**Name: Odikeme Gideon Tamaratorufa**

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**Department: Human Anatomy**

**Question 1**

What do you understand by hypothesis testing?

Hypothesis testing is an act in statistics whereby an analyst tests an assumption regarding a population parameter. The methodology employed by the analyst depends on the nature of the data used and the reason for the analysis. It is used to assess the plausibility of a hypothesis by using sample data. Such data may come from a larger population, or from a data-generating process.

**Question 2**

The Classical Approach to hypothesis testing is to compare a test statistic and a critical value. It is best used for distributions which give areas and require you to look up the critical value (like the Student’s t distribution) rather than distributions which have you look up a test statistic to find an area (like the normal distribution).

The P-Value Approach, short for Probability Value, approaches hypothesis testing from a different manner. Instead of comparing z-scores or t-scores as in the classical approach, you’re comparing probabilities or areas.

**Question 3**

According to the San Jose State University Statistics Department, hypothesis testing is one of the most important concepts in statistics because it is how you decide if something really happened, or if certain treatments have positive effects, or if groups differ from each other or if one variable predicts another. In short, you want to proof if your data is statistically significant and unlikely to have occurred by chance alone. In essence then, a hypothesis test is a test of significance.

If, for example, a person wants to test that a penny has exactly a 50% chance of landing on heads, the null hypothesis would be yes, and the alternative hypothesis would be no (it does not land on heads). Mathematically, the null hypothesis would be represented as Ho: P = 0.5. The alternative hypothesis would be denoted as “Ha” and be identical to the null hypothesis, except with the equal sign stuck-through (≠) meaning that it does not equal 50%.

A random sample of 100 coin flips is taken, and the null hypothesis is then tested. If it is found that the 100 coin flips were distributed as 40 heads and 60 tails, the analyst would assume that a penny does not have a 50% chance of landing on heads and would reject the null hypothesis and accept the alternative hypothesis.

If, on the other hand, there were 48 heads and 52 tails, then it is plausible that the coin could be fair and still produce such as this where the null hypothesis is “accepted”, the analyst states that the difference between the expected results (50 heads and 50 tails) and the observed results (48 heads and 52 tails) is “explainable by chance alone”.