Exam Question Translation

Discrete Markov chains

"Define Markov chain"
  – Discrete-time stochastic process
  – finite, countably infinite state space E
  – satisfies Markov condition

after drawing transition diagram: check sum of numbers on arrows starting from a state is 1

"finding all possible stationary distribution"
  – State whether stationary distribution is unique and why
  – Say some states are transient so $\pi_i = 0$
  – find ALL possible distributions, possibly using parameters
  – prove the vectors you find are stationary distributions (i.e. non-negative, sum to 1 and is an Eigenvector)

"Specify the dynamics of Markov chain"
  – State "The dynamics of Markov chain are determined by initial distribution and transition matrix"
  – write down initial distribution
  – write down transition matrix

Poisson process

"Give example of a class of stochastic process which might be more suitable for … than simple Poisson process"
  – Choose from non-homogeneous Poisson process, compound Poisson process or continuous Markov chain.

Continuous-time Markov chain

"find the transition matrix of the jump chain associated with this Markov chain"
  – quote the formulae of transition probabilities of jump chain from lectures
  – write down the matrix