

B. Sc. (Honours) Part-II Examination-2022
Department of Applied Mathematics
Course: A. Math.-220
(Practical using FORTRAN)

Exam. Marks: 70

Class Assessment, Lab. Tutorial, Note Book Marks:30

Total Marks: 100

1. Write a FORTRAN program to print the area and perimeter of a triangle when three vertices of the triangle are given.
2. Write a FORTRAN program to print the area and perimeter of a triangle when two sides and angle between them of the triangle are given.
3. Write a FORTRAN program to print the area and perimeter of a rectangle when four vertices of the rectangle are given.
4. Write a FORTRAN program to print the area and circumference of a circle when end points of a diameter of the circle are given.
5. Write a FORTRAN program to print the area and circumference of an inner circle of a triangle whose three vertices are given.
6. Write a FORTRAN program to print the area and circumference of an outer circle of a triangle whose three vertices are given.
7. Write a program in Fortran'90 to evaluate u, v of the expressions: $u = \frac{|a+b^{-1}|}{\sin(r-d)}$; $v = \frac{cu^{-1}-u \cos x}{b}$.
8. Write a FORTRAN program to solve a quadratic equation $ax^2 + bx^2 + cx + d = 0$ and print the roots (real or complex) by normally.
9. Write a FORTRAN program to solve a quadratic equation $ax^2 + bx^2 + cx + d = 0$ and print the roots (real or complex) by using Case construct.
10. Write a FORTRAN program, which reads n elements in an array and prints them in ascending order and descending order.
11. Write a FORTRAN program to print prime numbers and how many prime numbers between a specified range (m, n ; $m < n$).
12. Write a program to find the biggest number of $u, v, \& w$
13. Write a FORTRAN program to print some Fibonacci sequence (i.e. $n \leq 20$).
14. Write a Fortran'90 program to find the sum of digits of a number in Particularly (at least 7 digits).
15. Write a Fortran'90 program to find the sum of digits of any integer number.
16. Write a FORTRAN program to print the product of an expression such as $(1/2)(3/4)(5/6) \dots$ upto n terms.
17. Write a FORTRAN program to print the product of an expression such as $(1/(a+b))(2/(a+2b))(3/(a+3b)) \dots$ upto n terms.
18. Write a FORTRAN program to print the product of an expression: $(b/r)(2b/(r+a)^2)(3b/(r+2a)^3) \dots$ upto n terms.
19. Write a FORTRAN program to print the sum of an expression such as $1 + 1/2^2 + 1/3^2 + \dots$ upto n terms.
20. Write a FORTRAN program to print the sum of an expression such as $1/a + 2/(a+b) + 3/(a+2b) + 4/(a+3b) + \dots$ upto n terms.
21. Write a FORTRAN program to print the sum of an expression such as $x + x^2/2! + x^3/3! + \dots$ upto n terms.

22. Write a FORTRAN program to print the sum of an expression such as $b/r + 2b/(r+a)^2 + 3b/(r+2a)^3 + \dots$ upto n terms.
23. Write a FORTRAN program to calculate the sum of series such as $(1-2x)^{-1}$; when $|x| \leq 1/2$
24. Write a FORTRAN program to calculate the sum of series such as $\sin x = x - x^3/3! + x^5/5! - \dots$
25. Write a FORTRAN program to calculate the sum of series such as $\cos x = 1 - x^2/2! + x^4/4! - \dots$
26. Write a FORTRAN program to calculate the sum of series such as $\tan x = x + x^3/3 + 2x^5/15 + \dots$
27. Write a FORTRAN program to calculate the sum of series such as $e^x = 1 + x + x^2/2! + x^3/3! + \dots$
28. Write a FORTRAN program to calculate the sum of series such as $\text{Log}(1+x) = x - x^2/2 + x^3/3 - x^4/4 + \dots$
29. Write a FORTRAN program to calculate the sum of series such as $(1+x)^{-1}$; when $|x| \leq 1 = 1 - x + x^2 - x^3 + \dots$
30. Write a FORTRAN program to calculate the sum of series such as $(1-x)^{-1}$; when $|x| \leq 1 = 1 + x + x^2 + x^3 + \dots$
31. Write a FORTRAN program to calculate the sum of series such as $(1+bx)^{-1}$; when $|x| \leq 1/|b|$
32. Write a FORTRAN program, which reads n elements in an array and Given a set of points $(x_1, y_1), (x_2, y_2), (x_3, y_3), \dots (x_n, y_n)$ to fit a straight line $y = mx + c$.
33. Write a FORTRAN program, which reads two matrices and print their Sum in matrix form.
34. Write a FORTRAN program, which reads two matrices and print their Subtraction in matrix form.
35. Write a FORTRAN program, which reads two matrices and print their Multiplication in matrix form.
36. Write a FORTRAN program, which reads two matrices and print their Sum, Subtraction and Multiplication in matrix form.
37. Write a FORTRAN program, which reads n elements and write some Functions subprogram to print the values of Sum, AM, GM and SD.
38. Write a FORTRAN program, which reads n elements and write some Subroutine subprogram to print the values of Sum, AM, GM and SD.
39. Write a FORTRAN program to solve a quadratic equation $ax^2 + bx^2 + cx + d = 0$ and print the roots (real or complex) by subroutine subprogram.
40. Write a FORTRAN program to calculate the the value of y from the following using function.

$$\begin{aligned} y &= 2x^2 + 3x + 4 \text{ for } x < 2 \\ y &= 0 \text{ for } x = 2 \\ y &= 2x^2 + 3x - 4 \text{ for } x > 2. \end{aligned}$$
41. Write a FORTRAN program to solve a quadratic equation $ax^2 + bx^2 + cx + d = 0$ and print the roots (real or complex) by function subprogram.
42. Write a FORTRAN program to output along with the following input data, the charges for use of electricity of customers.
 An electricity company has three categories of customers: Industrial, Bulk Industrial and Domestic. The rates are:
 (a) For Industrial minimum upto 150 units tk. X fixed. Next 150 units rate tk. P per unit. Next 200 units rate tk. Q per unit and above this units rate tk. R per unit.
 (b) For Bulk Industrial minimum upto 100 units tk. Y fixed. Next 100 units rate tk. U per unit. Next 200 units rate tk. V per unit and above this units rate tk. W per unit.
 (c) For Domestic minimum upto 50 units tk. A per unit and minimum upto 75 units tk. B per unit. Next 125 units rate tk. C per unit. Next 200 units rate tk. D per unit and above this units rate tk. G per unit.
 Given the customer id number, category of customer, the previous meter reading and the current reading, demand charge tk. 30 then including vat 5%.