Ref. No.: Ex/CE/5/T/104/2022

BACHELOR OF ENGINEERING (CIVIL ENGINEERING) EXAMINATION 2022

(First Year, Second Semester)

SUBJECT: COMPUTER PROGRAMMING - I

Time: Three Hours | Full Marks 100 (50 marks for each part)

Use a separate Answer-Script for each part

No. of questions	Part I	Marks
	Answer Question **No.1** and any **Two** from the rest.	
1.	Answer any one question	
	a) Write a computer program in FORTRAN 77 using False-position method that finds a root of the equation $x^2 - 6x + 8 = 0$ between 0.00 and 3.00, using tolerance of 0.001.	10
	b) Write a FORTRAN 77 program to estimate a value y at a point x from a given table of values of x and y by using n^{th} order Lagrange interpolation polynomial.	10
2.	a) Using Newton-Raphson method, using two iterations ,determine the roots of the following non-linear simultaneous equations, close approximation to start with x =1.50 and y = 0.50 $x^2 + xy + y^2 = 7$ $x^3 + y^3 = 9$	12
	b) Explain the limitations of using Newton-Raphson Method.	4
	c) Using Newton-Raphson method, using two iterations, find a root of the function $f(x) = 2x^3 + x^2 - 1 = 0$, in the vicinity of $x = 0.40$.	4
3.	a) What is an initial-value problem? How is it different from a boundary value problem?	3
	b) Describe how Taylor's theorem of expansion can be used to solve a differential equation.	3
	c) Explain Predictor – Corrector method for solving initial-value problem for the type $\frac{dy}{dx} = f(x,y)$ with initial condition $y = y_i$ at $x = x_i$.	6
	d) Using Runge-Kutta method of order four find y at x = 0.20 and 0.30 by solving $\frac{dy}{dx} = 2x + 3y^2$ and y(0.1) = 1.12 Assume step size (h) = 0.10.	8
4.	a) Derive formula for Bisection method. How it differs from False position method.	4
	b) Write an algorithm to find root of a non-liner equation f(x) = 0 using Secant method.	4
	c) Using What is interpolation? Given a set of n+1 points, state the general form of nth degree Lagrange interpolation polynomial.	4
	d) For the following table of values:	8

x	-2.0	-1.0	0.0	4.00
f(x)	-2.0	4.0	1.0	8.00

Find f(x) for x = 2.0 using Lagrange interpolation. What order of polynomial would you use in the above problem?

[Turn over

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SUBJECT: COMPUTER PROGRAMMING-I

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Full Marks 100
(50 marks for each part)

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No. of Question	PART – II	
1.(a)	Write the equivalent FORTRAN expression for the following arithmetic statement: $Y=1-\|X\| e^{-by}$	2
(b)	Write the equivalent arithmetic expression for the following FORTRAN statement: Y=a**b/c+d**e*f-h/p*r+q	2
(c)	What will be the printed output, at the end of the following program segment? m= - 567 a=0.999 WRITE(*,8) m,a 8 FORMAT(2X,I8,F8.2) END	2
(d)	What will be the value of the variable n, at the end of the following program segment? X=0 DO I=1,5,3 Do J=2,3 X=X+1.0 END DO END DO WRITE (*,*) X END	2
2.	Write short notes on the following. a) Different block if –statement. b) Function subprogram and subroutine subprogram c) Rules to be followed in written DO-Loop. d) Library function in FORTRAN	4x3=12

No. of Question		
3.	Answer any two Questions.	15x2=30
a)	i) Write a FORTRAN program to print ascending order form given input as N number integer.	8
	ii) Given integer number, write a FORTRAN program to find number is prime or not.	7
b)	i) Write a FORTRAN program, to product of two Matrices [A] and [B], both of size (2x3) and (3X2) respectively and store the result in a separate matrix [C].	9
	ii) Write step-wise Algorithm and draw the flow chart to find big number from given three integer number.	6
c)	i) Write a FORTRAN program to the sum of following series for the first N terms, using function subprogram. Y=1+ 2/2! - 3/3! +……	8
	ii) Write a FORTRAN program to find the value of $^{n}c_{r}$, using subroutine subprogram.	7