

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

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

Name :

SID :

Score :

1. (10pts) Evaluate the surface integral.

$$\iint_S z dS,$$

$S$  is the surface  $x = y + 2z^2$ ,  $0 \leq y \leq 1$ ,  $0 \leq z \leq 1$ .

2. (10pts) Find the flux of

$$\mathbf{F}(x, y, z) = x^2\mathbf{i} + y^2\mathbf{j} + z^2\mathbf{k}$$

across the boundary of the solid half-cylinder  $0 \leq z \leq \sqrt{1 - y^2}$ ,  $0 \leq x \leq 2$ .

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

4. (10pts) Use Stokes' Theorem to evaluate  $\int_C \mathbf{F} \cdot d\mathbf{r}$ , where  $\mathbf{F}(x, y, z) = xy\mathbf{i} + yz\mathbf{j} + zx\mathbf{k}$ , and  $C$  is the triangle with vertices  $(1, 0, 0)$ ,  $(0, 1, 0)$ , and  $(0, 0, 1)$ , oriented counterclockwise as viewed from above.