KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Food Engg.) 2015 Admission

IV Semester Final Examination – August - 2017

Cat. No: Basc. 2209

Title: Numerical Methods for Engineering Applications (1+1)

Marks: 50

Time : 2 hours

Part I Answer all the questions [10 X 1 = 10]

1. The bisection method for finding the root of an equation $f(x) = 0$ is -----.
2. The order of convergence in Newton-Raphson method is 2. State true or false.
3. Milne's predictor formula is -----.
4. State true or false. The Runge-Kutta method is self-starting method.
5. The order of the difference equation $y_{n+2} - 2y_{n+1} + y_n = 0$ is -----.
6. In ----- method, we approximate the curve of solution by the tangent in each interval.
7. Simpson's Rule is used for numerical ----- .
8. In the Gauss elimination method for solving a system of linear algebraic equations, triangularization leads to ----- triangular matrix.
9. The number of significant digits in the number 204.020050 is -----.
10. ----- is used to denote the process of finding the values outside the interval (x_0, x_n).

Part II Answer any five questions [5 X 2 = 10]

1. If the temperature of a room is 25°C ± 0.5°C, find the percentage error.
2. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal rule.
3. Find the value of $\int_2^6 \frac{dx}{x}$ using Simpson's rule.
4. Find the P.I of $y_{n+2} - 4y_{n+1} + 3y_n = 5^n$
5. Find by Taylor's series method the value of $y\,(0.1)$ from $\frac{dy}{dx} = x^2y - 1,\ y(0) = 1.$
6. Write Lagrange's interpolation formula.
7. What are the classifications of the partial differential equations?

Part III Answer any five questions [5 X 4 = 20]

1. Find the positive root of $f(x) = 2x^3 - 3x - 6 = 0$ by Newton – Raphson method correct to five decimal places.
2. Prove that $E\nabla = \Delta = \nabla E$.
3. Given $y_3 = 2, y_4 = -6, y_5 = 8, y_6 = 9$ and $y_7 = 17$, calculate $\Delta^4 y_3$.
4. Find the value of y at $x = 21$from the following data

x	20	23	26	29
y	0.3420	0.3907	0.4384	0.4848

5. Using Lagrange's formula of interpolation find $y(9.5)$ given

x	7	8	9	10
y	3	1	1	9

6. Using Newton's divided difference formula, find the values of $f(2), f(8)$ and $f(15)$ given the following table.

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

7. Solve the difference equation $y_{x+3} - 2y_{x+2} - y_{x+1} - 2y_x = 0$.

Part IV Answer any one question **[1 X 10 = 10]**

1. Using Taylor series method, find, correct to four decimal places, the value of $y(0.1)$, given $\frac{dy}{dx} = x^2 + y^2$ and $y(0) = 1$.
2. Apply the fourth order R -K method to find $y(0.2)$ given that $y' = x + y,\ y(0) = 1$.

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