Statistics Assignment - 6

(1) a) Joint PMF $= \frac{n!}{a!\,b!\,c!} \left(\frac{1}{3}\right)^{a+b+c}$

b) $P(\text{decisive}) = 3 \sum_{k=1}^{n-1} \frac{n!}{0!\,k!\,(n-k)!} \left(\frac{1}{3}\right)^{n}$

$= 3\left(\frac{1}{3}\right)^{n} \sum_{k=1}^{n-1} \left({}^{n}C_{k}\right)$

$= \frac{2^{n} - 2}{3^{n-1}}$

c) $P(n=5) = \frac{2^{5} - 2}{3^{4}} = \frac{30}{81} = 0.37$

If number of players becomes very large, it is very likely to have atleast one of rock, paper or scissors.