

**UNIVERSITY OF SWAZILAND**  
**FACULTY OF SOCIAL SCIENCE**  
**DEPARTMENT OF ECONOMICS**  
**MAIN EXAMINATION**  
**MAY 2012**

**TITLE OF PAPER: STATISTICS FOR ECONOMISTS**

**COURSE CODE: ECON 209**

**TIME ALLOWED: THREE (3) HOURS**

- INSTRUCTIONS:**
- 1. ANSWER FOUR (4) QUESTIONS:**  
**QUESTION ONE (1) IS COMPULSORY AND YOU CAN THEN CHOOSE ANY THREE (3) QUESTIONS FROM THE REMAINING QUESTIONS PROVIDED.**
  - 2. ALL QUESTIONS CARRY 25 MARKS EACH**
  - 3. ALWAYS ROUND UP THE FINAL ANSWER TO TWO (2) DECIMAL PLACES.**

**THIS PAPER IS NOT SUPPOSED TO BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR**

**QUESTION 1 (compulsory)**

- a) Outline the two important procedures for estimating the probability of an event. (5)
- b) Find the probability that a single toss of a die will result in a number less than 4 if
- i) No other information is given. (2)
  - ii) It is given that the toss resulted in an odd number (3)
- c) If 20% of the bolts produced by a machine are defective, determine the probability that out of 4 bolts chosen at random;
- i) 1 will be defective (3)
  - ii) 0 will be defective (3)
  - iii) Less than 2 bolts will be defective (3)
- d) The mean inside diameter of a sample of 200 washers produced by a machine is 0.502 inches and the standard deviation is 0.005 inches. The purpose for which these washers are intended allows a maximum tolerance in the diameter of 0.496 to 0.508 inches, otherwise the washers are considered defective. Determine the percentage of defective washers produced by the machine, assuming the diameters are normally distributed. (6)

**QUESTION 2**

- a) A sample of 100 voters is chosen at random from all voters in the Ka Lamgabhi constituency indicates that 55% of the voters are in favor of a particular candidate. Find
- i) 95% confidence limits for the proportion of all the voters in favor of this candidate. (3)
  - ii) 99% confidence limits for the proportion of all the voters in favor of this candidate. (3)
  - iii) 99.73% confidence limits for the proportion of all the voters in favor of this candidate. (3)
- b) Differentiate between sampling with replacement and sampling without replacement. (2)
- c) The Swaziland Electricity Company (SEC) takes a random sample of 1000 customer accounts and finds that 200 of them have been in arrears for more than 3 months.
- i) Find the 95% confidence interval for the percentage of accounts in arrears. (8)
  - ii) If the company has a total of 50,000 accounts, find the 95% confidence interval for the number of accounts in arrears. (6)

**QUESTION 3**

- a) The mean height of male students who showed above-average participation in UNISWA athletics was 68.2 inches with a standard deviation of 2.5 inches, while 50 male students who showed no interest in such participation had a mean height of 67.5 inches with a standard deviation of 2.8 inches.
- i) Test the hypothesis that male students who participate in UNISWA athletics are taller other male students. (8)
  - ii) What is the P value of the test? (2)
- b) A sales department notices that 6% of interviews with sales prospects have matured into sales during 2010. In 2011 the sales department examined the results of a random sample of 2000 interviews and noted that 140 sales contracts were gained. Do you think that the proportion of successful interviews has significantly improved from 2010 to 2011? (6)
- c) Write short explanatory notes on the following terms: (3 marks each)
- i) Statistical decisions
  - ii) Acceptance region
  - iii) P - value

**QUESTION 4**

The table below shows the respective heights  $x$  and  $y$  of a sample of 12 fathers and their oldest sons.

Father's height ( $x$ )	65	63	67	64	68	62	70	66	68	67	69	71
Son's height ( $y$ )	68	66	68	65	69	66	68	65	71	67	68	70

- a) Construct a scatter diagram. (4)
- b) Find the least-squares regression line of  $y$  on  $x$ . (8)
- c) Find the least – squares regression line of  $x$  on  $y$  (8)
- d) Calculate the coefficient of determination for b) and interpret the results (5)

