Inferential Statistics

School of Economics, QAU

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**Note** : Attempt all the questions

#### Q#1 (15 points)

1. Write down four conditions to be satisfied for an experiment to be Binomial.
2. For each of the following situations, state whether the parameter of interest is a mean or a proportion. It may be helpful to examine whether individual responses are numerical or categorical.
3. In a survey, one hundred college students are asked how many hours per week they spend on the Internet.
4. In a survey, one hundred college students are asked: “What percentage of the time you spend on the Internet is part of your course work?”
5. In a survey, one hundred college students are asked whether or not they cited information from Wikipedia in their papers.
6. In a survey, one hundred college students are asked what percentage of their total weekly spending is on alcoholic beverages.
7. In a sample of one hundred recent college graduates, it is found that 85 percent expect to get a job within one year of their graduation date.

#### Q#2 (12 points)

A food safety inspector is called upon to investigate a restaurant with a few customer reports of poor sanitation practices. The food safety inspector uses a hypothesis testing framework to evaluate whether regulations are not being met. If he decides the restaurant is in gross violation, its license to serve food will be revoked. (a) Write the hypotheses in words. (b) What is a Type 1 Error in this context? (c) What is a Type 2 Error in this context? (d) Which error is more problematic for the restaurant owner? Why? (e) Which error is more problematic for the diners? Why? (f) As a diner, would you prefer that the food safety inspector requires strong evidence or very strong evidence of health concerns before revoking a restaurant’s license? Explain your reasoning.

#### Q#3 (8 points)

Let . Find the following properties of .

a. What are the different values that can take?

b.

c.

d.

#### Q#4 (15 points)

1. A May 2023 Gallup poll suggests that 13% of Pakistani think home schooling provides an excellent education for children. Would a random sample of 1,000 Pakistani where only 100 share this opinion be considered unusual?

#### ii)) Explain any of the three following concepts (briefly)

1. Point estimate and interval estimate
2. Type I and Type II Error
3. Null and Alternative Hypothesis
4. Central Limit Theorem and Law of Large Numbers

Good luck