S.Y.B.Sc. EXAMINATION:MARCH/APRIL 2017

PAPER NO.:M-203 | Numerical Analysis | CODE NO: 8403

TIME:3 HOURS | INSTRUCTIONS(1)ALL QUESTIONS ARE COMPULSORY. (2)EACH QUESTION CARRY EQUAL MARKS | TOTAL MARKS:100

Q.1 A Find value of $\delta^7 y_6$ and $\Delta^6 y_8$ [7]

B Define Absolute error and Relative error and percentage error [7]

C find the Relative error in computation of x-y and x+y , where x= 12.65 ,y= 10.32 and $\Delta x=0.004, \Delta y = 0.002$ [6]

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 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]

C State and prove formula for estimation of errors [6]

Q.2 A Find by Gauss Backward Interpolation formula, the sales of a company for the year 1936 , given [7]

year	1901	1911	1921	1931	1941	1951
sales	12	15	20	27	39	52

B Derive derivative using Gregory-Newton's Forward Interpolation formula [7]

C Derive Gauss Backward Interpolation formula [6]

OR

Q.2 A Derive Gauss forward difference formula [7]

B Derive Gregory-Newton's Forward Interpolation formula. [7]

C Find y at x=0.15 by using Guass backward difference formula given that f(0.10) = 1.132 , f(0.12) = 1.333 , f(0.14) = 1.744 , f(0.16) = 2.358 , f(0.18) = 2.973 , f(0.20) = 3.805 [6]

Q.3 A Derive Strling's formula [7]

B Using Everett's formula ,find value of functions Find f(41) for [7]

X	35	40	45	50	55	60
Y	862	1001	1224	1572	2123	2983

C Derive Lagrange's formula. [6]

OR

Q.3 A Derive Laplace Everett's interpolation formula [7]

B Derive differentiation formula based on stirling formula. [7]

C Find the first and second derivatives of f(x) at x = 2.7 if [6]

X	1.5	2.0	2.5	3.0	3.5	4.0
f(x) = y	3.375	7.000	13.625	24.00	38.875	59.000

Q.4	A	Derive : Euler- Maclaurin's summation formula	[9]
	B	Derive: Trapezoidal rule.	[7]
	C	Find the approximate value of $\int_0^{\frac{\pi}{2}} \sin\theta \, d\theta$ by dividing the interval into six equal parts by Weddle's Rule	[6]
		OR	
Q.4	A	Prove : $Q_{31}(1) = \frac{h}{24}\{-1,13,13,-1\}$	[7]
	B	Derive Simpson's $\frac{1}{3}^{rd}$ rule.	[7]
	C	Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using trapezoidal rule divide it in 6 equal parts.	[6]
Q.5	A	Using Milne's method , solve : $y' = \frac{1}{x+y}$, with initial condition $y(0) = 2, y(0.2) = 2.0933, y(0.4) = 2.1755, y = (0.6) = 2.2493$ then find $y(0.8)$	[7]
	B	Given the differential equation for Runge - Kutta 2nd order $\frac{dy}{dx} = y + x$ with y(0) =1 ,find y(0.2) whenever h = 0.1.	[7]
	C	Derive Taylor's series method	[6]
		OR	
Q.5	A	using method of Iteration, Solve the equation : $f(x) = x^3 + x^2 - 2 = 0$ correct upto four decimal places.	[7]
	B	Derive Picard's method	[7]
	C	using Bisection method,find the real root of : $f(x) = x^3 - 5x - 6$ correct upto four decimal places	[6]