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 : 14MA2012
Sub. Name : Numerical Mthods

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

Q. No.	Questions				Course outcome	Marks
	PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)					
1.	The approximating curve is_____.				CO1	
	a.Empirical equation	b. Linear law	c. $y = x^2 y - 2$	d. $x_1 + y_1 = 0$		(1)
2.	In $y = ax + b$, a is called as_____				CO1	
	a. Intercept	b. Slope	c. Origin	d. Point of intersection		(1)
3.	The pattern $y = ax^n$ is reducible to				CO1	
	a. $Y = A + nX$	b. $Y = AX$	c. $y_2 - y_1 = 0$	d. $x_2 - x_1 = 0$		(1)
4.	The method of fitting curve is _____				CO1	
	a. Least squares	b. Unique	c. Isognal method	d. Exponential method		(1)
5.	Slope of the equation 3y = 5x-6				CO1	
	a. $\frac{5}{3}$	b. $\frac{5}{6}$	c.5	d.6		(1)
6.	The principle of least squares is _____.				CO1	
	a. E is minimum	b. E is maximum	c. E>a	d. E < b		(1)
7.	n $\sum y = a\sum x + nb$, n is _____				CO1	
	a zero	b.one	c. Number of observations	d. None of the above		(1)
8.	The linear form of $y = ax^b$ is_____				CO1	
	a. $Y = A + bX$	b. $Y = A - bX$	c. $y = ax + b$	d. $y = ax - b$		(1)
9.	For some observations the normal equations are $55a + 15b + 5c = 200$, $225a + 55b + 15c = 832$, $979a + 225b + 55c = 3672$				CO1	
	a.-5.7143,-11.0858,10.4001	b. 5.7143,11.0858, 10.4001	c. 5.7143,-11.0858, -10.4001	d. 0, 5.7134, 11 , -10.4001		(1)

10.	If $\log_{10} a = 2.5010$, the value of a is_____.				CO1	
	a. 316.95668	b.200	c.343	d. 0.5962		(1)
11.	If f(a) and f(b) are of _____ , a root of f(x)=0 lies between a and b.				CO1	
	a. Opposite signs	b. Same signs	c.Zero	d. One		(1)
12.	For $f(x) = 2x^3 - 3x - 6 = 0$, find the interval a and b where at least one real root lies				CO1	
	a. 2 and 3	b. 0 and 1	c. 1 and 2	d. 2 and 3		(1)
13.	Formula of Newton Raphson Method_____.				CO1	
	a. $\alpha_{r+1} = \alpha_r - \frac{f(\alpha_r)}{f'(\alpha_r)}$	b. $\alpha_{r+1} = \alpha_{r-1} - \frac{f(\alpha_{r-}}{f'(\alpha_r -}$	c. $\alpha_r = \frac{f(\alpha_r)}{f'(\alpha_r)}$	d. $\alpha_{r+1} = \alpha_r$		(1)
14.	For a system of 3 simultaneous linear algebraic equations, $(A,B) = \begin{pmatrix} 2 & 3 & -1 & 5 \\ 0 & -2 & -1 & -7 \\ 0 & 0 & 6 & 18 \end{pmatrix}$, find the value of x, y, z.				CO1	
	a. 2, -1, 3	b. 1, -1, -1	c. 0, 1, 2	d. 1, 2, 3		(1)
15.	The system linear algebraic equations are equivalent to the form _____.				CO1	
	a. $AX = B$	b. $A = B$	c. $AXB = 0$	d. $A'X = B$		(1)
16.	To find the interpolation value nearby central value using the method_____.				CO2	
	a. Gauss's Interpolation formula	b. Newton's Interpolation formula	c. Factorial Polynomial	d. All the above		(1)
17.	In Gauss's backward interpolation formula the value of u is _____.				CO2	
	a. $\frac{x + x_0}{h}$	b. $\frac{x - x_0}{h}$	c. $\frac{x - x_n}{h}$	d. $x - x_n$		(1)
18.	Gauss's Forward formula involves _____ differences below the central line and _____ differences on the line.				CO2	
	a. Odd, odd	b. even, even	c. odd, even	d. even, odd		(1)
19.	Gauss's backward formula can be used when the value of u lies between _____				CO2	
	a. -1 and 1	b. -1 and 0	c. 1 and 2	d. 0 and 1		(1)
20.	Find the polynomial passing through the points (0,0), (1,1), (2,20)				CO2	
	a. $y = 9x^2 + 8x$	b. $y = x^2 + 8x$	c. $y = 9x^2 - 18x$	d. $y = 9x^2 - 8x$		(1)
21.	Let y=f(x). The process of finding x when y is given _____				CO2	
	a. Inverse Lagrange's formula	b. Gauss's Interpolation formula	c. Newton's Interpolation formula	d. Exponential method		(1)

22.	The error in the trapezoidal rule of the order_____.				CO3	
	a. h	b. $h+1$	c. $h-1$	d. h^2		(1)
23.	In Newton Cote's quadrature formula, setting n=1 we get _____				CO3	
	a. Newton's forward formula	b. Gauss's formula	c. Trapezoidal rule	d. Simpson's rule		(1)
24.	The truncation error in Trapezoidal rule is _____				CO3	
	a. $\|E\| < \frac{(b-a)h^2}{12}$	b. $\|E\| < \frac{(b-a)h^2}{12}M$	c. $\|E\| > \frac{(b-a)h^2}{12}M$	d. $\|E\| < \frac{(b-a)^2}{12}M$		(1)
25.	Simpson's three-eighth rule is applicable when the number of intervals n is _____.				CO3	
	a. odd	b. even	c.Multiple of 3	d.Multiple of 2		(1)
26.	The error in the Simpson's one-third rule of the order_____.				CO3	
	a. h	b. $h+1$	c. $h-1$	d. h^4		(1)
27.	Simpson's one-third rule is applicable when the number of intervals n is _____.				CO3	
	a. 1	b. 0	c. odd	d. enen		(1)
28.	In Newton Cote's quadrature formula, setting n=2 we get _____				CO3	
	a. Simpson's one-third rule	b. Gauss's formula	c. Trapezoidal rule	d. Newton's formula		(1)
29.	In trapezoidal rule the interpolating polynomial is _____.				CO3	
	a. Linear	b. Polynomial of degree 2	c. Polynomial of degree 3	d. Polynomial of degree n		(1)
30.	The truncation error in Simpson's one third rule is _____				CO3	
	a. $\|E\| < \frac{(b-a)h^4}{180}M$	b. $\|E\| < \frac{(b-a)h^2}{12}M$	c. $\|E\| > \frac{(b-a)h^2}{12}M$	d. $\|E\| < \frac{(b-a)^2}{12}M$		(1)
31.	In Newton Cote's quadrature formula, setting n=3 we get _____				CO3	
	a. Simpson's one-third rule	b. Gauss's formula	c. Trapezoidal rule	d. Simpson's three-eighths rule		(1)
32.	A factorial polynomial $x^{(2)} =$_____				CO2	
	a. $x-h$	b. $x(x-h)$	c. $x(x-h)(x-h)^2$	d. $x(x-h)(x-2h)$		(1)
33.	$\Delta^n y_i =$				CO2	
	a. $\Delta^{n-1}y_{i+1} - \Delta^{n-1}y_i$	b. $\Delta^{n-1}y_{i+1}$	c. $\Delta^{n-1}y_i$	d. $\Delta^{n-1}y_{i+1} + \Delta^{n-1}y_i$		(1)
34.	The sum of the squares of the residuals of straight line fit is _____				CO1	
	a. $E = \sum y^2 - a\sum xy - b\sum y$	b. $E = \sum y^2 - a\sum xy$	c. $E = ax^2 + bx + c$	d. $E = ax^2y + bx$		(1)

35.	In Newton forward interpolation method $u =$				CO2	
	a. $\frac{x}{h}$	b. $\frac{x-x_n}{h}$	c. $\frac{x_n}{h}$	d. $\frac{x-x_0}{h}$		(1)
36.	For solving a system of 3 equations, the initial values in Gauss Seidel Method				CO1	
	a. $x=1, y=1, z=1$	b. $x=0, y=1, z=1$	c. $y=0, z=0$	d. $x=0, y=0, z=0$		(1)
37.	Relation between E and Δ is_____				CO2	
	a. $E=\Delta$	b. $E=\Delta+1$	c. $E=\Delta-1$	d. $E=1$		(1)
38.	Error in the Taylor series method is _____				CO3	
	a. $\frac{h^n}{n!} f^n(\theta)$	b. $\frac{h^n}{n!} f^{n+1}(\theta)$	c. $\frac{h^{n+1}}{n!} f^{n+1}(\theta)$	d. $\frac{h^n}{(n+1)!} f^{n+1}(\theta)$		(1)
39.	In Runge Kutta method the solution y(x+h)= _____				CO3	
	a. $y(x)+\Delta y$	b. $y(x)-\Delta y$	c. $y(x)+h\Delta y$	d. $y(x)-h\Delta y$		(1)
40.	In Runge Kutta third order $\Delta y =$ ___				CO3	
	a. $\frac{1}{6}(k_1+4k_2-k_3)$	b. $\frac{1}{6}(k_1-4k_2+k_3)$	c. $\frac{1}{6}(k_1+4k_2+k_3)$	d. $\frac{1}{6}(2k_1+4k_2-k_3)$		(1)

	PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)		
41.	Fit a curve of the form $y=ax^b$ to the data X: 1 2 3 4 5 6 Y: 1200 900 600 200 110 50	CO1	(5)
42.	Find the positive root of $f(x)=2x^3-3x-6=0$ by Newton-Raphson method correct to four decimal places.	CO1	(5)
43.	Solve the following system of equations by Gauss-seidel method $5x-2y+z=-4, x+6y-2z=-1, 3x+y+5z=13$	CO1	(5)
44.	From the following data find the value of y at x=1976 using Newton's backward interpolation formula: X: 1941 1951 1961 1971 1981 1991 Y: 20 24 29 36 46 51	CO2	(5)
45.	**F**ind the seventh term of the sequence 2,9,28,65,126,217	CO2	(5)
46.	Apply Gauss's forward central difference formula and estimate f(32) from the following table: X: 25 30 35 40 Y: 0.2707 0.3027 0.3386 0.3794	CO3	(5)
47.	Using Lagrange's formula of interpolation find y(10) from the following data: X: 5 6 9 11 Y: 12 13 14 16	CO3	(5)
48.	Using Taylor's method, compute y(1.1) and correct to three decimal places given	CO3	(5)

	$\frac{dy}{dx} = x + y$ and y(0)=1.		
49.	Solve the equation $\frac{dy}{dx} = 1 - y$, given y(0)=0 using Modified Euler's method and Find y(0.1).	CO3	(5)
50.	Obtain the values of y at x=0.1, using Runge-kutta method of fourth order for the differential equation $\frac{dy}{dx} = -y$, given y(0)=1	CO3	(5)
	PART C(2 X 10 = 20 MARKS) (ANSWER ANY TWO)		
51.	Fit a straight line and parabola to the following data and find out which one is most appropriate. X: 1 2 3 4 5 Y: 10 12 8 10 14	CO1	(10)
52.	Solve the system of equations by Gauss-Jordan method $x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13$	CO1	(10)
53.	Evaluate $\int_{-3}^{3} x^4 dx$ using (i) Trapezoidal rule, (ii) Simpson's one- third, (iii) Simpson's three-eighth rule.	CO3	(10)

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