GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER-II(Old course) • EXAMINATION (Remedial) - WINTER- 2015

Suk Suk Tin	oject (oject] ne:2::	Code: 1722309 Date: 15/12/201 Name: Numerical Methods 30 nm to 5:00 nm Total Marks: 7	Date: 15/12/2015 Total Marks: 70				
Inst	ruction 1. 2. 3.	I occur fractions in a figure source of the figure	Ū				
Q.1	(a)	Derive the iterative formula to find $\frac{1}{\sqrt{N}}$ and hence find $\frac{1}{\sqrt{14}}$.	07				
	(b)	 (1) Discuss different types of errors with example. (2) Explain partial pivoting 	04 03				
Q.2	(a) Find the root of the equation $\cos x = xe^x$ using regula-falsi method of						
	(b)	tour decimal places. The following table gives the viscosity of oil as a function of temperature. Use Lagrangeøs formula to find viscosity of oil at a temperature of 140° .	07				
	(b)	Use the Trapezoidal rule to estimate the integral $\int_{0}^{2} e^{x^{2}} dx$ taking 10 intervals	07				
Q.3	(a)	Apply Runge ó Kutta method to find approximate value of y for $x = 0.2$, in	07				
	steps of 0.1, if $\frac{dy}{dx} = x + y^2$, given that $y = 1$ when $x = 0$.						
	(b)	Find a root of the equation $x^3 - 4x - 9 = 0$, using bisection method correct to three decimal places.	07				
Q.3	(a)	Describe in detail the pitfalls of Gauss Elimination Method.	07				
	(b) Using Newtonøs iterative method, find the real root of $x \log_{10} x = 1.2$ corr five decimal places.						
Q.4	(a)	The velocity v (km/min) of a train which starts from rest at time t (min), is given in following table:	07				
		$\begin{array}{c ccccccccccccccccccccccccccccccccccc$					
	Estimate approximately the distance covered in 20 min. $2 - 0$						
	(b) Fit a second degree parabola to the following data:						
		x 1989 1990 1991 1992 1993 1994 1995 1996 1997					
		y 352 356 357 358 360 361 361 360 359					
	OR 1.4						

Q.4 (a) Compute the value of
$$\int_{0.2}^{1+\pi} (\sin x - \log x + e^x) dx$$
 using Simpson $\frac{3}{8^{\text{th}}}$ rule. 07

07

(b) An experiment gave the following values:

v (ft/min)	350	400	500	600
$t(\min)$	61	26	7	2.6

It is known that v and t are connected by the relation $v = at^b$. Find the best possible values of a and b.

Q.5	(a)	Explain algorithm for Modified Euler Method.	07
	(b)	Solve, by Gauss Elimination Method, the equations	07
		10x - 7y + 3z + 5u = 6	
		-6x + 8y - z - 4u = 5	
		3x + y + 4z + 11u = 21	
		5x - 9y - 2z + 4u = 7	
		OR	
Q.5	(a)	Explain algorithm for Eulerøs Method.	07
	(b)	Solve, by Gauss ó Seidal Method, the equations correct to four decimal places	07

$$20x + y - 2z = 17$$

$$2x - 3y + 20z = 25$$

$$3x + 20y - z = -18$$
