



KERALA AGRICULTURAL UNIVERSITY

B.Tech.(Food Engg) 2016 Admission

IV Semester Final Examination-July 2018

Basc.2209

Numerical Methods for Engineering Applications (1+1)

Marks: 50

Time:2hours

I Fill up the following blanks:

(10x1=10)

- 1 Inmethod the values of x_1, x_2, \dots, x_n are obtained immediately without using back substitution.
 - 2 Lagrange's interpolation formula is used only for ----- intervals.
 - 3 One dimensional heat equation is
 - 4 The positive root of $f(x) = 2x^3 - 3x - 6 = 0$ lies between
 5. Iterative formula of Newton's Raphson method is
- State True or False
- 6 Newton-Raphson method is quadratically convergent.
 - 7 Solution matrix of $AX=B$ by Gauss-elimination method is an upper triangular matrix.
 - 8 Newton's forward interpolation formula is suitable to estimate the interpolations near the middle of the table value.
 - 9 Modified Euler's method is the Runge-Kutta method of fourth order.
 - 10 Error in the trapezoidal rule is of the order h^4 .

II Write Short notes on any FIVE of the following

(5x2=10)

- 1 Define interpolation and extrapolation.
- 2 i) Write trapezoidal rule.
ii) Write Newton's backward difference interpolation formula.
- 3 Classify the PDE $f_{xx} - 2f_{xy} = 0$.
- 4 Using Gauss elimination method solve $2x + y = 3$
 $7x - 3y = 4$
- 5 Find relation between E and Δ
- 6 Form the divided difference table for the following data

x	1	2	4	7	12
f(x)	22	30	82	106	206

- 7 Evaluate $\int_0^1 \left(\frac{1}{1+x^2} \right) dx$ using Trapezoidal rule by taking interval $h = \frac{1}{2}$

P.T.O

III Answer any FIVE of the following.

(5x4=20)

- 1 Solve the equation $x^3 - 2x - 5 = 0$ by Newton Raphson method.
- 2 Using Newton's forward interpolation formula find y at $x = 8$ from the table:

x	0	5	10	15	20	25
y	7	11	14	18	24	32

- 3 Find the value of $\int_1^2 \left(\frac{1}{5+3x}\right) dx$ using Simpson's rule.
- 4 Obtain the values of y at $x = 0.1, 0.2$ using R.K method of second order.
- 5 Solve $\frac{dy}{dx} = x + y$, given $y(1) = 0$, and get $y(1.1)$ by Taylor series method.
- 6 Using Crank-Nicholson's method solve $u_{xx} = 16u_t, 0 < x < 1, t > 0$ given $u(x,0) = 0, u(0,t) = 0, u(1,t) = 100t$. Compute u for one step in t direction taking $h = \frac{1}{4}$.
- 7 Write short notes on classification of partial differential equation of second order.

IV Write Essay on ANY ONE

(1x10=10)

1. Explain briefly Gauss elimination and Gauss Jordan Methods.
2. The following are data from steam table.

Temp °C	140	150	160	170	180
Pressure Kg/cm ²	3.685	4.854	6.302	8.076	10.225

Using Newton's formula, find the pressure of the steam for a temperature of 142°C.
