Form A: Paper –Setting Blank

Ref No. – **Ex/ES/CM/T104B/2019**

B.C.E. 1ST YEAR 2ND SEMESTER 2019

(1st / ~~2nd~~-Semester ~~/ Repeat / Supplementary / Annual / Bianual~~)

SUBJECT: *Computer Programming & Numerical Methods*

Time: ~~Two hours~~/Three hours/~~Four hours/ Six hours~~

Full Marks 100

(50 marks for each part)

Use a separate Answer-Script for each part

PART – I

Answer any THREE from Q.1 and any TWO from Q.2

1.a) Certain experimental values of x and y are given below. Form an Exponential Function in the form of $y=ae^{bx}$, using **Least Square Method**. Find value of y when x=48. — 10

X	10	20	40	50	56
Y	100	110	120	150	200

b) Find inverse of [A] by **Gauss Jordan Method**. Hence find solution of x_1, x_2 and x_3 of the equation [A] {x} = [B] by **matrix inversion method**. — 10

$$[A] = \begin{bmatrix} 1 & 1 & 1 \\ 4 & 3 & -1 \\ 3 & 5 & 3 \end{bmatrix} \qquad [B] = \begin{bmatrix} 2 \\ 3 \\ 6 \end{bmatrix}$$

c) Using *Runge Kutta Method of order 4*, find y (0.2) given that $dy/dx = (2x^2+y^2)$, y (0) = 1.5. Take h=0.1. — 10

d) Obtain Newton's Forward Interpolating Polynomial for the following data and interpolate the value at x= 1.6 — 10

X	1.0	1.4	1.8	2.2
Y	3.49	4.82	5.96	6.50

2. a) Derive the difference form of first and second derivative of y w.r.t x when y is known at 3 points (x_{i-1}, y_{i-1}) , (x_i, y_i), (x_{i+1}, y_{i+1}). — 10

b) Find the largest eigen-value and corresponding eigen-vector of [P] using Power method with initial approximation $[1\ 0\ 0]^T$. — 10

$$[P] = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

c) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using i) Trapezoidal Rule ii) Simpson's 1/3 rd rule. Take h=1. Compare the result with actual value. — 10

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	Use a separate Answer-Script for each part PART – II	
	Q.1 and Q2 are compulsory and any two from Q3 to Q5.	
1.	Define FLOW CHART. Describe flow chart of:,IF, IF…ELSE, CASE .. SWITCH, FOR LOOP, WHILE LOOP And DO LOOP.	15
2.a)	Explain FORTRAN Data Type.	
b)	Write briefly Arithmetic Expressions and Operand evaluation order of a FORTRAN program.	5+5+5=15
c)	What are Overloaded operators?	
3. a)	State briefly Execution Control in FORTRAN PROGRAMMING. (Can explain writing any simple program)	
b)	What is a FUNCTION? What is a Procedure? Describe Differences between a Function and Procedure.	4+4+2=10
c)	Write a Complete program describing a procedural call to find out the area of a Circle.	
4. a)	What are Intrinsic Functions? What are Key Words? Explain one Intrinsic Function Briefly.	
b)	Write a 3x3 Matrix Multiplication program in FORTRAN.	5+5=10
5.	State the meaning of following functions: i. ALL(MASK, dim) ii. COUNT(MASK, dim) iii. BTEST(I, POS) iv. IOR(I, J) v. ISHFTC(I, SHIFT, size) vi. DIGITS(X) vii. PRECISION(X) viii. LOGICAL(L, kind) ix. IACHAR(C) x. INDEX(STRING, SUBSTRING, back)	10