

JK Lakshmipat University, Jaipur
Institute of Engineering and Technology
 End Term Examination, December 2025
 BCA (Backlog), 2025-26

Roll No.....

AS1115: Mathematics-II

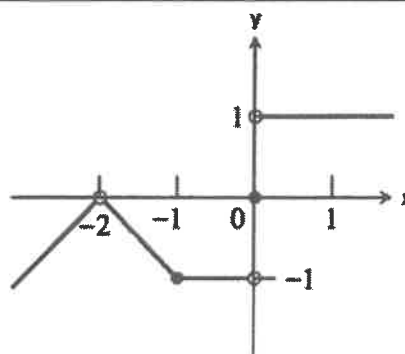
Time: 2 hours 30 minutes

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on the question paper.
2. Mention all the assumptions for your answers clearly.
3. Calculators are not allowed.

Q. 1	Find the slope of the curve $y = x^2 + 2$ at the point $P(1, 3)$.	1.0 (CO 2)
Q. 2	At what points is the function $f(x) = \frac{1}{x-2} - 4x$ continuous?	1.0 (CO 2)
Q. 3	Determine all the critical points of the function $f(x) = x^3 - 2x + 4$.	1.0 (CO 2)
Q. 4	Find an antiderivative of the function $f(x) = x^2 - 2$.	1.0 (CO 1)
Q. 5	A square matrix A is said to be involutory if $A = A^{-1}$. Check whether $A = \begin{bmatrix} 3 & -4 \\ 2 & -3 \end{bmatrix}$ is involutory?	1.0 (CO 3)
Q. 6	Let $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ 1 & 0 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}$, $C = \begin{bmatrix} -1 & 2 \\ 0 & 1 \\ 1 & 2 \end{bmatrix}$. Calculate the following. a. AB b. BC c. $B^T C$ d. $A + C$	2.0 (CO 3)
Q. 7	Find the eigenvalues and corresponding eigenvectors of the matrix $A = \begin{bmatrix} 1 & 1 \\ 4 & 1 \end{bmatrix}$.	3.0 (CO 3)
Q. 8	Consider the function $y = f(x)$ given in the figure. Find the following. a. $\lim_{x \rightarrow 0} f(x)$ b. $\lim_{x \rightarrow -2} f(x)$ c. Is f continuous at $x = -1$?	3.0 (CO 2)
Q. 9	Find the absolute maximum and minimum values of the function $f(x) = 10x(2 - \ln x)$ on the interval $[1, e^2]$.	3.0 (CO 2)



Q. 10	Compute the value(s) of a for which the given function is continuous everywhere. $f(x) = \begin{cases} a^2x - 2a, & x \geq 2 \\ 12, & x < 2 \end{cases}$	2.0 (CO 1)
Q. 11	Find the derivative of the following functions. a. $\frac{d}{dx}(2 - x)$ b. $\frac{d}{dx}\left(\frac{7x+3}{4x-8}\right)$ c. $\frac{d}{dx}(x^4 + 5x^3 + 1)$ d. $\frac{d}{dx}(\sec^2 x)$	4.0 (CO 1)
Q. 12	Compute the following integrals. a. $\int (x^3 - 2x^2 - x + 1) dx$ b. $\int \left(\frac{2}{x} + \sin x\right) dx$ c. $\int (\cos 4x - 4 \cos x) dx$ d. $\int \left(e^{8x} + e^{\frac{x}{2}}\right) dx$	4.0 (CO 1)
Q. 13	Compute the following definite integrals. a. $\int_{-1}^4 -3 dx$ b. $\int_0^2 (3x + 1) dx$	2.0 (CO 1)
Q. 14	Find the area under the curve $y = 2x$ from $x = 0$ to $x = 2$.	2.0 (CO 2)

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