2006 Paper 7 Question 10

Topics in Concurrency

(*a*) Present the transition semantics rules for the CCS operations of prefixing, binary sum and parallel composition. [4 marks]

(*b*) Describe diagrammatically a Petri net semantics for the CCS operations of binary sum and parallel composition. [6 marks]

(*c*) (*i*) Draw the transition system associated with the CCS process P defined by $P \stackrel{\text{def}}{=} a.(P + a.b.P)$. [2 marks]

(*ii*) Does P satisfy $\mu Z. (\langle b \rangle T \vee (\langle a \rangle T \wedge [a]Z))$? Justify your answer. [4 marks]

(*iii*) Does P satisfy $\nu Z. (\langle b \rangle T \vee (\langle a \rangle T \wedge [a]Z))$? Justify your answer. [4 marks]

Here T means true. (Although a rigorous proof is not required, you should justify your answers carefully.)