

**Second Semester FYUGP Degree (Reg) Examination APRIL
2026**

KU2DSCCMT114- MATHEMATICS FOR ECONOMICS - II
2024 Admission onwards

Time : 2 hours

Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Define local maximum of a function
2. Define local minimum of a function.
3. If $z = x(y + 1)$, find $\frac{\partial z}{\partial y}$
4. State generalized power function rule of partial derivatives.
5. If $z = \frac{x}{y}$, find $\frac{\partial z}{\partial x}$
6. State chain rule of differentiation.
7. State product rule of differentiation.
8. Differentiate $4x^2 - 7x + 8$ with respect to x .

Section B

Answer any 4 questions. Each carry 6 marks.

9. Find all first order partial derivatives of the function $z = 2w^2 + 8wxy - x^2 + y^2$
10. Using product rule, find all partial derivatives of the function $z = (3x^2 + 5y)(2x + 6y^2)$
11. Using generalized power function rule find all first order partial derivatives of $z = (2x - 5y)^3$
12. Differentiate $\frac{1}{x}$ with respect to x using first principle
13. Find $\frac{dy}{dx}$ if $x^2 - 2xy + y^2 = 8$
14. Find the derivative of the following functions with respect to x .
 - a) $f(x) = x^2 + \frac{1}{x} + 7$
 - b) $f(x) = \frac{1}{\sqrt{x}}$

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Section C

Answer any 2 questions. Each carry 14 marks.

15. If $y = \sqrt{25 - 3x}$ find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 3$.
16. If $y = x^2 + \frac{1}{x^2}$, show that $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} = 4y$
17. a) The total cost function (in rupees) of x units of a product is $c(x) = x^2 + 78x + 2500$ and the demand function is $p = 600 - 8x$, when the price is Rs. p per unit. Show that the maximum net revenue (i.e profit) is obtained when 29 units are produced. Also find the price at which profit is maximum.
b) For a certain establishment the total cost function C and the total revenue function R are given by $C = x^3 - 12x^2 + 48x + 11$ and $R = 83x - 4x^2 - 21$ where $x = \text{output}$. Obtain the out put for which profit is maximum and the maximum profit.