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 $P \overset{\text{def}}{=} a.(P + a.b.P)$. [2 marks]

(ii) Does $P$ satisfy $\mu Z. ((b)T \lor (a)T \land [a]Z)$? Justify your answer. [4 marks]

(iii) Does $P$ satisfy $\nu Z. ((b)T \lor (a)T \land [a]Z)$? Justify your answer. [4 marks]

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