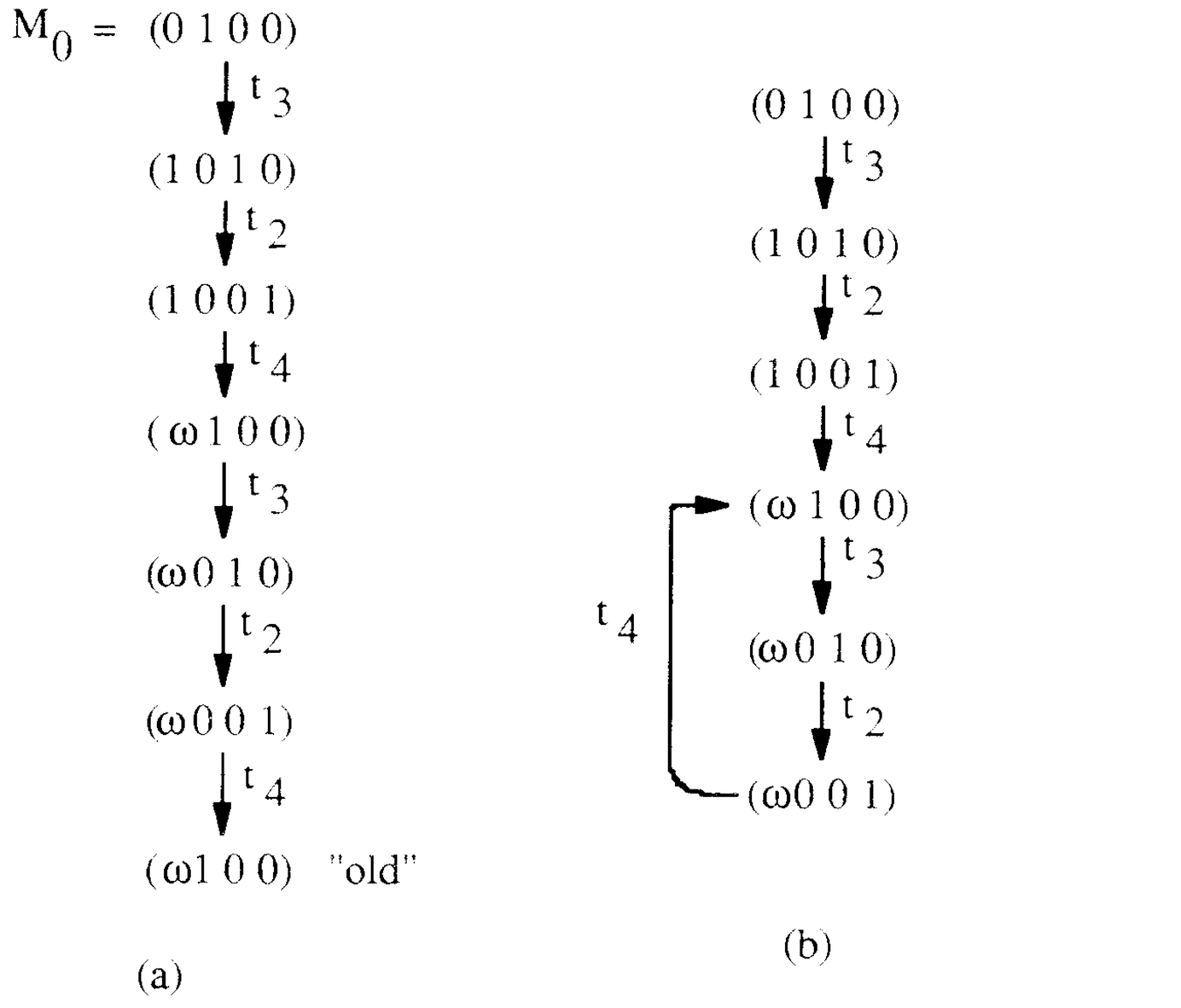

Fig. 4.4 Exercise 4.1: (a) The coverability tree and (b) coverability graph of the net in Fig.3.4(a)

4.2 Incidence Matrix and State Equation

The dynamic behavior of many systems studied in engineering can be described by differential equations or algebraic equations. It would be nice if we could describe and analyze completely the dynamic behavior of Petri nets by some equations. In this spirit, we present matrix equations that govern the dynamic behavior of concurrent systems modeled by Petri nets. However, the solvability of these equations is somewhat limited, partly because of the nondeterministic nature inherent in Petri net models and because of the constraint that solutions must be found as non-negative integers. Whenever matrix equations are discussed in this book, it is assumed that a Petri net is pure, or is made pure by adding a dummy pair of a transition and a place as is discussed in Chapter 1 (Fig. 1.3).