(1) $P[M=m|C=c]=\dfrac{P[M=m \wedge C=c]}{P[C=c]}$ $(\textit{definition of conditional probability})$

(2) $P[M=m \wedge C=c]=P[M=m \wedge K=m \oplus c]$ $(M=m \wedge C=c \textit{ and } M=m \wedge K=m \oplus c \textit{ are equivalent})$

$=P[M=m]\cdot P[k=m \oplus c]$ $(K \textit{ is independent of } M, \textit{ so you can multiply these two})$

$=P[M=m]\cdot 2^{-n}$ $(K \textit{ is randomly chosen})$

(3) $P[C=c]=\sum_m P[M=m \wedge C=c]$

$=\sum_m P[M=m]\cdot 2^{-n}$ $(\textit{by the result obtained in } 2)$

$=1\cdot 2^{-n}$ $(\sum_m P[M=m]=1)$

$=2^{-n}$ $(\textit{that is, each } c \textit{ is equally likely})$

(4) $P[M=m|C=c]=\dfrac{P[M=m \wedge C=c]}{P[C=c]}$

$=\dfrac{P[M=m]\cdot 2^{-n}}{2^{-n}}$ $(\textit{by the result obtained in } 2 \textit{ and } 3)$

$=P[M=m]$