PG/IS/PHY/PH-1103/09

M.Sc 1st Semester Examination, 2009

PHYSICS

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

PAPER—PH- 1103 (A)

[*Marks* : 20]

Time : 1 hour

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

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

(*a*) What is the main disadvantage of an assembly language ? Define assembler.

(*b*) What is the difference between primary memory and secondary memory ?

(*c*) What are the functions of Control Unit (CU) ?

(*d*) Define fifth generation computer.

(*e*) What is the advantage of an array-declaration in FORTRAN ?

(*f*) What are the major differences between system software and application software ?

(*g*) Write an algorithm to find the average of n numbers.

(*h*) What are the rules to naming variables in FORTRAN ?

2. A function $f(x)$ is defined as follows :

$$f(x) = \begin{cases} \sin x, & 0 \leq x \leq 1 \\ x^2 + |x|, & 1 < x \leq 2 \\ 2x - \log(x), & 2 < x \leq 5 \end{cases}$$

Write a program in FORTRAN to find the values of $f(x)$ for $x = 0, 0{\cdot}5, 1{\cdot}0, 1{\cdot}5, \ldots, 5{\cdot}0$. 10

3. Write a program in FORTRAN to generate a Fibonacci series upto 100 and also find their sum. 10

PAPER—PH-1103 (B)

[*Marks* : 20]

Time : 1 hour

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

1. Answer any *five* questions : 2×5

(*a*) State the rule of rounding off number with examples.

(*b*) State the difference between the "round off error" and the "truncation error".

(*c*) What do you mean by interpolation ?

(*d*) Define divided difference of order n.

(*e*) Define the symbolic operators Δ and ∇ and find a relation between them.

(*f*) State the limitations of using Newton-Raphson method.

(*g*) Why does one need to use numerical method instead of analytical method for integration.

(*h*) Write a set of sufficient conditions for the convergence of Gauss-Seidel iteration method.

2. (*a*) Calculate from the following table the value of y when $x = 1 \cdot 02$:

x	$1 \cdot 0$	$1 \cdot 5$	$2 \cdot 0$	$2 \cdot 5$	$3 \cdot 0$
y	$0 \cdot 11246$	$0 \cdot 14032$	$0 \cdot 16800$	$0 \cdot 19547$	$0 \cdot 22270$

(*b*) Evaluate

$$\int_0^{10} \frac{dx}{1+x}$$

by dividing the range into 8 equal parts.

(*c*) Using fourth order Runge–Kutta Method to find $y(0 \cdot 2)$ given that

$$\frac{dy}{dx} = x + y,\ y(0) = 1. \qquad 4 + 4 + 2$$

3. (*a*) Solve the following equations :

$$\begin{aligned} x + 2y + 3z &= 8 \\ x + y + z &= 3 \\ 2x + 2y + z &= 1 \end{aligned}$$

by Gauss elimination method.

(*b*) Fit a straight line to the data given below :

x	0	1	2	3	4
y	1	$1 \cdot 8$	$3 \cdot 3$	$4 \cdot 5$	$6 \cdot 3$

(*c*) Find the largest magnitude eigenvalue of the matrix

$$\begin{bmatrix} 1 & -3 & 2 \\ 4 & 4 & -1 \\ 6 & 3 & 5 \end{bmatrix}.$$

$4 + 2 + 4$
