23U506 (Pages: 2) Name: ……..…….……..

Reg. No: …….

FIFTH SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(CBCSS-UG)

(Regular/Supplementary/Improvement)

CC20UMTS5D01 – APPLIED CALCULUS

(Mathematics – Open Course)

(2020 Admission onwards)

Time: 2 Hours Maximum: 60 Marks

Credit: 3

Section A

Answer ***all*** questions Each question carries 2 marks.

1. Define a function
2. Find f(x+1), where f(x) = $\sqrt{3x-5}$
3. Find the distance between the points P(3,-1) and Q(7,1)
4. Plot the given points in a rectangular coordinate system P(4,3) and Q(-2,7)
5. Find $\lim_{x\to 1} \frac{x^2+4x-2}{x^2-x+1}$
6. List all values of x for which the given function is not continuous f(x) = $\frac{3x-2}{(x+3)(x-6)}$
7. Differentiate the function f(x) = $(2x^4-3)^3$
8. Find the critical points of the function f(x) = $2x^4-4x^2+3$
9. Define points of inflection
10. Evaluate the given exponential expressions. a) $(3)^2(3)^3$ b) $(5)^{1/3}(2)^{1/3}$.
11. If $\log_2 x = 5$, what is lnx ?
12. Evaluate $\int e^{3x}dx$

(Ceiling: 20 Marks)

Section B

Answer ***all*** questions. Each question carries 5 marks.

13. Find the line that passes through the given pair of points P(2,6) and (2,-4)
14. Find the derivative of f(x) = $\frac{x^2+x-1}{2x-1}$
15. Suppose the total cost in dollars of manufacturing q units of a certain commodity is given by the function C(q) = $q^3-30q^2+500q+200$
    a) Compute the cost of manufacturing 10 units of the commodity
    b) Compute the cost of manufacturing the 10^{th} unit of the commodity

16. Find the slope of the tangent line to the circle $x^2 + y^2 = 25$ at the point (3, 4). What is the slope at the point (3, -4)?
17. Solve the following equations for x.
    a) $3 = e^{20x}$ b) $2 \ln x = 1$
18. Differentiate the following functions.
    a) $f(x) = x^2 e^x$ b) $f(x) = x e^{2x}$
19. Find the following integrals
    a) $\int (2x^5 + 8x^3 - 3x^2 + 5)\, dx$ b) $\int \frac{x}{x-1} dx$

(Ceiling: 30 Marks)

Section C

Answer any ***one*** question. The question carries 10 marks.

20. Sketch the graph the function $f(x) = 2x^3 + 3x^2 - 12x - 7$
21. Suppose Rs.1,000 is invested at an annual interest rate of 6%. Compute the balance after 10 years if the interest is compounded.
    a) Quarterly b) Monthly c) daily d) Continuously

(1 × 10 = 10 Marks)

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