Suppose that X is a random variable whose entropy H(X) is 8 bits. Suppose that Y(X) is a deterministic function that takes on a different value for each value of X.

1. What is the entropy of Y ?

Since Y is injective and the entropy does not depend on the values, but only on their probabilities, the entropy of Y is equal to the entropy of X.

$$H(Y) = H(X) = 8$$

2. What is the joint entropy $H(X,Y)$?

Since Y is a deterministic function of X:

$$H_X(Y) = 0$$

$$H(X,Y) = H(X) + H_X(Y) = 8 + 0 = 8 \ \ bits$$