There are 4 problems in the quiz.

(5 points) 1. Find all integral curves of the vector field $\mathbf{V} = (2xz, 2z(y-1), x-2x^2)$ defined in the domain $\{(x, y, z) : x > 0, z > 0\}$.

(5 points) 2. Find the general solution of the equation $x^2(y-z)u_x + y^2(z-x)u_y + z^2(x-y)u_z = 0$ in the domain $\{(x, y, z) : x > y > z\}$.

(6 points) 3. Find the integral surface of the vector field $(x \cos^2 y, \sin y \cos y, -z \sin^2 y)$ containing the curve described by the equations $x = y \sin y$, $yz = \cos y$ in the domain $\{(x, y, z) : 0 < y < \pi/2\}$.

(6 points) 4. Find all integral surfaces of the vector field $(y^2 - z^2, xy - 2xz, 2xy - xz)$ containing the curve described by the equations $x^2 - 1 = yz$, $x^2 + yz = 2y^2 + 2z^2$ in the domain $\{(x, y, z) : y > z > 0\}$.