Form A: Paper –Setting Blank

Ref No. –Ex/CE/T/215/12/09 (old)

B.E. CIVIL ENGINEERING
SECOND YEAR FIRST SEMESTER EXAM 2019 (Old)
(1st / 2nd-Semester ~~/ Repeat / Supplementary / Annual / Bianual~~)
SUBJECT: *Numerical Analysis & Computer Programming*
(Name in full)

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

No. of Group	PART – I	Marks
	Answer **Q 1.** and **any three** from the rest.	
1.	Solve the following equation by *LU decomposition* method. x1+2x2+4x3-3x4 = 1 x1+x2+x3+x4 = 3 2x1-2x3+3x4 =4 x1-x2-x3+x4 = 1 Or, Solve the previous equations by *Gauss Elimination* method.	14
2.	Solve the following equation by *method of bisection*. Find out the result correct upto 3 decimal points. Use tabular form showing only one sample calculation. The root lies between (1 and 2). $\cos(x) + \sin(x) = xe^x - 2.975$	12
3.	Use *Newton Raphson method* of two variables to solve the equations $x=x^2+y^2$, $y=x^2-y^2$ Correct to two decimals, starting with the approximation (0.8, 0.4).	12
4	The following table gives the viscosity of oil as a function of temperature. Use *Lagrange's formula* to find viscosity of oil at a temperature of 140^0.	

Temp (^{0})	110	130	160	190	200
Viscosity	10.8	8.1	5.2	4.8	4.1

12

5.	Using *Runge Kutta Method of order 4*, find y (0.2) given that $dy/dx = 3x+0.5y^2$, y (0) = 1. Take h=0.1.	12
6.	Write short notes :	
a)	Gauss Seidal Method	
b)	Inconsistent Equations	4+2+4= 10
c)	Non-linear Curve fitting	

.....*B.E.CIVIL ENGINEERING 2nd Year 1st Semester [OLD]*..... EXAMINATION, *2019*

SUBJECT .....*NUMERICAL ANALYSIS AND COMPUTER PROGRAMMING* .....

PAPER .....--.....

Full Marks 100
(50 marks for each part)

Time: **Three hours**

Use a separate Answer-Script for each part

No. of Questions	PART ~~I~~ II	Marks
	Answer Q1 and any four from rest	
1.a)	Why do we require 'compilation' of FORTRAN computer programme?	[2+4+ 2+2 =10]
1.b)	Write the equivalent FORTRAN statements of the following arithmetic equations i) $A=\dfrac{B}{2.5-\dfrac{G}{x^2+\cos(3\alpha)}}$ ii) $s=\tan^{-1}\left(\dfrac{\log_{10} k}{\lvert\beta-4.1\delta\rvert}\right)$	
1.c)	State whether the FORTRAN statements are correct or not. If not, rewrite the statement after rectifying them. i) `READ(2,2)"SUM=",S` ii) `Y=SQRT(TS/N)`	
1.d)	What is difference between 'STOP' and 'END' statements used in FORTRAN programme?	
2.	Write a FORTRAN programme that is capable of finding both real and imaginary roots of quadratic equation $ax^2+bx+c=0$.	10
3.	Write a FORTRAN program that will take co-ordinates (x,y) of the three points in a plane and determines whether these points can form a triangle or not.	10
4.	Write a FORTRAN program to check a given integer is prime or not.	10
5.	Write a FORTRAN programme to calculate the sum of the following series upto n-th term: $S=1-\dfrac{3}{x^2}+\dfrac{5}{x^3}-\dfrac{7}{x^4}+\ldots$	10

(Contd. to page 2)

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PAPER .....

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
	(Contd. from page 1)	
6.	Write a FORTRAN program that tabulates the values of the following function f(x,y) for the range of x and y as given below and determines their arithmetic mean: $\mathbf{F(x,y) = 7x^2 - xy + 10y}$ Range of x: –2.2 to 4.6 with the increment 0.2 Range of y: –6.5 to 0.0 with the increment 0.5	10
7.	Write a FORTRAN programme that reads the elements of a matrix of size (4x6) row-wise and then finds out the **minimum element** from the elements of **each row** and the **maximum element** from the elements of **each column.**	10
8.	Write a FORTRAN programme that reads the elements of a matrix [B] of size (4x6) in column-wise order & [D] of size (4x4) in row-wise order and calculates $[S] = [B]^T.[D].[B]$ and displays the elements of [S] row-wise order.	10
9.	Write a FORTRAN subprogram to calculate the factorial of an integer. Using this subprogram, write a FORTRAN programme to calculate the value of $${}^nC_r = \frac{n!}{r!(n-r)!}$$	10

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