

Q.1 (A) Explain the advantages and disadvantages of using the Newton-Raphson method to solve simultaneous non-linear equations. [07]

(B) Apply Gauss elimination method to solve following set of equations. [07]
 $x + 2y + 3z - u = 10$, $2x + 3y - 3z - u = 1$, $2x - y + 2z + 3u = 7$ and $3x + 2y - 4z + 3u = 2$.

OR

Q.1 (A) Using factorization method to solve the equations. [07]

$$3x + 2y + 7z = 4, 2x + 3y + z = 5 \text{ and } 3x + 4y + z = 7.$$

(B) Consider four possible scenarios in which a system of linear simultaneous equations needs to be solved. To demonstrate each of these, provide an example. [07]

Q.2 (A) The values of x and y obtained in an experiment are as follows: [07]

x	2.30	3.10	4.00	4.92	5.91	7.20
y	33.0	39.1	50.3	67.2	85.6	125.0

The probable law is $y = ae^{bx}$. Verify the accuracy of this law graphically and if the law holds good then find the best values of the constants.

(B) Describe the method of group averages. Write down its restrictions. [07]

OR

Q.2 (A) The pressure and volume of a gas is given by $pV^Y = k$, where Y and k being constants. Fit this equation to the following set of observations. [07]

p (kg/m ²)	0.5	1.0	1.5	2.0	2.5	3.0
y (litres)	1.62	1.00	0.75	0.62	0.52	0.46

(B) An experiment give the subsequent values: [07]

v (ft/min)	350	400	500	600
t (min)	61	26	7	2.6

It is recognized that v and t are linked by the relation $v = at^b$. Get the finest possible values of a and b .

Q.3 (A) Write a program to read marks of 50 students in a class, call a function to find out how many students scored more than class average. Print the result from main(). [07]

(B) Define a structure *physics* with members as name, roll number, age, sex, marks. Read information of 75 students – name, roll number, age, sex and marks out of 100 each. [07]

(i) Obtain and print average age of the class,

(ii) arrange and print details of the students in the decreasing order of marks.

OR

Q.3 (A) Write a program to read a positive number, call a function to get lowest digit in that number. I/O operations should be performed from main(). [07]

e.g. 8247 \rightarrow 2

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- (B) Define a structure *library* with title, author, page nos, publisher, year of publication as its members. Read details of 100 books. Print details of all books authored by Balagurusamy. Program also should print details of the latest book in the library. [07]
- Q.4 (A) Write a program to read a series of 50 values, call a function with pointer arguments to obtain range of values (maximum – minimum) in the series. Print results from main(). [07]
- (B) Write a program to integrate the following function $3x^2 + 2$ within the user specified limits using Simpson's method. [07]
- OR**
- Q.4 (A) Write a program to copy content of a user specified file to another user specified file. [07]
- (B) Write a program to obtain solution of the following function $x^2 + 3x + 4 = 0$ using Newton Raphson method. [07]
- Q.5 Answer in brief **Any Seven** questions from the following: (Each question is of two mark). [14]
- (i) As soon as a new value of a variable is found by iteration, it is used immediately in the following equations, this method is known as
- (a) Gauss-Jordan Method (b) Gauss-Seidal Method
(c) Jacobi's Method (d) Relaxation Method
- (ii) Outline 3rd order determinant.
- (iii) Write a curve fitting graphical technique.
- (iv) What do mean by an empirical law?
- (v) Give principle of least square.
- (vi) Solve the linear form of $y = ax^b + c$.
- (vii) What is a pointer?
- (viii) What happen when a pointer is incremented?
- (ix) How a union is different from structure?
- (x) With help of an example explain **fseek()** function
- (xi) Why Simpson method is superior than Trapezoidal method for numerical integration?
- (xii) Mention any two situations where the Newton-Raphson method is not suitable for obtaining solution of a polynomial.

*** PAPER ENDS ***