CODE : 3805/4203 B.Sc. SEM-III EXAMINATION, APRIL-2015

M-303: Numerical Analysis

TIME :2:30 HOURS TOTAL MARKS:70

INSTRUCTIONS: (1) All questions are compulsory.
(2) Each question carries equal marks.

Q.1	A	prove : $E_r \leq \sum_{i=1}^{n} \left\|\frac{\partial f}{\partial x_i}\right\| \left\|\frac{\Delta x_i}{y}\right\|$	[7]
	B	(1)Define Absolute error and Relative error (2) find the Relative error in computation of x-y , where x= 12.65 ,y= 10.32 and $\Delta x=0.004, \Delta y = 0.002$	[7]
		OR	
Q.1	A	If $y = 3x^4 - 5x + 2$ then find E_a, E_r, E_p in y at x=2 iff error in x is 0.06	[7]
	B	find E_a, E_p, E_r for (i) $V_t=\frac{22}{7}, V_a=3.14286$ (ii)$V_t=\frac{10}{3}, V_a=3.3333$(iii) $V_t=21.5471, V_a=21.5500$	[7]
Q.2	A	Prove that $\mu\delta = \frac{1}{2}(\Delta + \nabla)$ and $\mu=\frac{1}{2}\left[E^{\frac{1}{2}} - E^{\frac{-1}{2}}\right]$	[7]
	B	Express the following polynomials in factorial notation and get their Successive forward difference $f(x) = x^4 - 3x^3 - 5x^2 + 6x - 7$	[7]
		OR	
Q.2	A	show that $\delta^2 y_5 = y_6 - 2y_5 + y_4$ and $y_3 = y_2 + \Delta y_1 + \Delta^2 y_0 + \Delta^3 y_0$	[7]
	B	Prove that $e^x\left(u_0 + x\Delta u_0 + \frac{x^2}{2!}\Delta^2 u_0 + \cdots \ldots\right) = u_0 + u_1 x + u_2\frac{x^2}{2!} + \cdots \ldots$	[7]
Q.3	A	Derive Gauss forward interpolation formula	[7]
	B	Derive Gregory-Newton's backward Interpolation formula And give the formula for error in it .	[7]
		OR	
Q.3	A	Derive Gauss backward interpolation formula	[7]
	B	Derive Gregory-Newton's forward Interpolation formula And give the formula for error in it .	[7]
Q.4	A	Derive Bessel's formula.	[7]
	B	Derive Stirling's formula	[7]
		OR	
Q.4	A	Derive Laplace Everett's interpolation formula	[7]
	B	prove : $\Delta^n y_x = y_{x+n} - {}_nC_1 y_{x+n-1} + {}_nC_2 y_{x+n-2} - \ldots\ldots\ldots + (-1)^n y_x$	[7]
Q.5	A	show that divided differences are symmetrical in all their arguments	[7]
	B	if $x_0, x_1, x_2 \ldots\ldots x_n$ are Equidistant $\Rightarrow [x_0, x_1, \ldots\ldots x_n] = \frac{\Delta^n y_0}{n! h^n}$	[7]
		OR	
Q.5	A	Prove Newton's divided difference formula	[7]
	B	Derive Lagrange's formula	[7]