* M B S - 0 0 3 - 1 2 0 4 0 0 1 *

MBS-003-1204001 Seat No. _____

M. Sc. (Sem. IV) (CBCS) Examination

April / May - 2018

Physics : CT-11

(Numerical Analysis and Computer Programming)

(New Course)

Faculty Code : 003

Subject Code : 1204001

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Answer any **seven** of the following : **14**

(a) What do you mean by least square fitting of experimental data ? Why it is necessary ?

(b) What are the direct and iterative numerical methods to solve the linear equations ?

(c) Establish the relationship between operators Δ and E.

(d) Define : Cosine and sine series; odd and even function.

(e) List the different rules used to solve numerical integration and methods used to solve ordinary differential equations.

(f) List the allowed characters in FORTRAN.

(g) Explain the 'computed go to' statement.

(h) Explain the hierarchy of operations followed by FORTRAN.

(i) Describe the implied do loop.

(j) List the comparative control statements and their FORTRAN code.

2 Attempt any **two** : **14**

(a) The following table gives corresponding values of x and y. Obtain an equation of the following form : $y = ax + b$ using the method of least squares :

x	0	5	10	15	20	25
y	10	15	17	20	24	30

(b) Solve the given set of equation by Matrix inversion method :

$$x + 2y + 3z = 14$$

$$2x - y + 3z = 9$$

$$5x + 11y + z = 30$$

(c) Given $y'(x) = x^2 + y^2, y(0) = 0,$ find $y(0.4)$ using Runge-Kutta method of second order assume $h = 0.2$.

3 (a) Prove that full wave rectifier does a fairly good job of approximating direct current. **7**

(b) From the following data table, estimate the number of persons having income in between 1000 – 1700 : **7**

Income	below 500	500 – 1000	1000 – 2000	2000 – 3000	3000 – 4000
No. of Persons	6000	4250	3600	1500	650

OR

3 (a) Explain the logical 'IF' statements and its different ways with flow chart. **7**

(b) Write a FORTRAN program to find the average height of male and female students using 'IF' statement. **7**

4 Attempt any **two** : **14**

(a) Describe the method for defining integer and real variable names in FORTRAN.

(b) Explain the rules to be used with real expression in FORTRAN.

(c) Write the methods of input/output statements.

5 Attempt any **two** : **14**

(a) A curve is drawn to pass through the following points :

x	1	2	3	4	5
y	1.5	3.5	4.5	6.5	8.5

Estimate the area bound by the curve, x-axis and lines $x = 1$, and $x = 5$. Also find the volume of solid generated by revolving this area using Weddle's rule.

(b) Show how Fourier series is used for expansion of Reimann-Zeta function ?

(c) Write a note on : Flow chart and its applications.

(d) Write a note on : Sub-program and its utility.
