Q4)

Vanishing points are not affected by camera translation. So, the vector **t** cannot be inferred from the given information.
a) Assume all intrinsic parameters are known.

Let (p_x, p_y) and (q_x, q_y) are optical centres of the cameras P and Q respectively. For the vanishing points, the direction vectors the lines in coordinate system of camera P would respectively be
p_1=$((p_{1x} - p_x) * s_p, (p_{1y} - p_y) * s_p, f_p)$,
p_2=$((p_{2x} - p_x) * s_p, (p_{2y} - p_y) * s_p, f_p)$,$p_3$=$((p_{3x} - p_x) * s_p, (p_{3y} - p_y * s_p), f_p)$.
Similarly for the coordinate system of camera Q , the direction vectors are q_1=$((q_{1x} - q_x) * s_q, (q_{1y} - q_y) * s_q, f_q)$, q_2=$((q_{2x} - q_x) * s_q, (q_{2y} - q_y) * s_q, f_q)$ and q_3=$((q_{3x} - q_x) * s_q, (q_{3y} - q_y) * s_q, f_q)$. Normalize these 6 direction vectors.These normalized direction vectors satisfy the equation :

$$(p_1|p_2|p_3) = \mathbf{R}(q_1|q_2|q_3).$$

From this equation,if solvable, we can determine the rotation matrix **R**.

b) If s_p, f_p parameters are not known. The direction vectors p_1, p_2, p_3 are mutually perpendicular to each other.So, $p_1.p2 = 0$.Therefore,

$$(p_{1x} - p_x)(p_{2x} - p_x)s_p^2 + (p_{1y} - p_y)(p_{2y} - p_y)s_p^2 + f_p^2 = 0$$

If (p_x, p_y) is known, then we can get the value of $\frac{s_p}{f_p}$.Similarly, we can also find the value of $\frac{s_q}{f_q}$.