Registration no:

Total Number of Pages: 02   <u>**B.Tech**</u>
                                                                        FESM6301

6th Semester Regular / Back Examination 2016-17
NUMERICAL METHODS
BRANCH(S):AEIE, EIE, IEE
Time: 3 Hours
Max Marks: 70
Q.CODE: Z888
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   **(2 x 10)**
   a) Find the formula to find the solution of $\sqrt{N}, (N > 0)$ Using Newton's Raphson Method.
   b) What are the error's in Newton's Raphson and Trapezoidal Rule of numerical integration?
   c) State three point Gauss Quadrature Formula
   d) Using Euler's Method find y(0.1) from $\frac{dy}{dx} = x + y. y(0) = 1 \ with \ h = 0.1$
   e) State Milne's Predictor and Corrector Formulae.
   f) State Newton's Backward formula for interpolation.
   g) Write down the condition for convergence of Newton's Raphson Method for f(x)=0
   h) Convert the binary form $(1100010.101)_2$ to decimal fraction .Then round off to two significant digits and calculate the relative error.
   i) When a system of equations is said to be ill conditioned?
   j) Find the maximum step size so that the integration of f(x)= sin x in the interval [0,π/2] ,is correct to 3 decimal places.

Q2 **a)** Define the secant Method to find root of an equation.   **(2)**
      b) Find the root of the equation x-0.2sin x=0.5 ,lying between (0.5,1) and correct to 4 decimal places using secant method.   **(8)**

Q3 **a)** Solve the equation $x log_{10} x = 1.2$ Using Newton's Method.   **(5)**

      b) Solve the system of equations using Gauss Seidal Iterative method.   **(5)**

      4x+2y+z=14

      X+5y-z=10

      X+y+8z=20

Q4 a) Find all the eigen values of A=$\begin{pmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{pmatrix}$, using power method. **(5)**

b) Fit a Lagrange polynomial to the data: **(5)**

X:1 2   3   5
Y:0 1   26 124
And hence find y(3.5)

Q5 a) Evaluate $\int_{0.2}^{1.5} e^{-x^2} dx$ using three point Gaussian quadrature formula. **(5)**

b) Using Newton's divided difference formula find f(3) from the data: **(5)**
X: 0   1   2   4   5
Y: 1 14 15 5   6

Q6 a) Given $\frac{dy}{dx} = x^2(1 + y)$,y(1)=1 ,y(1.1)=1.233 ,y(1.2)=1.548 **(5)**

,y(1.3)=1.979,Evaluate y(1.4) by Adam's Bashforth Method.

b) Apply modified Euler's method to find y(0.2) and y(0.4) given **(5)**
$\frac{dy}{dx} = x^2 + y^2, y(0) = 1$ by taking h=0.2

Q7 Given **(10)**
$5x\frac{dy}{dx} + y^2 = 2, y(4) = 1, y(4.1) = 1.0049, y(4.2) = 1.0097, y(4.3) = 1.0143. Compute\ y(4.4)$ Using Milne's Method

Q8 **Write short answer on any TWO:** **(5 x 2)**
a) Order of convergence of an equation f(x)=0
b) Single step method and Multi step method for IVP.
c) Error Propagation
d) Interpolation of a polynomial