

QUIZ 13 (LAST) (30MINS, 40PTS)

Please write down your name, SID, and solutions discernably.

Name :

SID :

Score :

1. (10pts) Evaluate the surface integral.

$$\iint_S x^2 z^2 dS,$$

S is the part of the cone $z^2 = x^2 + y^2$ that lies between the planes $z = 1$ and $z = 3$.

2. (10pts) Find the flux of

$$\mathbf{F}(x, y, z) = xz\mathbf{i} + x\mathbf{j} + y\mathbf{k}$$

across the hemisphere $x^2 + y^2 + z^2 = 25$, $y \geq 0$, oriented in the direction of the positive y -axis.

3. (10pts) Use Stokes' Theorem to evaluate $\iint_S \text{curl } \mathbf{F} \cdot d\mathbf{S}$, where $\mathbf{F}(x, y, z) = x^2yz\mathbf{i} + yz^2\mathbf{j} + z^3e^{xy}\mathbf{k}$, S is the part of the sphere $x^2 + y^2 + z^2 = 5$ that lies above the plane $z = 1$, and S is oriented upward.

4. (10pts) Use Stokes' Theorem to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$, where $\mathbf{F}(x, y, z) = x^2\mathbf{i} + y^2\mathbf{j} + z^2\mathbf{k}$, where C is the circle which is the intersection of $z = 1 - x^2 - y^2$ and xy -plane, oriented counterclockwise as viewed from above.