**Michael Le (21689299) Assessment 2 PART 1**

**1.**

documents uploaded per day (arrival rate follows Exp())

documents printed per day (service rate follows Exp())

**2.**

**Average time taken between the document status from Waiting to In Progress**

**Refer from, Example 6.4.3.**

**E[] = 1/****= 1/37 = 0.027 days = 0.649 hours**

**More appropriate to convert in hours.**

**3.**

**Time between arrivals follows an Exp() distribution**

What is the probability that after a customer uploads a document, the next occurs within 15 minutes?

First, we convert the arrival rate from documents uploaded per day to documents uploaded per hour and time between arrivals from minutes to hours.

1 - = 0.320

**Time to be served follows an Exp() distribution**

1 -

= = 0.680

**4.**

**N**

**Probability the machine is inactive,**

**P(N=0) =**

**On average,**

Following Little’s law, where L = E[N], following Result 6.6.2 and 6.6.3

(total Average the Machine is inactive plus uploading time)

**5.**

From **4.** After computing **W** and, the total waiting time was 1.895 hours which was less than the on average, advertised pickup time. Which is roughly 2 hours, so the answer is yes, since the document is already printed and ready, hence given that customer is satisfied with their service.

**6.**

**T** is the time spent in the queue, this includes the time waiting to get to the front of the queue AND time being printed.

**T ~ Exp(**

Average Time is **E[T] =**

**7.**

**A customer is satisfied if T**  , we need to compute P(**T**

Also Note, we need to convert **in hours.**

P(**T**  = 1 - = 0.794

**8.**

P(**T**  = 1 - = 0.95

Solving for b,

b =

**9.**

**C**

**10.**

From the definition 6.6.1, if the arrival rate is greater than or equal to the service (i.e. if the traffic density is greater or equal to one), the length of the queue (of the customers) will grow without bound. Which can occur if the demand has not increased, hence this would make the system unmanageable leaving the customers dissatisfied with the service).