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 : 14MA2006 | **Semester : 2016-17 ODD**
Sub. Name : Numerical methods and computing | **Duration : 3hrs** | **Max. marks : 100**

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	What is the Taylor series of the function $f(x)=3x^5-2x^4+15x^3+13x^2-12x-5$ at the point c=2?	CO 1	7
	b.	Find $P(5)$ from the polynomial $P(x)=-8x^3+7x-8x^4+2x^5-x^2+3$ by using nested multiplication.	CO 1	3
	c.	Write pseudocode for Newton Raphson method	CO 1	10
		(OR)		
2.	a.	Find a root of the equation $f(x)=x^3-x-1$ correct to 4 decimal places by using bisection method	CO 1	10
	b.	Convert 2576.35546875 to octal, binary and hexadecimal forms.	CO 1	10
3.	a.	Find a root of the equation $f(x)=3x-\cos x-1$ using Newton Raphson method.	CO 1	10
	b.	How many steps of the bisection algorithm are needed to compute a root of f to full machine precision on the Marc-32 if a=16 and b=17?	CO 1	5
	c.	Determine f[1,3,-2,4] from the following table: x: 1, 3, -2, 4 y: 2, 6, -1, -4	CO 2	5
		(OR)		
4.	a.	Using the Newton's algorithm, find the interpolating polynomial of least degree from the following table: x: -2, -1, 0, 1, 2 Y: 2, 14, 4, 2, 2	CO 2	12
	b.	Write pseudo code of Newton's interpolating polynomial.	CO 2	8
5.	a.	Find a polynomial of least degree using Lagrange's interpolating polynomial method from the following table: x: 0, 1, 3, 2, 5 Y: 2, 1, 5, 6, -183	CO 2	10
	b.	Use inverse Lagrange's interpolating polynomial method to find x when y=10 from the data given below: X: -2, -1, 0, 1, 2 Y: 2, 14, 4, 2, 2	CO 2	10
		(OR)		
6.	a.	Compute $\int_0^1 e^x dx$ with 11 uniform points using trapezoid rule.	CO 3	10
	b.	Write pseudo code for Romberg's algorithm.	CO 3	10
7.	a.	If the trapezoid rule is to be used to compute $\int_0^1 e^{-x^2} dx$ with an error of at most	CO 3	5

		$\frac{1}{2}\times 10^{-4}$, how many points should be used?		
	b.	Find an approximate value of $\int_1^4 \sin^2 x dx$ using Simpson's one third rule when n=12.	CO 3	**15**
		(OR)		
8.	a.	Evaluate $\int_{-1}^{1} e^{-\frac{x}{2}} dx$ when n=1 and n=2.	CO 3	**10**
	b.	Write pseudo code for Simpson's one third rule.	CO 3	**10**
		Compulsory:		
9.	a.	Determine whether the function $f(x)$ is a linear spline or not : $f(x) = x \ , \ x \in [-1,0]$ $= 1-x \ , \ x \in (0,1)$ $= 2x-2 \ , \ x \in [1,2]$.	CO 3	**5**
	b.	Determine whether the function $Q(x)$ is a Quadratic spline or not : $Q(x) = x^2 \ , \ x \le 0$ $= -x^2 \ , \ 0 < x \le 1$ $= 1-2x \ , \ x \ge 1$.	CO 3	**5**
	c.	Find the equations of the natural cubic interpolating spline for the following data:	CO 3	**10**

x	-1	0	1
y	1	2	-1

ALL THE BEST