**ALLAMA IQBAL OPEN UNIVERSITY, ISLAMABAD**

**(Department of Economics)**

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| **Warning**  **1. Plagiarism or hiring of a ghost writer(s) for solving the assignment(s) will debar the student from the award of degree/certificate if found at any stage.**  **2. Submitting assignments borrowed or stolen from other(s) as one’s own will be penalized as defined in the “AIOU plagiarism policy”.** |

**Course: Intermediate Statistics for Economists (9310) Semester Spring, 2025**

**Level B.A.**

## Please read the following instructions for writing your assignments.(AD, BS, BEd, MA/MSc, MEd) (ODL Mode).

1. All questions are compulsory and carry equal marks but within a question the marks are distributed according to its requirements.

2. Read the question carefully and then answer it according to the requirements of the questions.

3. Avoid irrelevant discussion/information and reproducing from books, study guide or allied material.

4. Handwritten scanned assignments are not acceptable.

5. Upload your typed (in Word or PDF format) assignments on or before the due date.

6. Your own analysis and synthesis will be appreciated.

7. Late assignments can’t be uploaded at LMS.

8. The students who attempt their assignments in Urdu/Arabic may upload a scanned copy of their handwritten assignments (in PDF format) on University LMS. The size of the file should not exceed 5MP.

**Total Marks: 100 Pass Marks: 40**

## Assignment No. 1

**Units 1-4**

Q.1. Consider a finite population with five elements labelled A, B, C, D, and E. Ten possible simple random samples of size 2 can be selected.

1. List the 10 samples beginning with AB, AC, and so on. (06)
2. Using simple random sampling, what is the probability that each sample of size 2 is selected? (07)
3. Assume random number 1 corresponds to A, random number 2 corresponds to B, and so on. List the simple random sample of size 2 that will be selected by using the random digits 8 0 5 7 5 3 2. (07)

Q.2. Fifty-two percent of primary care doctors think their patients receive unnecessary medical care

a. Suppose a sample of 300 primary care doctors were taken. Show the sampling distribution of the proportion of doctors who think their patients receive unnecessary medical care.

b. What is the probability that the sample proportion will be within ±.03 of the population proportion?

c. What is the probability that the sample proportion will be within ±.05 of the population proportion?

d. What would be the effect of taking a larger sample on the probabilities in parts (b) and (c)? Why? **(5 + 5 + 5 +5)**

Q.3. Many medical professionals believe that eating too much red meat increases the risk of heart disease and cancer (WebMD website, March 12, 2014). Suppose you would like to conduct a survey to determine the yearly consumption of beef by a typical American and want to use 3 pounds as the desired margin of error for a confidence interval estimate of the population mean amount of beef consumed annually. Use 25 pounds as a planning value for the population standard deviation and recommend a sample size for each of the following situations.

a. A 90% confidence interval is desired for the mean amount of beef consumed.

b. A 95% confidence interval is desired for the mean amount of beef consumed.

c. A 99% confidence interval is desired for the mean amount of beef consumed.

d. When the desired margin of error is set, what happens to the sample size as the confidence level is increased? Would you recommend using a 99% confidence interval in this case? Discuss.

Q.4. Test the following hypotheses by using the *x*2 goodness of fit test.

*H*0: *p*A 5 .40, *p*B 5 .40, and *p*C 5 .20

*H*a: The population proportions are not

*p*A 5 .40, *p*B 5 .40, and *p*C 5 .20

A sample of size 200 yielded 60 in category A, 120 in category B, and 20 in category C. Use *a* = .01 and test to see whether the proportions are as stated in *H*0.

* 1. Use the *p*-value approach.
  2. Repeat the test using the critical value approach.

Q.5. Consider the following hypothesis test:



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A sample of 100 provided a sample mean of 28.15. The population standard deviation is 3.

a. compute the value of the test statistic.

b. what is the p-value?

c. at a = .05, what is your conclusion?

d. What is the rejection rule using the critical value? What is your conclusion?

**Total Marks: 100 Pass Marks: 40**

## Assignment No. 2

**Units 5-9**

Q.No.1. Given the following data: **(10 + 10)**

***xi*** 2 6 9 13 20

***yi*** 7 18 9 26 23

1. What is the value of the standard error of the estimate?
2. Test for a significant relationship by using the *t* test. Use *a* = .05.

Q.2. What is meant by student t- distribution? Elaborate with an example: (10+ 10)

a. Confidence interval estimation from a sample of 15 observations.

b. Conduct a sample test of mean given the data in part a.

Q.3. Given the following data. **(5 + 5 + 5 + 5)**

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| --- | --- | --- | --- |
| ***xi*** | 2 | 6 | 5 4 5 |
| ***yi*** | 4 | 7 | 1. 11 12 |

1. Compute the mean square error using the equation.
2. Compute the standard error of the estimate using the equation.
3. Compute the estimated standard deviation of *b*1 using the equation.

*H*0: *b*1 0



*H*a: *b*1 0



(d) Use the *F* test to test the above hypotheses at a .05 level of significance.

Q.4. (a) Explain different uses of Chi- square distributions with at least one suitable example.

(b) Explain the Chi-Square test as a test of homogeneity. Explain its procedure with an example. **(10 + 10)**

Q.5. (a) What is The Mann-Whitney U Test? Explain with the help of an example. **(08)**

(b) The following hypothesis test is to be conducted.  **(12)**

*H*0: Median ≤ 150

*H*a: Median > 150

A sample of 30 provided 22 observations greater than 150, 3 observations equal to 150, and 5 observations less than 150. Use *a* = .01. What is your conclusion?