Unit 9 - week 7

Assignment 7

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-18, 23:59 IST.

Each of the following questions has four options out of which one or more options can be correct. Individual marks are mentioned corresponding to each questions. In case of multiple answers partial marks will be awarded for every correct option chosen provided no incorrect option have been chosen. 0 marks are awarded for questions not attempted.

1) Consider that two identical $M/M/1$ queueing systems with the same rates λ and μ, which are in operation side by side (with separate queues) in a premises. The probability that there are a total of k number of customers in the two systems taken together in long-run is given by *2 points*

- $(k)\rho^{k+1}(1-\rho)^2$
- $(k+1)\rho^k(1-\rho)$
- $(k+1)\rho^k(1-\rho)^2$
- $(k)\rho^k(1-\rho)^2$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$(k+1)\rho^k(1-\rho)^2$

2) *2 points*

Mr. Rajesh runs a one-person, unisex hair salon. He finds that customers seem to arrive according to a Poisson process with a mean arrival rate of 4 per hour. Because of his excellent reputation, customers were always willing to wait. The data further showed that customer processing time (aggregated female and male) was exponentially distributed with an average of 10 min.

Answer Question 2 to Question 5 based on this

The average number of customers in the shop is

- 1
- 2
- 3
- 4

No, the answer is incorrect.
Score: 0
Accepted Answers:
2

3) The average number of customers waiting for a haircut *2 points*

- $\frac{1}{3}$
- $\frac{2}{3}$
- $\frac{4}{3}$
- 1

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{4}{3}$

4) The percentage of time an arrival can walk right in without having to wait at all *2 points*

- 0.166
- 0.706
- 0.223
- 0.333

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.333

5) The expected waiting time of a customer is *2 points*

- 0.166
- 2.5
- 0.223
- 0.333

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.333

6) Consider a $M/M/1$ queueing model with arrival rate λ and service rate μ. The service rate where customers arrive at a rate of 3 per minute, given that 90% of the time the queue contains less than or equal to 5 customers is given by *2 points*

- 4.4
- 4.8
- 2.2
- 3.9

No, the answer is incorrect.
Score: 0
Accepted Answers:
4.4

7) Patients visit a doctor in accordance with a Poisson process at the rate of 5 per hour, and the time doctor takes to examine any patient is exponential with mean 6 minutes. All arriving patients attended by the doctor. *2 points*

Answer Questions 7 and 8 based on the above information

The expected waiting time of any patient who visits the doctor is given by

- $\frac{1}{10} hours$
- $\frac{1}{2} hours$
- $\frac{1}{8} hours$
- $\frac{1}{4} hours$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{1}{10} hours$

8) The probability that a patient does not have to wait on arrival *2 points*

- 0.5
- 0.25
- 0.75
- 0.33

No, the answer is incorrect.
Score: 0
Accepted Answers:
0.5

9) Consider a multiplexer that collects traffic formed by messages arriving according to exponential distributed inter-arrival times. The multiplexer is formed by a buffer and a transmission line. Assume that, the transmission time of a message is exponential distributed with the mean value 10 millisecond. From measurements on the state of the buffer, we know that the idle buffer probability is 0.8. The mean delay (waiting time) for the message is *2 points*

- 32.87 millisecond
- 10 millisecond
- 8.0912 millisecond
- 2.5 millisecond

No, the answer is incorrect.
Score: 0
Accepted Answers:
2.5 millisecond