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Reg No:.....
Name :.....

First Semester FYUGP Degree Supplementary Examination
January 2025
KU1DSCCMT101 - COMPUTATIONAL CALCULUS 1
2024 Admission onwards

Time : 2 hours Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Find x if $ln(x) = 5$.
2. Define vertical asymptote of the curve $y = f(x)$.
3. Define horizontal asymptote of the curve $y = f(x)$.
4. Define inflection point of a curve.
5. State Concavity Test.
6. What is Profit Function and Marginal Profit Function?
7. What is Revenue Function and Marginal Revenue Function?
8. Find all functions g such that $g'(x) = 4sinx + \frac{2x^3 - \sqrt{x}}{x}$.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Find $\lim_{t \to 0} \frac{\sqrt{t^2+9}-3}{t^2}$.
10. Evaluate $\lim_{x \to 2} \frac{\sqrt{6-x}-2}{\sqrt{3-x}-1}$.
11. Find the horizontal asymptotes of $f(x) = \frac{3x^2-x-2}{5x^2+4x+1}$.
12. A store has been selling 200 TV monitors a week \$350 each. A market survey indicates that for each \$10 rebate offered to buyers, the number of monitors sold will increase by 20 a week. Find the demand function and the revenue function. How large a rebate should the store offer to maximize revenue?
13. Find f if $f'''(x) = 12 + sint$.
14. A particle moves in a straight line and has acceleration given by $a(t) = 6t + 4$. Its initial velocity is $v(0) = -6$ cm / s and its initial displacement is $s(0) = 9$ cm . Find its position function $s(t)$.

Section C

Answer any 2 questions. Each carry 14 marks.

15. (a) State and prove Rolle's Theorem.
    (b) Prove that $x^3 + x - 1 = 0$ has exactly one real solution.
16. (a) Where is the function $|x|$ differentiable? (b) Find derivative of $\frac{sinx}{x}$.
17. Sketch the graph of the function $f(x) = x^{\frac{2}{3}}(6-x)^{\frac{1}{3}}$.