

2016**M.Sc.****2nd Semester Examination****PHYSICS****PAPER – PGS-203 (Gr. – A + B)*****Full Marks : 50******Time : 2 Hours***

***The figures in the right hand margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.***

(Gr. A – Computer Programming)***Answer Q1 and Q2 and any one from Q3 and Q4.***

1. Answer any three bits:

3 X 2 =

6

(i) Draw a flow chart to find the sum of all natural numbers between 1 and n .

(ii) What are essential features of an algorithm?

(iii) Define Subroutine in FORTRAN.

(iv) What do mean by COMMON statement in FORTRAN?

(v) What do mean by BLOCK DATA statement in FORTRAN?

2. Answer any one:

1 X 4 = 4

(i) Write a program to find the value of $\cos 45^\circ$.

(ii) Write a program in FORTRAN to generate the following series 2, 4, 8, 14, 22, 32, 44, 58.

(Turn Over)

- 3. (a) Write a program in FORTRAN to check whether a number is prime or not. (5)
- (b) Write a program in FORTRAN to sort some numbers in ascending order. (5)
- 4. (a) Write a program in C to find the sum of two given matrices. (5)
- (b)) Write a program in C to compute and display the sum of all integers that are divisible by 6, but not divisible by 4, lie between 0 and 100. (5)

(Gr. B – Numerical Analysis)

Answer any four questions. 4X5 = 20

- 1. Establish composite Simpson’s 1/3 rd rule for numerical integration of $f(x)$ in [a, b] and give the geometrical significance of it.
 - 2. Evaluate $y(0.02)$, given $\frac{dy}{dx} = x^2 + y$, $y(0) = 1$ by Modified Euler’s method.
 - 3. Fit an exponential function of the type for the following data using the method of least square.
- | | | | | | | |
|----|------|------|------|------|-------|--------|
| x: | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 |
| y: | 0.10 | 0.45 | 2.15 | 9.15 | 40.35 | 180.75 |

- 4. The angle of rotation θ (radians) of a rod is given for various values of the time t in seconds. Find the angular velocity when $t = 1.2$ sec.

t:	0	0.4	0.8	1.2
θ :	0.10	0.493	0.2022	4.666

- 5. Given the following table, find $f(2)$.

x:	0	1	5	7
$f(x)$:	1	2	146	386

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- 6. Find a positive real root of the equation $x + \ln x - 2 = 0$ by Newton-Raphson method.
 - 7. Compute the value of $y = e^x$ for $x = 0.01$, given the values
- | | | | | | |
|---------|-----|--------|--------|--------|--------|
| x: | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 |
| e^x : | 1.0 | 1.1052 | 1.2214 | 1.3499 | 1.4919 |
- 8. Find the inverse of the following matrix by Gauss elimination method.

1	-1	1
1	-2	4
1	2	2

- 9. Using Runge-Kutta method $h = 0.01$, find $y(1.2)$; given $\frac{dy}{dx} = y^2 + 3x$, $y(1) = 1.2$.

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(Internal Assessment – 10)