by solving part a we conclude that $L_1 \notin REC$

part (b) $(L_1 = L_P)$ $\quad P = \{L \mid L \in RE, L \cup L_R = \Sigma^*\}$

$L_1 = \{enc(M) \mid L(M) \in P\}$

Input

$enc(M_P)$

output

$enc(M, M')$

relation

If $enc(M_P) \in L_P$ then $enc(M, M') \in L_2$

If $enc(M_P) \notin L_P$ then $enc(M, M') \notin L_2$

by considering $L(M_P) = L(M) \cup L_R = \Sigma^*$ and $L(M') = \emptyset$

yes-yes

If $enc(M_P) \in L_P$ then $L(M_P) = \Sigma^*$ so we have $L(M_P) = L(M) \cup L_R = \Sigma^*$ so we have and $L(M') = \emptyset$ so $L(M) \cup L(M') \cup L_R = \Sigma^*$ so

$enc(M, M') \in L_2$

no-no

If $enc(M_P) \notin L_P$ then $L(M_P) \neq \Sigma^*$ so $L(M) \cup L_R \neq \Sigma^*$ and ~~we~~ we had $L(M') = \emptyset$ so $L(M) \cup L(M') \cup L_R \neq \Sigma^*$ so

$enc(M, M') \neq L_2$

~~by~~ So we conclude that $L_2 \notin REC$ by reduction from L_P and we had come to conclusion that ~~L1~~ L_P was not in REC ~~so~~ in part a