

KFUPM – CCSE - COMPUTER ENGINEERING DEPARTMENT**CSE 642 – Computer Systems Performance (Take home quiz 3)****Student Name:****Student Number:**

1) (10 points) Consider a “cyclic queue” in which M customers circulate around through two queueing facilities as shown below. Both servers are of the exponential type with rates μ_1 and μ_2 , respectively. Let p_k be defined as the probability of k customers in stage 1 and $M-k$ in stage 2.

a) Draw the state-transition-rate diagram.

b) Write down the relationship among $\{p_k\}$ (global balance equations).

c) Find $N(z) = \sum_{k=0}^M p_k z^k$

d) Find p_k .

