



PR-003-1204001

Seat No. _____

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

August - 2020

Physics : CT - 11

(Numerical Analysis & Computer Programming)

(New Course)

Faculty Code : 003

Subject Code : 1204001

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) Attempt all questions.
(2) The figures on right side indicate marks.

1 Attempt any **seven** : **14**

- (1) What do you mean by 'Curve fitting' ?
- (2) List the methods used solve simultaneous linear equations.
- (3) What do you understand by interpolation and extrapolation of experimental data ?
- (4) Write a mathematical form of Fourier series.
- (5) Using Pascal triangle rule give expansion of $(x+1)^5$.
- (6) Explain the importance of flow chart.
- (7) Describe the procedure to be followed to solve a problem using computer.
- (8) List the comparative control statements and their FORTRAN code.
- (9) Define Computer.
- (10) Describe how the integer variable name can be written ?

2 Attempt any **two** :

- (a) The following table gives corresponding values of x and y . Obtain an equation of the form $y = ax + b$ using the method of least squares. **7**

x	0	5	10	15	20	25
y	12	15	17	22	24	30

- (b) Solve the given set of equations by matrix inversion method : **7**

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

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

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

- (c) Obtain the exact form of $f(x)$ by using the following data and hence $f(5)$ and $f(13)$. 7

x	0	1	2	3
$f(x)$	1	3	7	13

- 3 (a) Evaluate $\int_0^5 \frac{1}{1+x} dx$ by using (i) Trapezoidal rule 7
(ii) Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule (iii) Weddle's rule.
Compare your results with the actual value.
- (b) Solve $y' = 3x^2 + y$ in $0 \leq x \leq 0.3$ by Euler's method 7
and modified Euler's method taking $h = 0.1$ given
that $y(0) = 4$.

OR

- 3 (a) Define arithmetic expressions. Write and explain the 7
rules for real and integer expressions.
- (b) Briefly discuss the FORMAT function. List and explain 7
the use of various FORMAT specifiers with appropriate
examples.
- 4 Answer any **two** : 7
- (a) Write the general statement for the 'Do'. What do you 7
mean by implied 'Do' loop ? Discuss the rule to be
followed using 'Do' loop.
- (b) List the control statements. Using the flow chart explain 7
the various logical IF statements.
- (c) Draw and describe the symbols used in flow chart. 7
- 5 Answer any **two** : 14
- (a) Show how Fourier series is used for expansion of 7
Reimann - Zeta function ?
- (b) Discuss application of Fourier series for square wave 7
analysis; Show that square wave contains large number
of high frequency components.
- (c) Using IF statement, write the FORTRAN program to 7
find the sum of digits of a given number.
- (d) Describe in detail, the method of generating Algorithm. 7