second approximation of the :

$$dy/dx = x + y^2$$

with

OR

Describe the graphical representation of Euler's method.

Q-4. Describe the logical expressions used in Fortran programming.

OR

Describe the Arithmetic expressions used in Fortran programming.

Section-'C'

Answer the following long-answer-type questions

(10x4=40)

Q-1. Assuming that a root of -

lies in the interval . Find the root by Bisection method.

OR

By Gaussian elimination method, find the inverse of

$$A = \begin{bmatrix} & & \\ & & \\ 3 & 2 & 3 \\ 1 & 4 & 9 \end{bmatrix}$$

Q-2. From the following table of half yearly premium for policies maturing at different ages; estimate the premium for policies maturing at ages 46 & 63.

Age (x) :	45	50	55	60	65
Premium (y) :	114.84	96.16	83.32	74.48	68.48

OR

The value of x and y are related by the law ; corresponding values of x and y are give below. Find the values of a, b and c :

x :	2	4	6	8	10	12
y :	24	41	69	126.5	219	404

P.T.O.