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Total Number of Pages: 02

B.Tech.
FESM6302

5th Semester Back Examination 2017-18

Advance Numerical Methods

BRANCH: CIVIL, MECH, METTA, MME

Time: 3 Hours

Max Marks: 70

Q.CODE: B156

Answer Part-A which is compulsory and any four from Part-B.

The figures in the right hand margin indicate marks.

Q1 Answer the following questions: *multiple type or dash fill up type* (2 x 10)

- Explain Gauss – Elimination method?
- Solve the system of equations by Gauss elimination method $11x + 3y = 17$, $2x + 7y = 16$?
- What are the advantages of Gauss Seidel method over Jacobi method?
- What is the limitation of power method?
- State the two differences between direct and iterative methods for solving system of equations?
- Define round off error?
- State the principle uses in Gauss- Jordan method?
- For solving a linear system, compare Gauss elimination method and Gauss Jordan method?
- Gauss – Seidel method is better than Gauss Jacobi method. Why?
- Write the Iterative Formula of Newton – Raphson method?

Q2 a) Solve using Gauss Elimination (5)

$$\begin{aligned} 2x_1 + x_2 &= 1 \\ x_1 + 2x_2 + x_3 &= 2 \\ x_2 + x_3 &= 4 \end{aligned}$$

b) Solve using Gauss – Jordan elimination (5)

$$\begin{aligned} x - y + 2z &= -8 \\ x + y + z &= -2 \\ 2x - 2y + 3z &= -20 \end{aligned}$$

Q3 a) Solving the system of equations (5)

$$\begin{aligned} 4x_1 + x_2 + x_3 &= 2 \\ x_1 + 5x_2 + 2x_3 &= -6 \\ x_1 + 2x_2 + 3x_3 &= -4 \end{aligned}$$

using Jacobi method

b) Solve the system of equations (5)

$$\begin{aligned} 4x + 2y + z &= 14 \\ x + 5y - z &= 10 \\ x + y + 8z &= 10 \end{aligned}$$

using Gauss – Seidel iteration method

Q4 a) Solve by orthogonal collocation method $y''(x) = y(x)$ $y(0) = y(1) = 0$? (5)

b) Solve by orthogonal collocation method $y'' + (1 + x^2)y + 1 = 0$ With $y(-1) = y(1) = 0$? (5)

Q5 a) Explain BVP for solving with Finite Difference method? (5)

b) Use the Galerkin method to approximate the solution of equation $y'' + y + x = 0$, subject to the boundary condition $y(0) = 0$ $y(1) = 0$ (5)

