

**2015**

**M.Sc. 1st Seme. Examination**

**PHYSICS**

**PAPER—PHS-103**

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

***Use separate Answer-scripts for Group-A & Group-B***

**Group-A**

[ Marks : 20 ]

Answer Q. No. 1 & 2 and any *one* from the rest.

1. Answer any *three* bits : 3×2

(a) What is the difference between a RAM and a ROM ?

(b) What is flowchart ? Give an example.

*(Turn Over)*

- (c) Describe different types of loops in C.
- (d) What is a compiler ?
- (e) What is class and object in C++ ?

**2. Answer any one :** 1×4

- (a) Write a C program to find the sum of the following series :

$$1 + 2 + 3 + 4 + \dots$$

- (b) Write a C++ class to represent a bank account. Write suitable member variables and member functions to deposit, withdraw and display account details.

**3. (a)** Write a FORTRAN program to check whether a given number is prime or not.

- (b) Write a FORTRAN program to calculate the factorial of a given number.

**4. (a)** Write a FORTRAN program to calculate the gcd of two given numbers.

- (b) Write a FORTRAN program to display the nth fibonacci number.

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**Group-B**

[ Marks : 20 ]

Answer any *four* questions.

4×5

1. Solve

$$x + 2y + z = 4$$

$$2x - 3y - z = -3$$

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

by Matrix factorization method.

2. Solve  $e^x = 3x$  by Newton-Raphson method upto three decimal figures. (the roots lying between 0 to 1).

3. Deduce Simpson  $\frac{1}{3}$  rule for integration and evaluate

$$\int_0^{\pi/6} \sin(x^2) dx$$

4. Apply Runge-Kutta method (4th order) to find the value of  $y$  at  $x = 0.2$ .

Given that

$$\frac{dy}{dx} = x + y^2 \text{ and } y(0) = 1.$$

5. Deduce Lagrange's interpolation method for un-equal spacings.
6. Make a best fit for the parabola

$$y = a_0 + a_1x + a_2x^2$$

Given :

x	-2	-1	0	1	2	3
y	9.1	3.5	0.5	0.8	4.6	11

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