1.

2. Compute probabilities P_c

$$P_c(1) = \frac{1}{2} * \frac{1}{3} + \frac{1}{2} * \frac{1}{4} = \frac{7}{24}$$

$$P_c(2) = \frac{1}{2} * \frac{1}{6} + \frac{1}{2} * \frac{1}{2} + \frac{1}{4} * \frac{1}{3} = \frac{5}{12}$$

$$P_c(3) = \frac{1}{4} * \frac{1}{6} + \frac{1}{4} * \frac{1}{3} = \frac{1}{8}$$

$$P_c(4) = \frac{1}{4} * \frac{1}{6} + \frac{1}{4} * \frac{1}{2} = \frac{1}{6}$$

Also compute H(K) + H(P)

$$H(K) = -\left(\frac{1}{2} log_2 \frac{1}{2} + \frac{1}{4} log_2 \frac{1}{4} * 2\right) = 1.5$$

$$H(P) = -\left(\frac{1}{3} log_2 \frac{1}{3} + \frac{1}{6} log_2 \frac{1}{6} + \frac{1}{2} log_2 \frac{1}{2}\right) = 1.46$$

Now plug in P_C to get H(C)

$$H(C) = -(\frac{7}{24} \log_2 \frac{7}{24} + \frac{5}{12} \log_2 \frac{5}{12} + \frac{1}{8} \log_2 1/8 + \frac{1}{6} \log_2 \frac{1}{6}) = 1.85$$

Finally evaluate H(K) + H(P) – H(C)

H(K|C) = 1.5 + 1.46 – 1.85 = 1.11