Registration Number:

Date & Session

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU -27

BCA (Data Analytics)– III SEMESTER

SEMESTER EXAMINATION: OCTOBER 2022

(Examination conducted in December 2022)

BCADA3322 – MATHEMATICS III

Time: 2 Hours **Max Marks: 60**

This paper contains THREE printed pages and THREE parts

PART-A

Answer all the questions **10x1=10**

1. Which of the following is an iterative method?
   a. Gauss Seidel
   b. Gauss Jordan
   c. Factorization
   d. Gauss Elimination
2. Which of the following symbol is known as forward difference operator?
   a. ϕ
   b. ∇
   c. Δ
   d. E
3. The aim of elimination steps in Gauss elimination method is to reduce the coefficient matrix to _____
   a. Diagonal
   b.Identity
   c.Lower triangular
   d.Upper triangular
4. The degree of differential equation (d^2y/dx^2)-8 dy/dx +y =0 is
   a. 1
   b. 2
   c. 3
   d. 4
5. Maxmin principle is
   a. Maximum(row minimum)
   b. Maximum(column minimum)
   c. Minimum (row maximum)
   d. All the mentioned
6. Find limit for the following function $\lim_{(x,y)\to(1,2)} x^3 + 3xy - 2y^2$
   a. 1
   b. 2
   c. -1
   d. -2

7. Using chain rule find dy/dx for the following function $y=\tan x^2$
    a. $2x \sec^2 x^2$
    b. $2x \cos x^2$
    c. $2x \cos^2 x^2$
    d. $2x \tan x^2$
8. Differentiate $f(x,y)= 2x^3+3y^2+5xy$ and find f '(x)
    a. $6x^2+5y$
    b. 6y+5x
    c. 5x+6y
    d. None
9. The order of differential equation is always
    a. Positive Integer
    b. Negative Integer
    c. Rational Number
    d. Whole number
10. False position method is used to solve
    a. Nonlinear equation
    b. System of linear equations
    c. Quadratic equations
    d. Iterative methods

PART B

Answer any four questions **4x5=20**

11. Perform four iterations of a Regula-Falsi method to obtain the root of the equation: *$f(x)= x^3-2x-5 =0$*
12. Find the real root of the equation $f(x)= x^3-x-1=0$ using bisection method.
13. Solve the differential equation : $d^2y/dx^2 - 8dy/dx +15y=0$
14. $\lim_{(x,y)\to(5,5)} x^2 - y^2/(x-y)$. Find Limit.
15. $F(x,y)=2x^3+3y^2+5xy$. find $\frac{\partial^2 f}{\partial x^2}$ and $\frac{\partial^2 f}{\partial y^2}$
16. Solve the following system of equation using Gauss-Elimination method
    x+2y = 3 and 2x+3y = 1.

PART C

Answer any three questions **3x10=30**

17. Find the real root of the equation $x^3-5x+1=0$ lies in the interval [0, 1] and perform four iterations using secant method.
18. Solve by the method of variation of parameters $d^2y/dx^2 +y=x \sin x$

19. Apply $f=\log(x^2+y^2+z^2)$ show that $\frac{\partial^2 f}{\partial x^2} + \frac{\partial^2 f}{\partial y^2} + \frac{\partial^2 f}{\partial Z^2} = \frac{2}{x^2+y^2+Z^2}$ using partial derivative.

20. Find the real root of the equation $x^3-3x-5=0$ using Newton Raphson Method.