Performance modeling for Computer systems (Midsem 30% weightage, 40 marks)

1 Each Question is of 10 marks

- 1 For i=1,2,3, suppose X_i is an exponential random variable with parameter λ_i . Furthermore, X_i 's are independent. Obtain the probability that X_3 is less that both X_1 and X_2 .
 - Model the Poisson Process as a CTMC and write down its transition probability matrix P(t). What is the dimension of the matrix P(t) and derive the expression for $p_{ij}(t)$.
 - Derive the one step transition probability matrix P for the Binomial process.
- Consider a Continuous time Markov coin with the following rate matrix $Q = \begin{bmatrix} -\lambda_H & \lambda_H \\ \lambda_T & -\lambda_T \end{bmatrix}$. Obtain its stationary distribution. Now consider the corresponding embedded DTMC and derive its transition probability matrix.