.........*B. Civil Engg. 2nd Year 1st Semester [Supplementary] (OLD).........* EXAMINATION, *2017*

SUBJECT ....Numerical Analysis and *Computer Programming(OLD)*...........

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	Marks
	Answer Q.1 and ANY FIVE questions from the rest	
1.a)	Write the equivalent FORTRAN statements of the following arithmetic equations i) $Z = \dfrac{e^{|x+y|}}{x+y} - \dfrac{e^{|x-y|}}{x-y}$ ii) $g = \sin(\log_{10}(p+q)) - \sin 60^0$	[4+2x3 = 10]
1.b)	Answer, in brief, the following questions: i) What do you mean by compiler? ii) What are the differences between the executable and non-executable statements? iii) Give examples of 'Arithmetic IF' and 'Computed GO TO' statement.	
2.	Write a FORTRAN programme to find out the real roots of a quadratic equation $ax^2 + bx + c = 0$. It should display the message if the roots are imaginary.	8
3.	Write a FORTRAN program to determine the '*arithmetic mean*' of n real numbers x_1, x_2, x_3, ... x_n having the frequencies f_1, f_2, f_3, ... f_n.	8
4.	Write a FORTRAN programme to check whether a given integer is divisible by either 7 or 11 or not.	8
5.	Write a FORTRAN program to determine the 'directions of principal planes' and 'the principal moment of inertia' using the following expressions and find the maximum and minimum principal moment of inertia. $\theta_1 = \left(\dfrac{1}{2}\right)\tan^{-1}\left(\dfrac{2.I_{yz}}{I_{zz}-I_{yy}}\right)$ and $\theta_2 = \theta_1 + 90^0$ $I_{uu} = \left(\dfrac{1}{2}\right)(I_{zz}+I_{yy}) - \left(\dfrac{1}{2}\right)(I_{zz}-I_{yy})\cos(2\theta) - I_{yz}\sin(2\theta)$ $I_{vv} = \left(\dfrac{1}{2}\right)(I_{zz}+I_{yy}) + \left(\dfrac{1}{2}\right)(I_{zz}-I_{yy})\cos(2\theta) + I_{yz}\sin(2\theta)$	8

.........*B. Civil Engg. 2ⁿᵈ Year 1ˢᵗ Semester [Supplementary] (OLD)*......... EXAMINATION, *201*

SUBJECT .... **Numerical Analysis and *Computer Programming(OLD)***...........

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

Full Mark

(50 marks for each

Time: **Three hours**

Use a separate Answer-Script for each part

No. of Questions	PART I	M:
	(Contd. from page 1)	
6.	Write a FORTRAN program to calculate the harmonic mean of all integers in the range 65 to 90.	
7.	Write a sub-programme to calculate the factorial of an integer number. Using this, write a FORTRAN main-programme to calculate **nCr** where n and r will be given by the user. $$^nC_r = \frac{n!}{r!(n-r)!}$$	
8.	Write a FORTRAN sub-programme that finds the largest and smallest elements from an one dimensional array. Using this subprogramme, write a FORTRAN programme to find the smallest and largest element from the principal diagonal of a matrix of size 5x5.	
9.	Write a FORTRAN subprogram to calculate the sum $S = a_1b_1 + a_2b_2 + \ldots + a_nb_n$. Using this subprogram, write a FORTRAN programme to calculate the following quantity $$R = \frac{\sqrt{x_1^2 + x_2^2 + \ldots + x_n^2} \times \sqrt{y_1^2 + y_2^2 + \ldots + y_n^2}}{\sqrt{x_1y_1 + x_2y_2 + \ldots + x_ny_n}}$$ where $x_1, x_2, x_3, \ldots x_n$ and $y_1, y_2, y_3, \ldots y_n$ will be given by the user.	

=== END ===

Full Marks 100

(50 marks for each part)

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

Use a separate Answer-Script for each part

No. of Question	PART – II
	Answer any FIVE (All questions carry equal marks)
1.	Solve the following equation by *Gauss Elimination* method. $3X_1+4X_2-X_3 = 15$ $5X_1-3X_3 = 11$ $2X_1-3X_2-2X_3 = -1.5$
2.	Solve the following equation by *Newton Raphson Method.* Find out the result correct upto 3 decimal points. Use tabular form showing only one sample calculation. Start with guess value x=0. $xe^x +\ln(x)- \cos(x)= -0.6$
3.	Use *Newton Raphson method* of two variables to solve the equations $x^4-x^2 +y = 74.245$ $x -y^3+xy = -56.805$ Correct to two decimals, starting with the approximation (2.7, 4).
4.	Using *Runge Kutta Method of order 4*, find y (0.4) given that $dy/dx = x^3+xy-y^2$, $y(0) = 0$. Take h=0.2.
5.	The following table gives the value of X and Y, Y being the dependent variable. Use *Lagrange's formula* to find value of Y when X = 4.

X	1	3	5	8
Y	22.3	500.4	650.5	793.3

6. Write short notes (ANY TWO):

a) Method of Bisection

b) Gauss Seidal Method

c) Ill-Conditioned System of equations