

Total Pages : 4

KN-275

BCA (Part-II) (Supp.) Examination, 2022

**THEORETICAL FOUNDATION OF
COMPUTER SCIENCE**

(Differentiation and Integration)

Time Allowed : Three Hours

Maximum Marks : 50

Minimum Pass Marks : 20

Note : Attempt **all five** questions. All questions carry **equal** marks.

Unit-I

1. State and Prove Rolle's theorem.

Or

What is successive Differentiation? Explain with suitable example.

KN-275/1000

(1)

[P.T.O.]

Unit-II

2. Explain Asymptotes with suitable example.

Or

Prove that radius of curvature at the point $(a \cos^3 \theta, a \sin^3 \theta)$ of the curve :

$$x^{2/3} + y^{2/3} = a^{2/3} \text{ is } 3a \sin \theta \cos \theta.$$

Unit-III

3. If $u = \sin^{-1} \frac{x+y}{\sqrt{x} + \sqrt{y}}$, then prove that

$$x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \frac{1}{2} \tan u.$$

Or

Find the directional derivative of $\phi = 3x^2yz - 4y^2z^3$ in the direction of the vector $3i - 4j + 2k$ at the point $(2, -1, 3)$.

Unit-IV

4. Evaluate $\int \frac{2x+5}{\sqrt{x^2+3x+1}} dx$.

Or

Evaluate $\int_1^2 x^2 \log x \, dx$.

Unit-V

5. Evaluate $\int_0^3 \int_1^2 xy(1+x+y) \, dx \, dy$.

Or

Find the area of the Positive quadrant of the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

-----X-----