IA2 assignment –CO5 Questions

Ex 1 Find the average number of customers in the system and in the queue if the system is (M/M/1/∞) and $\mu = 15, \lambda = 10$

Ex 2 Find service utilization factor, the average waiting time per customer in the queue and in the system for (M/M/1/∞) model if $\mu = 15, \lambda = 9$ per hour. Also find the probability that (i)a customer has to wait in the system (ii)there are more than 8 customers in the system.

Ex 3 Find the traffic intensity of the system (M/M/1/∞) model if $\mu = 11\ per\ hour, \lambda = 8$ per hour. Also find the probability that a customer has to wait for more than 20 minutes to be out of the service station.

Ex 4 A customer arrives at a clinic according to a poisson process with a mean interval of 25 minutes. The doctor needs on an average 20 minutes for a patient to examine. Find
(i) the expected number of patients in the clinic and in the queue
(ii) percentage of patients who are not required to wait
(iii) on an average how much time is spent by a patient in the clinic
(iv) the doctor will appoint another doctor if the patient's time in the clinic exceeds 2 hours. How much must the rate of arrivals increase so that another doctor is appointed?
(v) average time a patient has to be in queue before the doctor examines him.
(vi) probability that the total waiting time of patient in the system is greater than 1 hour.
(vii) percentage of patients who have to wait before they are called by the doctor for examination
(viii) probability that there are more than 4 patients in the queue
(ix) it is desired that fewer than 5 patients are in the queue for 99% of the time. How fast the service rate should be?