

Reg.No. _____



Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

End Semester Examination – Nov/Dec – 2016

Code : **15MA3011**
Sub. Name : **Numerical Analysis**

Semester : **2016-17 ODD**
Duration : **3hrs**
Max. marks : **100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks												
1.	a.	Prove that the rate of convergence is quadratic in Newton Raphson Method	C02	10												
	b.	Solve by L-U Decomposition method: $x+y+z = 3$, $2x-y+3z = 16$, $3x+y-z = -3$	C01	10												
(OR)																
2.	a.	Solve by Gauss Seidal Method: $27x+6y-z = 85$, $6x+15y+2z = 72$, $x+y+54z = 110$	C01	10												
	b.	Solve by Iteration Method: $x^3+x^2-1 = 0$	C01	10												
3.	a.	From the following table find $f(-0.5)$ and $f(0.5)$ using Hermite's Interpolation.	C01	20												
		<table><tr><td>x</td><td>-1</td><td>0</td><td>1</td></tr><tr><td>f(x)</td><td>1</td><td>1</td><td>3</td></tr><tr><td>f'(x)</td><td>-5</td><td>1</td><td>7</td></tr></table>			x	-1	0	1	f(x)	1	1	3	f'(x)	-5	1	7
		x			-1	0	1									
		f(x)			1	1	3									
f'(x)	-5	1	7													
(OR)																
4.	a.	From the following table fit quadratic splines with $M(0) = f^{(1)}(0) = 0$ and hence find $f(2.5)$	C01	10												
		<table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>f</td><td>1</td><td>2</td><td>33</td><td>244</td></tr></table>			x	0	1	2	3	f	1	2	33	244		
		x			0	1	2	3								
f	1	2	33	244												
	b.	Derive the error in Lagrange's interpolation.	CO2	10												
5.	a.	Evaluate $\int_0^6 \frac{dx}{1+x}$ using Trapezoidal rule, Simpson's(both) rules, Weddle's rule. Verify using actual integration.	C03	15												
	b.	Explain the algorithm of Trapezoidal rule.	C03	5												
(OR)																
6.	a.	Explain the algorithm of Gauss Elimination Method.	C01	10												
	b.	Find $f'(1)$ using Newton's forward formula from the following data.	C01	10												
		<table><tr><td>x</td><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td></tr><tr><td>f(x)</td><td>85.3</td><td>74.5</td><td>67</td><td>60.5</td><td>54.3</td></tr></table>	x	1	3	5	7	9	f(x)	85.3	74.5	67	60.5	54.3		
x	1	3	5	7	9											
f(x)	85.3	74.5	67	60.5	54.3											

7.	a.	Solve $dy/dx = e^x - y$, $y(0)=0$ using Picard's method and find $y(0.1)$	C01	10
	b.	Solve $dy/dx = y - (2x/y)$, $y(0)=1$ using Modified Euler method and find $y(0.1)$ and $y(0.2)$	C01	10
(OR)				
8.	a.	Solve $(dy/dx) + (y+xy^2) = 0$, $y(0)=1$ using Third order Runge kutta method and Fourth order Runge kutta method. Find $y(0.1)$ and $y(0.2)$	C01	20
<u>Compulsory:</u>				
9.	a.	Find $y(2)$ given that $dy/dx = (x+y)/2$, $y(0)=2$, $y(0.5)=2.636$, $y(1) = 3.595$, $y(1.5) = 4.968$ using (i) Milne's Predictor and Corrector method (ii) Adam Bashforth Predictor and Corrector method	C01	20

ALL THE BEST