King Fahd University Of Petroleum & Minerals
Department of Mathematics & Statistics
STAT416 : Stochastic Processes for Actuaries (181)
Assignment # 5 (Due in Sunday , November 13, 2018)

Do the following problems as appear in their order.

Problem.1 Solve problem 2 page 547 of your text book.

Problem.2 Solve problem 8 page 548 of your text book.

Problem.3 Consider a network with four servers. Any arrival must go first to server 4, the arrival rate at that server is a Poisson rate of 4 customers per minute. The service rates at servers 1, 2, 3, and 4 are, respectively 25, 30, 15, and 20. An arrival upon completion of service at server 4 will always go to server 1 ($\pi_{41} = 1$). An arrival departing service at server 1 will equally likely go to server 2 or 3 ($\pi_{12} = \pi_{13} = 0.5$). An arrival departing service at server 2 will always go to server 1 ($\pi_{21} = 1$). An arrival departing service from server 3 will either go to server 1 with probability (0.6) or leave the system. ($\pi_{31} = 0.6, \pi_{33} = 0$).

(a) Find the probability of having (3,2,4,1) arrivals at servers (1,2,3,4).

(b) Find the average number of arrivals in the system.

(c) Find the average amount of time an arrival spent on the system.