

QUIZ 22.

Q1. evaluate $\iint_S F \cdot dS$ $F(x,y,z) = (xy, yz, zx)$

$$z = 1 - x^2 - y^2 \quad 0 \leq x \leq 1, \quad 0 \leq y \leq 1$$

$$z = g(x,y) = 1 - x^2 - y^2$$

$$P = xy \quad Q = yz, \quad R = zx$$

$$\iint_S F \cdot dS = \iint_D (-xy \cdot (-2x) - (yz) \cdot (-2y) + zx) dA$$

$$= \iint_D (2x^2y + 2y^2z + (1-x^2-y^2) \cdot x) dA$$

$$= \iint_S (2x^2y + 2y^2z + x - x^3 - xy^2) dA$$

$$= \int_0^1 \int_0^1 (2x^2y + 2y^2z + x - x^3 - xy^2) dx dy$$

$$\frac{83}{180}$$

