MIDTERM

Name: _____ **ID: _____**

Problem 1 (10 P):

A. Enumerate four systems that can be modeled and simulated:

i. _____

ii. _____

iii. _____

iv. _____

B. System models can be:

i. Dynamic vs. _____

ii. Deterministic vs. _____

iii. Discrete vs. _____

C. Based on the categories in part B, the hospital emergency operation can be described as:

_____

D. Describe the difference between Wait, Pre-empt, and Ignore for resource schedule switching:

_____

_____

_____

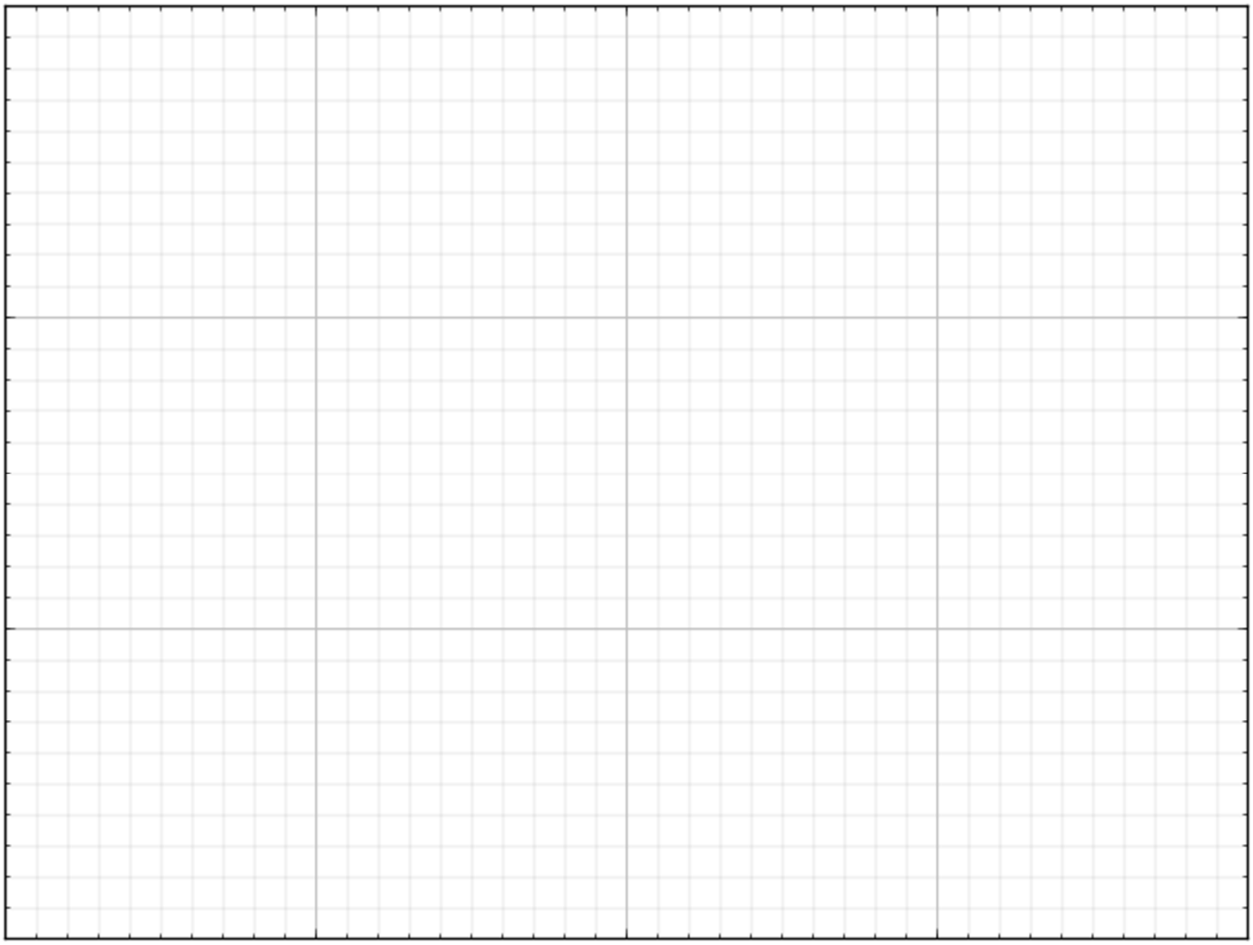
_____

_____

Problem 2 (25 P):

Provided that the demand distribution shown in the following table, plot the cumulative distribution function $F(d_i)$ and the inverse function $F^{-1}(u)$, where u is a random variable such that $0 \le u \le 1$. Write an Excel formula that generates this demand.

d_i	5	10	40	45	50	55	60
$f(d_i)$	0.1	0.2	0.3	0.2	0.1	0.05	0.05



Excel Formula

Problem 3 (30 P):

Sly's convenience store sells a piece of BBQ wings for 25 cents. They cost 15 cents to make a piece. The BBQ wings that are not sold on a given day are purchased by a local food pantry for 2 cents each the second day. Assuming that Sly decides to make 30 wings a day and provided that the demand distribution is normal with mean 25 and standard deviation 7. Build an excel model for the simulation of Sly's operation.

Problem 4 (35 P):

Suppose that the customers arriving to the drive-through pharmacy according to an exponential distribution with inter-arrival rate of 3.2 minutes. Customers can decide to enter the store instead of entering the drive-through lane. Assume a 60% chance that the arriving customer decides to use the drive through pharmacy and a 40% chance that the customer decides to use the store. In-store customers are serviced by two available pharmacists. The drive-through customers are serviced by a different pharmacist. Knowing that the prescription preparation time, regardless which service the customer chooses, is modeled as a triangular process with minimum time of 7 minutes, maximum time of 25 minutes and most likely time of 15 minutes. Note that prior to getting serviced, the in-store customers require time to park their cars which is usually modeled as a uniform distribution between 0.5 and 1 minute. Model this situation with Arena™.