

**First Semester FYUGP Degree (Reg/Sup) Examination
November 2025**

**KU1DSCCMT114 - MATHEMATICS FOR ECONOMICS - I
2024 Admission onwards**

Time : 2 hours

Maximum Marks : 70

Section A

Answer any 6 questions. Each carry 3 marks.

1. Is the function $f(x) = 2x - 2$ continuous at $x = 0$? Why?
2. Is the function $f(x) = x + 3$ continuous at $x = 1$? Why?
3. Find $\lim_{x \rightarrow 0} (3x + 1)$
4. Find $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$
5. $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$
6. Find $\lim_{x \rightarrow \infty} \frac{1}{x^3}$
7. Find $\lim_{x \rightarrow \infty} 1 + \frac{1}{x} + \frac{1}{x^3}$
8. What is $\lim_{x \rightarrow 0} \frac{e^x - 1}{x}$.

Section B

Answer any 4 questions. Each carry 6 marks.

9. Evaluate
 - (a) Find $\lim_{x \rightarrow 1} (x^3 + x^2 + x - 1)$
 - (b) Find $\lim_{x \rightarrow 2} \frac{6x - 7}{5x - 9}$
10.
 - (a) Find $\lim_{x \rightarrow 1} (2x - 5)$
 - (b) $\lim_{x \rightarrow -5} \frac{9x - 8}{x + 1}$
11. Find $\lim_{x \rightarrow \frac{1}{2}} \frac{2x^2 + 3x - 2}{2x^2 + 5x - 3}$.

12. Find $\lim_{x \rightarrow \infty} \frac{2x - 3}{(4x - 2)(3x - 4)}$.
13. Give an example for each of the following cases:
- (a) $f(x)$ does not exist but $\lim_{x \rightarrow a} f(x)$ does exist
 - (b) $f(x)$ exist but $\lim_{x \rightarrow a} f(x)$ does not exist
 - (c) $f(x)$ and $\lim_{x \rightarrow a} f(x)$ both exist but they are unequal
14. Evaluate $\lim_{x \rightarrow 0} \frac{4x - [x]}{3x - 2[x]}$

Section C

Answer any 2 questions. Each carry 14 marks.

15. If $X = \{1, 2, 3, 4\}$, $Y = \{3, 4, 5, 6\}$ and $U = \{1, 2, 3, 4, 5, 6, 7\}$, then verify the following:
- (a) $\overline{X \cup Y} = \overline{X} \cap \overline{Y}$
 - (b) $\overline{X \cap Y} = \overline{X} \cup \overline{Y}$.
 - (c) $X - Y = X \cap \overline{Y}$
 - (d) $X - Y \subset X \cup Y$
16. Explain with an example any seven types of functions.
17. (a) Check the continuity at $x = 1$ of the function

$$f(x) = \begin{cases} \frac{x^3 - 1}{x - 1}, & x \neq 1 \\ 3, & x = 1 \end{cases}$$

- (b) Find the points of discontinuity of the function

$$f(x) = \frac{2x^2 + 6x - 5}{12x^2 - x - 20}.$$