

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

M-203 (Differential and Integral Calculus)

2<sup>nd</sup> MidTerm Examination (2<sup>nd</sup> semester 1445) (2023/2024),

Time: 90 Minutes

Max. Marks: 25.

Note: All questions carry equal marks.

Q 1. Evaluate the double integral:

$$\int_0^1 \int_{y^2}^1 y \sin(x^2) dx dy.$$

Q 2. Find the volume of the solid in the first octant bounded by  $z = y$ ;  $x^2 + y^2 = 4$ ;  $x = 0$ ;  $y = 0$ .

Q 3. Find the surface area of the portion of the cone  $z = \sqrt{x^2 + y^2}$  that lies inside the cylinder  $x^2 + y^2 = 1$  in the first octant.

Q 4. Using triple integral, find the volume of the solid bounded by the graphs of the equations:  $z = 2 - x^2 - y^2$  and  $z = x^2 + y^2$

Q 5. Using cylindrical coordinates evaluate the integral:

$$\int_0^2 \int_0^{\sqrt{2x-x^2}} \int_0^{x^2+y^2} \sqrt{x^2 + y^2} dz dy dx.$$