KFUPM - COMPUTER ENGINEERING DEPARTMENT

COE-540 – Computer Networks

Quiz 03 – Due March 21th, 2012 (noon time)– Take home quiz

Student Name:

Student Number:

Problem 1(20 points): ATM cells arrive to a communications buffer with exponential interarrival times of mean 1 millisecond. Let the interarrival time random variable be denoted by *T*.

a) **(5 points)** Write the probability density function for the interarrival time random variable.

b) **(5 points)** If our interest is the number of ATM cells arriving in *t* seconds, what probability mass function characterizes this random variable? (state the name and write an expression for the random variables).

c) **(5 points)** What is the mean number of cells arriving in 15 ms?

d) **(5 points)** What is the probability of no ATM cell arriving in a period of 50 milliseconds?

Problem 2(20 points): Computation of moments

a) **(10 points)** Assume K is a discrete random variable following the binomial distribution with parameters N and p. Compute the mean $E[K]$, the variance $Var[K]$, and the coefficient of variation $COV[K]$.

b) **(10 points)** Assume X is an exponential random variable with parameter α. Compute the mean $E[X]$, the variance $Var[X]$, and the coefficient of variation $COV[X]$.