24. Let

$$n(A) = m \text{ and } n(B) = n.$$

Then, total number of non-empty relations that can be defined from

$$A \text{ to } B$$

is

(A).

$$m^{n}$$

(B).

$$n^{m} - 1$$

(C).

$$mn - 1$$

(D).

$$2^{mn} - 1$$

Ans: Given:

$$n(A) = m \text{ and } n(B) = n.$$

First, find the number of elements in

$$A \times B$$

and then find the number of relation by using

$$2^{m(A \times B)} - 1.$$

We have,

$$n(A) = m \text{ and } n(B) = n$$

$$n(A \times B) = n(A) \cdot n(B)$$

$$n(A \times B) = mn$$

Total number of relations from

$$A \text{ to } B = 2^{mn} - 1.$$

Correct Answer: D