GUJARAT TECHNOLOGICAL UNIVERSITY ME – SEMESTER-1 (NEW) EXAMINATION – WINTER 2016

Date:03/01/2017 Subject Code: 2710210 Subject Name: Numerical methods for computer engineering Time: 2:30 pm to 5:00 pm **Total Marks: 70 Instructions:**

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.

Q.1 **(a)** Explain in brief the method of least square for fitting straight line y=a+bx for a 07 given table of data. $\begin{bmatrix} x & 1 \end{bmatrix}$ Δ 6 8 9 3 11 14

			-	5		U	0	-		- ·	
		у	1	2	4	4	5	7	8	9	
	(b)	Discuss i Find the digits.	in brief p relative	pitfalls in percenta	computi age error	ng . Also if (2/3) i	explain s approxi	various t imated t	ypes of e to four s	errors. ignificant	07
Q.2	(a)	Solve us	ing bise	ction me	thod 2 sir	x - x = 0).				07
	(b)	Utilize the Newton Raphson method to solve $f(x) = x^4 - x^3 + 10x + 7 = 0$ correct to three decimal places with a=(-2) and b=(-1).									
	-					OR					. –
	(b)	Impleme	nt the se	cant met	hod to so	olve cos:	$x - xe^x =$	0 with	$x_0 = 0,$	$x_1 = 1$	07
Q.3	(a)	Explain eliminati	procedu	re to s od for th	olve a ree unkno	linear owns.	system	of equat	ion usi	ng gauss	07
	(b)	Apply G_{3x-2y}	auss Jore	dan meth	od to sol	ve the sys	stem				07
		4x+y+	-2z=4								
		2 x-y +	-4Z— /			OR					
Q.3	(a)	Perform Bairstows method to extract a quadratic factor $x^2 + px + q$ from the									07
		polynomial $x^4 + x^3 + 2x^2 + x + 1 = 0$ with p= 0.5 and q=0.5.									
	(b)	$\frac{\pi}{2}$									07
		Evaluate	using Si	impsons	3/8 rule	$\int_{0}^{2} \frac{\cos x}{1+x} dx$	$h = \frac{\pi}{12}$				
Q.4	(a)	Use Mo	dified Ei	uler met	hod to so	blve $\frac{dy}{dx}$	= x + y	y(0) = 10	obtain y(0.1) using	07
		h=0.05.				a x					
	(b)	Apply R	unge Ku	tta 4 th or	der meth	od to solv	$ve \frac{dy}{dx} = y$	$v^2 + x y$	y(0) = 1.f	ind y(0.2)	07
		with h=0.	.1.								
						OR					
Q.4	(a)	Solve the	e bounda	ary value	ed proble	m $\frac{d^2 y}{dx^2} =$	y with	y(0)=0 ar	nd y(2)=3	.627. find	07
		y(1.5) wit	th h=0.5.								

- **(b)** Solve using shooting method, y''(x) = y(x) with y(0) = 0 and y(1) = 1.1752
- 1

07

Q.5 (a) Use lagranges interpolation formula to find the value of y when x=10, if the **07** value of x and y are given by

Х	5	6	9	11
У	12	13	14	16

(b) Fit a curve $y = ae^{bx}$ to the experimental data given,

Х	2	4	6	8	10				
У	4.077	11.084	30.128	81.897	222.62				
OR									

Q.5 (a) Define geometric mean and find the mean weight of 470 infants born in a 07 hospital in one year from the following data

			0			
Weight	2.0-2.4	2.5-2.9	3.0-3.4	3.5-3.9	4.0-4.4	4.5-4.9
of						
infants						
in kg						
No of	17	97	187	135	28	6
infants						

(b) Find the correlation coefficient between the serum diastolic blood pressure and 07 serum cholesterol levels of 10 randomly selected data of 10 persons

Persons	1	2	3	4	5	6	7	8	9	10
Cholesterol	307	259	341	317	274	416	267	320	274	336
BP	80	75	90	74	75	110	70	85	88	78

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