

***KFUPM - COMPUTER ENGINEERING DEPARTMENT*****COE-540 – Computer Networks****Quiz 03 – Due May 2<sup>nd</sup>, 2011 – Take home quiz****Student Name:****Student Number:**

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**Problem 1 (40 points):** Consider the Poisson arrival process depicted in Figure. Let the average rate of arrivals be equal to  $\lambda$  jobs per time unit.

- Let the number of jobs arriving in a time interval of length  $t$  seconds be equal to  $K$ . Specify the distribution of  $K$ . Compute its mean and its standard deviation.
- Compute the PGF for the R.V.  $K$  defined as  $G_K(z) = E[z^K]$ .
- Let the  $i$ th interarrival time be denoted by  $\tau_i$ . Prove that  $\tau$  is exponentially distributed with parameter  $\lambda$  (i.e. with mean equal to  $\lambda^{-1}$  time units).
- Specify the distribution of  $\tau$  and compute its mean and standard deviation.

