7. Using Jacobi method compute all the eigen values and the corresponding eigen vectors of the matrix : 20

$$\begin{bmatrix} 2 & \sqrt{2} & 4 \\ \sqrt{2} & 6 & \sqrt{2} \\ 4 & \sqrt{2} & 2 \end{bmatrix}$$

UNIT – D

8. Use Runga-Kutta method of order 4, to find $y(0.2)$, given that $\dfrac{dy}{dx} = 3x + \dfrac{1}{2}y$, $y(0) = 1$, $h = 0.1$. 20

9. Find the solution of the parabolic equation $u_{xx} = 2u_t$, when $u(0,t) = u(4,t)$ and $u(x,0) = x(4-x)$, taking $h = 1$ and $u(x,0) = x(4-x)$, taking h = 1. Find the values upto t = 5. 20

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Roll No. ....

24835

B. Tech 6th Semester

(Fire Tech & Safety)

Examination – May, 2018

APPLIED NUMERICAL TECHNIQUE AND COMPUTING

Paper : FT-310-F

Time : Three Hours] _[Maximum Marks : 100_

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is _compulsory_. Attempt _five_ questions in total by selecting at least _one_ question from each Unit.

1. (a) (i) Define Absolute error & Relative error. $2\dfrac{1}{2}$

      (ii) State difference between Interpolation and Extrapolation. $2\dfrac{1}{2}$

   (b) Drive Newton' Raphson iterative formula for finding cube roots. 5

(c) Find largest Eigen value and the corresponding Eigen vector of the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$. 5

(d) Obtain Taylor series for $y(x)$ where $y' + y^2 = x, y(0) = 1$. Use it to compute $y(0.1)$ up to four decimal places. 5

UNIT – A

2. (a) If $R = 4x^2 y^3 z^4$, find the maximum absolute error and maximum relative error in R, when error in $x = 1, y = 2, z = 3$ respectively are given 0.001, 0.002, 0.003. 10

(b) If $r = h(4h^5 - 5)$, find the percentage error in r at $h = 1$, if the error in h is 0.04. 10

3. (a) Fit a curve of the form $y = ae^{bx}$ to the following data : 10

x :	1	2	3	4	5	6
y :	1.6	4.5	13.8	40.2	125.0	300

(b) Determine $f(x)$ as a polynomial in x for the following data : 10

x :	–4	–1	0	2	5
f(x) :	1245	33	5	9	1335

Hence find f(1).

UNIT – B

4. (a) Find an approximate value of $\log_e^5$ by calculating to 4 decimal places by simpson's $\frac{1}{3}$ rule, $\int_0^5 \frac{1}{4x+5} dx$, dividing the range into 10 equal parts. 10

(b) Drive Newton-Cote's Quadrature formulae. 10

5. (a) Find by Newton-Repson method, a root of equation $x^3 - 5x + 3 = 0$, upto 3 decimal places. 10

(b) Find a root of equation $e^{-x} - x = 0$, correct to 3 decimal places by using secant method. 10

UNIT – C

6. Solve the following system of equations using the Gauss elimination method. 20

$2x + y + z = 12, 8x - 3y + 2z = 20$

$4x + 11y - z = 33$.