

Code: 5P2C23

M.C.A. II Semester Supplementary Examinations January 2019

Numerical Methods

Max. Marks: 60

Time: 3 Hours

Answer all five units by choosing one question from each unit (5 x 12 = 60 Marks)

UNIT-I

1. a) Perform four iterations of the Newton-Rapson method to obtain the approximate value of $(17)^{\frac{1}{3}}$ starting with the initial approximation $x_0=2$. 6M
- b) Use the Secant method to determine the root of the equation $\cos x - xe^x = 0$. 6M

OR

2. Perform two iterations with the Muller method for the equation $\ln x - x + 3 = 0$, $x_0 = 1/4, x_1 = 1/2, x_2 = 1$. 12M

UNIT-II

3. a) Solve the following equations by using the Gauss elimination method. 6M
 $2x + 2y + z = 1, 4x + 2y + 3z = 2, x + y + z = 3$.
- b) Solve the following equations by using the Gauss seidal method. 6M
 $4x + y + z = 2, x + 5y + 2z = -6, x + 2y + 3z = -4$.

OR

4. Find the largest Eigen value and its Eigen vector of $A = \begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ by using power method. 12M

UNIT-III

5. Find the least squares approximation of second degree for the discrete data

x	-2	-1	0	1	2
$f(x)$	15	1	1	3	19

12M

OR

6. Find the correlation coefficient between x and y from the given data:

x	78	89	97	69	59	79	68	57
y	125	137	156	112	107	138	123	108

12M

UNIT-IV

7. State appropriate interpolation formula which is to be used to calculate the values of $\sqrt{7.5}$ from the following data and hence evaluate it from the given data

x	5	6	7	8
$y = \sqrt{x}$	2.236	2.449	2.646	2.828

12M

OR

8. Use Gauss backward interpolation formula to find $f(32)$ given that $f(25)=0.2707$, $f(30)=0.3027$, $f(35)=0.3386$, $f(40)=0.3794$. 12M

UNIT-V

9. Find the value of y for $x = 0.4$ by Picard's method, given that $\frac{dy}{dx} = x^2 + y^2, y(0) = 0$. 12M

OR

10. Apply the fourth order R-K method to find $y(0.1)$ and $y(0.2)$, given $y' = xy + y^2, y(0) = 1$. 12M
