

Registration No:

|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|
|  |  |  |  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|--|--|--|

Total Number of Pages: 02

B.Tech.  
FESM6302

5<sup>th</sup> 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)
- a) Explain Gauss – Elimination method?
  - b) Solve the system of equations by Gauss elimination method  $11x + 3y = 17$ ,  $2x + 7y = 16$ ?
  - c) What are the advantages of Gauss Seidel method over Jacobi method?
  - d) What is the limitation of power method?
  - e) State the two differences between direct and iterative methods for solving system of equations?
  - f) Define round off error?
  - g) State the principle uses in Gauss- Jordan method?
  - h) For solving a linear system, compare Gauss elimination method and Gauss Jordan method?
  - i) Gauss – Seidel method is better than Gauss Jacobi method. Why?
  - j) Write the Iterative Formula of Newton – Raphson method?
- Q2** a) Solve using Gauss Elimination (5)  
 $2x_1 + x_2 = 1$   
 $x_1 + 2x_2 + x_3 = 2$   
 $x_2 + x_3 = 4$
- b) Solve using Gauss – Jordan elimination (5)  
 $x - y + 2z = -8$   
 $x + y + z = -2$   
 $2x - 2y + 3z = -20$
- Q3** a) Solving the system of equations (5)  
 $4x_1 + x_2 + x_3 = 2$   
 $x_1 + 5x_2 + 2x_3 = -6$   
 $x_1 + 2x_2 + 3x_3 = -4$   
using Jacobi method
- b) Solve the system of equations (5)  
 $4x + 2y + z = 14$   
 $x + 5y - z = 10$   
 $x + y + 8z = 10$   
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)

- Q6** a) Solve the system of equation  $u' = 3u + 2v$   $u(0) = 0$   $v' = 3u - 4v$  ,  $v(0) = 0.5$  with  $h = 0.2$  on the interval  $[0, 0.4]$  using R.K method? **(5)**  
b) Using Runge - Kutta method of fourth order, find  $y(0.8)$  correct to 4 decimal places if  $y' = y - x^2$ ,  $y(0.6) = 1.7379$  **(5)**
- Q7** a) Explain Galerkin Fem with example? **(5)**  
b) Define Finite difference methods? Write formula for Finite difference methods? **(5)**
- Q8** **Write short notes on any TWO :** **(5x2)**  
a) Tridiagonal Matrix  
b) Finite Element Method  
c) Finite difference methods