Question 1

Correct

Question text

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. The probability that there are exactly three patients in the system is (approximately)

Select one:

- a. 0.19
- b. 0.073
- c. 0.927
- d. None of the given choices are true
- e. 0.5

Feedback

The correct answer is: 0.19

Question 2

Correct

Question text

A basic difference between infinite source and finite source queuing models is:

Select one:

- a. the average arrival rate
- b. size of potential calling population
- c. service rate
- d. the number of servers
- e. the average waiting time

Feedback

The correct answer is: size of potential calling population

Question 3

Correct

Question text

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per

hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. The average number of patients waiting to be served would be (approximately)

Select one:

- a. 0.53
- b. 0.30
- c. 3.0
- d. 0.05
- e. None of the choices are correct

Feedback

The correct answer is: 0.53

Question 4

Correct

Question text

A company has hired you to analyze its waiting line system. They want to set up a new service desk and need to know on average how many customers will be in the system?

It is believed that customers will arrive at the rate of one every 15 minutes. A service rep can handle 7 customers per hour. Use the infinite queuing notations and assume Poisson arrival rate and Exponential service time.

Select one:

- a. 1.33
- b. .75
- c. 1.46
- d. 1.00
- e. 1.25

Feedback

The correct answer is: 1.33

Question 5

Correct

Question text

The number of parallel servers in waiting line analysis is referred to as the number of phases.

Select one:

- True
- False

Feedback

The correct answer is 'False'.

Question 6

Correct

Question text

Which of the following is not generally considered as a measure of system performance in a queuing analysis?
Select one:

- a. the average service time
- b. the probability that an arriving customer will have to wait for service
- c. the average number waiting in line
- d. the average number in the system
- e. server utilization

Feedback

The correct answer is: the average service time

Question 7

Correct

Question text

Buying a ticket for a college football game, where there are multiple windows to buy the ticket and where customers form a single queue, features which type of line structure in a queuing system?

Select one:

- a. Multichannel, multiphase
- b. Single channel, single phase
- c. Multichannel, single phase
- d. None of the above
- e. Single channel, multiphase

Feedback

The correct answer is: Multichannel, single phase

Question 8

Correct

Question text

Which of the following is not a disadvantage of a joint line?
Select one:

- a. Customers can't choose their favourite server.
- b. It may take a large space.

- [x] c. It increases average wait time for homogeneous customers.
- [ ] d. It might appear too long for customers.
- [ ] e. Servers may not work as fast.

Feedback

The correct answer is: It increases average wait time for homogeneous customers.

Question 9

Correct

Question text

Airplanes arrive at gate no. 12 of a busy airport. After being parked in the right position, the passengers' baggage gets unloaded by a team of baggage handlers. There is space for one airplane at the gate, and an unlimited space on the runaway for planes to wait for unloading. The arrival of planes follows a Poisson process with rate of 1 every hour. The unloading time of a plane is exponentially distributed, with rate proportional to the number of baggage handlers in the unloading crew. Each baggage handler can unload half of the plane in an hour. The manager has currently assigned 3 baggage handlers for unloading a plane. The average time a plane spends in the system is (approximately)

Select one:

- [ ] a. 1.28 hrs
- [x] b. 2 hrs
- [ ] c. None of the given choices
- [ ] d. 1.00 hr
- [ ] e. 0.66 hrs

Feedback

The correct answer is: 2 hrs

Question 10

Correct

Question text

A multiple server system has customers arriving at an average rate of five per hour and an average service time of forty minutes. The minimum number of servers for this system to be underloaded is:
Select one:

- [x] a. 4

- b. 2
- c. 3
- d. 5
- e. none of these

Feedback

The correct answer is: 4

Question 11

Correct

Question text

As the ratio of arrival rate to service rate is increased, which of the following is likely?
Select one:

- a. Customers move through the system in less time because utilization is increased.
- b. The average number in the system decreases.
- c. Utilization is decreased because of the added strain on the system.
- d. Customers move through the system more slowly because utilization is increased.
- e. None of these will occur.

Feedback

The correct answer is: Customers move through the system more slowly because utilization is increased.

Question 12

Correct

Question text

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. The average amount of time, in minutes, spent by a patient waiting in line is approximately (two places of decimal)

Select one:

- a. None of the given choices are true
- b. 0.05 minutes
- c. 0.03 minutes
- d. 3.00 minutes
- e. 19 minutes

Feedback

The correct answer is: 3.00 minutes

Question 13

Correct

Question text

Customers arrive at a teller of a bank at the rate of 14 every half an hour according to a Poisson distribution. Service times are exponentially distributed with a service rate of 35 customers per hour. The probability that there are more than 2 customers in the system is

Select one:

- a. 0.128
- b. 0.488
- c. none of the given choices
- d. 0.512
- e. 0.640

Feedback

The correct answer is: 0.512

Question 14

Correct

Question text

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. The average amount of time, in minutes, spent by a patient in the system would be (up to two places of decimal).

Select one:

- a. 3 minutes
- b. None of the given choices are correct
- c. 0.03 minutes
- d. 0.5 minutes
- e. 18.00 minutes

Feedback

The correct answer is: 18.00 minutes

Question 15

Correct

Question text

Airplanes arrive at gate no. 12 of a busy airport. After being parked in the right position, the passengers' baggage gets unloaded by a team of baggage handlers. There is space for one airplane at the gate, and an unlimited space on the runaway for planes to wait for unloading. The arrival of planes follows a Poisson process with rate of 1 every hour. The unloading time of a plane is exponentially distributed, with rate proportional to the number of baggage handlers in the unloading crew. Each baggage handler can unload half of the plane in an hour. The manager has currently assigned 3 baggage handlers for unloading a plane. The probability that the gate is busy and the plane has to wait for unloading is (approximately)

Select one:

- a. None of the given choices
- b. 1.00
- c. 0.50
- d. 0.66
- e. 0.33

Feedback

The correct answer is: 0.66

Question 16

Correct

Question text

Airplanes arrive at gate no. 12 of a busy airport. After being parked in the right position, the passengers' baggage gets unloaded by a team of baggage handlers. There is space for one airplane at the gate, and an unlimited space on the runaway for planes to wait for unloading. The arrival of planes follows a Poisson process with rate of 1 every hour. The unloading time of a plane is exponentially distributed, with rate proportional to the number of baggage handlers in the unloading crew. Each baggage handler can unload half of the plane in an hour. The manager has currently assigned 3 baggage handlers for unloading a plane. Which of the following is the effect of increasing the number of baggage handlers?

Select one:

- a. Average time a plane must wait in the system will increase
- b. Average utilization will increase.
- c. Average number of planes waiting to be unloaded will increase.
- d. All the given choices are true
- e. Probability that the server is idle will increase

Feedback

The correct answer is: Probability that the server is idle will increase

Question 17

Correct

Question text

For infinite source models, which of the following will equal the average time a customer is in the system?

I. average number in the system divided by the arrival rate
II. average number in the system multiplied by the arrival rate
III. average time in line plus average service time
Select one:

- a. II only
- b. III only
- c. I and III
- d. I only
- e. II and III

Feedback

The correct answer is: I and III

Question 18

Correct

Question text

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. On average, the total number of patients in the system (i.e. waiting and being served) would be (approximately)

Select one:

- a. 0.05
- b. 0.30
- c. 0.50
- d. 3.00
- e. None of the choices are true

Feedback

The correct answer is: 3.00

Question 19

Correct

Question text

A single server queuing system has an average service time of 16 minutes per customer, which is exponentially distributed. The manager is thinking of converting to a system with a constant service time of 16 minutes. The average arrival rate will remain the same. The effect will be to:
Select one:

- a. increase utilization
- b. increase the average waiting time
- c. decrease utilization
- d. decrease the average waiting time
- e. not have any effect since the service time is unchanged

Feedback

The correct answer is: decrease the average waiting time

Question 20

Correct

Question text

Customers arrive at a teller of a bank at the rate of 14 every half an hour according to a Poisson distribution. Service times are exponentially distributed with a service rate of 35 customers per hour. If the arrival rate remains at 14 customers every half hour and the bank manager wants to have the average time a customer spends in the system to be a maximum of 6 minutes on average, then the service rate must

Select one:

- a. decrease by 10 to 25 customers per hour
- b. none of the given choices
- c. decrease by 8 to 27 customers per hour
- d. decrease by 7 to 28 customers per hour
- e. increase by 3 to 38 customers per hour

Feedback

The correct answer is: increase by 3 to 38 customers per hour

Question 21

Not answered

Question text

Airplanes arrive at gate no. 12 of a busy airport. After being parked in the right position, the passengers' baggage gets unloaded by a team of baggage handlers. There is space for one airplane at the gate, and an unlimited space on the runaway for planes to wait for unloading. The arrival of planes follows a Poisson process with rate of 1 every hour. The unloading time of a plane is exponentially distributed, with rate proportional to the number of baggage handlers in the unloading crew. Each baggage handler can unload half of the plane in an hour. The manager has currently assigned 3 baggage handlers for unloading a plane. The average time a plane must wait

before being unloaded is (approximately)

Select one:

- a. None of the given choices
- b. 1.94 hrs
- c. 0.66 hrs
- d. 1.33 hrs
- e. 1.00 hr

Feedback

The correct answer is: 1.33 hrs

Question 22

Not answered

Question text

A single server queuing system has an average service time of 8 minutes and an average time between arrivals of 7.5 minutes. The average arrival rate is:

Select one:

- a. 10 per hour
- b. 7.5 per hour
- c. 6 per hour
- d. 12.5 per hour
- e. 8 per hour

Feedback

The correct answer is: 8 per hour

Question 23

Not answered

Question text

Which of the following is a consequence of increasing the number of servers in a waiting line system?

Select one:

- a. none of the given choices
- b. both service cost and waiting cost decrease
- c. both service cost and waiting cost increase
- d. service cost decreases, waiting cost increases, and waiting cost decreases
- e. service cost increases, waiting time decreases, and waiting cost decreases.

Feedback

The correct answer is: service cost increases, waiting time decreases, and waiting cost decreases.

Question 24

Not answered

Question text

Airplanes arrive at gate no. 12 of a busy airport. After being parked in the right position, the passengers' baggage gets unloaded by a team of baggage handlers. There is space for one airplane at the gate, and an unlimited space on the runaway for planes to wait for unloading. The arrival of planes follows a Poisson process with rate of 1 every hour. The unloading time of a plane is exponentially distributed, with rate proportional to the number of baggage handlers in the unloading crew. Each baggage handler can unload half of the plane in an hour. The manager has currently assigned 3 baggage handlers for unloading a plane. The average number of planes waiting to be unloaded is (approximately)

Select one:

- a. 0.66
- b. None of the given choices
- c. 1.00
- d. 1.33
- e. 1.94

Feedback

The correct answer is: 1.33

Question 25

Not answered

A walk-in medical clinic has four doctors that serve patients with health problems on a first-come, first-serve basis. On average a doctor requires 15 minutes to process a patient and service times follow an exponential distribution. Patients arrive at the clinic at the rate of 10 per hour according to a Poisson distribution. The probability that there is no patient in the medical clinic is 0.073. The probability that an arriving patient must wait for service is (approximately)

Select one:

- a. 0.31
- b. 0.50
- c. None of the choices are correct
- d. 1.00
- e. 0.927

The correct answer is: 0.31