

الف) شکل درخت صوابت سؤال

$$S_0 = 1S_1 + 1S_1$$

$$S_1 = 0S_1 + 1S_0 + \lambda \quad \text{و} \quad \mu = 0S_0 + 1S_1$$

$$\Rightarrow S_1 = 1^*0 S_0 \Rightarrow S_0 = (11^*0)^* 1S_1$$

$$\Rightarrow S_1 = 1^*0 (11^*0)^* 1 S_1$$

$$\Rightarrow S_1 = (01^*0 + 1)(11^*0)^* 1 S_1 + \lambda = ((01^*0 + 1)(11^*0)^* 1)^*$$

$$\Rightarrow S_0 = 1((01^*0 + 1)(11^*0)^* 1)^* + 11^*0 S_0$$

$$\Rightarrow \text{جواب} = S_0 = (11^*0)^* 1((01^*0 + 1)(11^*0)^* 1)^*$$

ب) شکل درخت صوابت سؤال

$$q_0 = a q_1 + a q_r$$

$$q_1 = a q_1 + a q_r + a q_f$$

$$q_r = \lambda + a q_1$$

$$a^* b q_r$$

$$q_r = b q_r + a q_f = a^* q_f + b q_r$$

$$q_r = \lambda + b q_r = b^* q_f = b^*$$

$$\Rightarrow q_r = a^* b + a^* b a q_1 \Rightarrow q_1 = a + a a q_1 + a b^* + a a^* b a q_1 + a^* b$$

$$\Rightarrow q_1 = (a + a^* b a) q_1 + (a + a b^* + a^* b) = (a + a^* b a)^* (a + a b^* + a^* b)$$

$$\Rightarrow q_0 = a(a + a^* b a)^* (a + a b^* + a^* b) + a b^* \equiv \text{جواب}$$