Department of Mathematics, College of Sciences
King Saud University, Riyadh.

M-203 (Differential and Integral Calculus)
2nd MidTerm Exam. (1st sem. 1447) (2025/2026),
Time: **90 Minutes**   Max. Marks: 25.
Note: **All questions carry equal marks.**

Q1. Evaluate the double integral: $\int_{1}^{e} \int_{\frac{1}{e}}^{\frac{1}{y}} \cos(x - \ln(x))dxdy$.

Q2. Evaluate the integral: $\iint_{R} \dfrac{x}{\sqrt{x^2 + y^2}}dA$, where R is the region that lies in the disc $x^2 + y^2 \le 2y$ and $y \ge 1$.

Q3. Let S be the surface defined by $z = x^2 + y^2$ and over the upper half unit disc $x^2 + y^2 \le 1$ and $y \ge 0$. Find the area of the surface S.

Q4. Find the volume of the region bounded the graphs of the equations: $z = 1 - y^2$, $z = 4 - y^2$, $z = -1$, $z = 1$, $x = 2$, and $x = 3$.

Q5. Evaluate the triple integral: $\iiint_{Q} \dfrac{3}{e + (x^2 + y^2 + z^2)^{\frac{3}{2}}}dV$, where Q is the solid bounded above by the sphere $x^2 + y^2 + z^2 = 1$ and below by the cone $z = \sqrt{3x^2 + 3y^2}$.