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

M-203 (Differential and Integral Calculus)
2nd MidTerm Examination (2nd semester 1446) (2024/2025),
Time: **90 Minutes**   Max. Marks: 25.
Note: **All questions carry equal marks.**

Q 1. Evaluate the double integral:

$$\int_0^1 \int_{y^2}^1 \frac{1}{1 + x\sqrt{x}} dx dy.$$

Q 2. Find the volume of the solid that lies under the paraboloid $z = x^2 + y^2$, above the xy-plane and inside the cylinder $x^2 + y^2 = 2x$.

Q 3. Find the surface area of the portion of the paraboloid $z = 2 - \frac{x^2}{2} - \frac{y^2}{2}$ that lies above the xy-plane.

Q 4. Use cylindrical coordinates to evaluate the integral:

$$\int_{-2}^2 \int_{-\sqrt{4-x^2}}^{\sqrt{4-x^2}} \int_{x^2+y^2}^4 x \, dz dy dx.$$

Q 5. Find the volume of the solid that lies outside the cone $z^2 = x^2 + y^2$ and inside the sphere $x^2 + y^2 + z^2 = 9$.

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