1)

a) $a^*(ba)a^*(ba+a^*)a^*$.

~~$\mathcal{L} = \{ xbayz :$~~

$\mathcal{L} = \{ x_1 ba x_2 y x_3 : x_1, x_2, x_3 \in \{a\}^* \wedge y \in \{ba, a^*\}\}$

x) c) $(00+1)^*(0+11)^*$

$\mathcal{L} = \{ xy : x \in \{00, 1\}^* \wedge y \{0, 11\}^* \}$

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e)

a) $\mathcal{L} = \{ w \in \{a,b,c\}^* : |w|_a > 0 \wedge |w_b| \geq 0 \wedge |w_c| > 0. \}$

$(a+b+c)^*(a(b+c)^*b(a+c)^*c + a(b+c)^*c(a+b)^*b.$

$b(a+c)^*a(b+c)^*c + b(a+c)^*c(a+b)^*a.$

$c(a+b)^*a(b+c)^*b + c(a+b)^*b(a+c)^*a)$

b) $\mathcal{L} = \{ a^{2n} b^{2m+1} : m, n \in \mathbb{N} \}$

$(aa)^*(bb)^*b$

d) $\mathcal{L} = \{ w \in \{a,b\}^* : |w_3| \geq 0. \}$

$((a+b)(a+b)(a+b))^*$

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3)

a) $\mathcal{L} = \{x1y : x, y \in \{0,1\}^* \wedge |y| = 4\}$

$(0+1)^* 1 (0+1)(0+1)(0+1)(0+1)$

b) $\mathcal{L} = \{x1 : x \in \{0,1\}^* \wedge 00 \notin w\}$

$((10)^* + (11)^* + (01)^* + (0(10)^* + 1(01)^*)1$

$= ((11)^* + (\varepsilon + 1)(01)^* + (\varepsilon + 0)(10)^*)1$

e) $\{w \in \{0,1\}^* : |w_0| \equiv_2 1\}$

$(1^*0^*0^*)^*1^*0^*1^*$

~~f)~~ c) ~~$w \in \mathcal{L} =$~~ $\{w \in \{0,1\}^* : |w_0| \equiv_5 0\}$

~~$(1^*0^*1^*0^*1^*0^*1^*)^*1^*0^*1^*$~~

$(1^*0^*1^*0^*1^*0^*1^*)^*$

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A)

a) $\{w \in \{a,b\}^* :$ aaa xuất hiện duy nhất 1 lần trong $w\}$

$(ab + aab + b)^* aaa (ba + baa + b)^*$.

b) $L = \{w \in \{a,b\}^*$ mọi cặp aa đều xuất hiện trước cặp bb$\}$

$(ba)^*(ab)^*(aa)^*(bb)^*(ab)^*(ba)^*$

c) $L = \{w \in \{a,b,c\}^*$: chiều dài các chuỗi con chứa a $\vdots 3\}$

$(b+c)^* + (a(a+b+c)(a+b+c) + (a+b+c)a(a+b+c) + (a+b+c)(a+b+c)a)^*$

Errata: chiều dài các chuỗi con chỉ chứa a : 3.

$(a+b+c)^*((b+c)(a+b+c)^*) + (aaa)^*$