MTH 234 Quiz 5 Name _____

June 23, 2016 (20 points total)

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1. (4 points) Evaluate

$$\iint_S xz \, dS$$

where S is the boundary of the unit ball $x^2 + y^2 + z^2 = 1$.

2. (4 points) Evaluate

$$\iint_S \mathbf{F} \cdot d\mathbf{S}$$

where $\mathbf{F} = \langle -x, 1, xy \rangle$ and S is the surface $z = xe^y$ where $0 \leq x \leq 1 - y$, and $0 \leq y \leq 1$ with an upward orientation.

3. (4 points) Evaluate

$$\iint_S \text{curl}\mathbf{F} \cdot d\mathbf{S}$$

where $F = \langle e^{xy}, -ye^{xz}, y \rangle$ and S is the half of the ellipsoid $x^2 + 4y^2 + 4z^2 = 4$ that lies above the yz-plane oriented in the direction of the positive x-axis.

4. (4 points.) Evaluate

$$\int_C \mathbf{F} \cdot d\mathbf{r}$$

where $F = \langle xy, 2z, 3y \rangle$ and C is the curve of intersection of the plane $x + z = 5$ and the cylinder $x^2 + y^2 = 9$.

5. (4 points.) Compute the surface integral

$$\iint_S \mathbf{F} \cdot d\mathbf{S}$$

where S is the boundary of the tetrahedron with vertices $(0,0,0), (1,0,0), (0,1,0)$, and $(0,0,1)$ and $\mathbf{F} = \langle 2x^2y - 2xz, -xy^2, z^2 - xyz \rangle$