2.) $\mathbb{E}[X] = c_0 \cdot 2^{\binom{n}{m} 2^{-n}} \cdot (1/2)^{\binom{n}{n-m} 2^{-n}} = c_0 \cdot (2 \cdot 1/2)^{\binom{n}{m} 2^{-n}} = c_0 \cdot 1^{\binom{n}{m} 2^{-n}}$

$= c_0$

$\mathrm{Var}(X) = \mathbb{E}[X^2] - (\mathbb{E}[X])^2 = c_0 - c_0^2 = c_0(1 - c_0)$

$\mathbb{E}_p[X^n] = \sum_{m=0}^{n} \binom{n}{m} (1/2)^n (1 - 1/2)^{n-m} \cdot c_0 = c_0 \cdot (1/2 + 1 - 1/2)^n = c_0 \cdot 1^n$

$= c_0$