Algorithm 1 randQueryEmbedding($\mathcal{D}$, k)

Input: a set of instances $\mathcal{D} = \{\mathbf{x}^i\}_{i=1}^m$ over r.v.s $\mathbf{X} = \{X_1, \ldots, X_n\}$, k as the number of features to generate
Output: a set of embeddings $\mathcal{E} = \{\mathbf{e}^i\}_{i=1}^m, \mathbf{e}^i \in \mathbb{R}^k$
$\theta \leftarrow$ learnDensityEstimator($\mathcal{D}$)
$\mathcal{E} \leftarrow \{\}$
for $j = 1, \ldots, k$ **do**
    $\mathbf{Q}_j \leftarrow$ selectRandomRVs($\mathbf{X}$)
    for $i = 1, \ldots, m$ **do**
        $e_j^i = p_\theta(\mathbf{x}^i_{\mathbf{Q}_j})$
    $\mathcal{E} \leftarrow \mathcal{E} \cup \{\mathbf{e}^i\}$
return $\mathcal{E}$