PG/IS/PHS-103/12

M.Sc. 1st Semester Examination, 2012

PHYSICS

(Computer Programming)

PAPER – PHS - 103 (A + B)

Full Marks : 40

Time : 2 hours

The figures in the right hand margin indicate 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 & B

GROUP – A

[*Marks* : 20]

Time : 1 hour

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

1. Answer any *five* questions : 2 x 5

   (*a*) Write the differences between Optical Mouse and Mechanical Mouse.

(*b*) Differentiate between Compiler and Interpreter.

(*c*) Draw a flowchart for finding the largest of three numbers.

(*d*) Write a short note on 'GOTO' statement in FORTRAN.

(*e*) Write the differences between 'STOP and END' statement in FORTRAN.

(*f*) Briefly write down the main features of supercomputer, mainframe and mini computers.

(*g*) Compare primary memory and secondary memory of a computer.

(*h*) Write down the differences between SRAM and DRAM.

2. Write a FORTRAN program to display Armstrong numbers between the range *a* to *b*. 10

3. Write a FORTRAN program to arrange a list of *n* numbers in ascending order using bubble sort technique. 10

GROUP – B

[*Marks* : 20]

Time : 1 hour

Answer any **four** questions : 5 x 4

1. Establish Lagrange interpolation formula taking $(n+1)$ points (x_i, y_i), $i = 0$ to n.

2. Let $x = \zeta$ be a root of $f(x) = 0$ and I be an interval containing the point $x = \zeta$. $\phi(x)$ is defined by the equation $x = \phi(x)$ which is equivalent to $f(x) = 0$. Prove that the sequence of approximations $x_0, x_1, x_2, \ldots, x_n$, defined by $x_{n+1} = \phi(x_n)$, converges to the root ζ, provided that the initial approximation x_0 is chosen in I and $|\phi'(x)| < 1$ for all x in I.

3. Find a real root of the equation $x^3 - 2x - 5 = 0$ by regular falsi method.

4. The table below gives the values of tan$x$ for $0{\cdot}10 \leq x \leq 0{\cdot}30$.

x	0·10	0·15	0·20	0·25	0·30
tan$x$	0·1003	0·1511	0·2027	0·2553	0·3093

Find tan 0·12.

5. Derive trapezoidal rule to integrate

$$\int_a^b f(x)dx.$$

6. Solve the following system using Gauss elimination method :

$$\begin{aligned} 2x + y + z &= 10 \\ 3x + 2y + 3z &= 18 \\ x + 4y + 9z &= 16. \end{aligned}$$