Q1

6 Points

Choose a profession or job (excluding doctor, as this were used as class examples) and complete the following. Note that some professions may make the following easier or more difficult to answer.

a) Identify a population of individuals with your job or profession (ex: medical doctors in North America or doctors working at the UW Medical Center) and describe a cluster sampling scheme for sampling people from that population. What pre-existing clusters can be used to sample for individuals in this profession? Identify at least one advantage and one shortcomings with this approach (and try to frame these to your specific example).

b) Identify a population of individuals with your job or profession and describe a stratified sampling scheme for sampling people in this profession. What pre-existing strata exist in the profession? Are there any shortcomings to this sampling approach? Identify at least one advantage and one shortcomings with this approach (and try to frame these to your specific example).

c) Identify a population of individuals with your job or profession and describe one other sampling scheme for sampling people in this profession. Identify at least one advantage and one shortcomings with this approach (and try to frame these to your specific example).

Q2

8 Points

You are working for an automotive parts manufacturer, and are responsible for product testing new brake pad designs against the standard model. Specifically, you are tasked with testing if the new brake pad designs will improve vehicle stopping distances. You have 100 different vehicles to test on, ranging from small compact cars to large trucks. Similarly you have a well controlled indoor test track on which to conduct your experiments, that can simulate different road types (gravel, asphalt, and concrete). The break pads have been removed, and each vehicle can only have one set of break pads installed (new or old model), as swapping them is very time consuming.

Last minute you are called to a very important company meeting, and instructed to let your staff handle the experimental data collection. Unfortunately, though your staff are diligent and well intentioned, they do not have a good understanding of experimental design, and left to their own devices will do whatever it is they find easiest to complete the objectives set before them.

Give a set of instructions for your staff to follow to conduct a thorough experiment for assessing whether new brake pad designs improve stopping distances. Be sure to address at least each of the following points:

Identify the variables that staff should record for each individual test.

Identify other variables the staff should account for on each test

Specify how they should set the experimental conditions for each test.

Identify key fundamentals of experimental design that you include in your experimental design.