



UNIVERSITY OF SWAZILAND  
Faculty of Health Sciences  
Department of Environmental Health Science

DEGREE IN ENVIRONMENTAL HEALTH AND FOOD  
SCIENCE

**SUPPLEMENTARY EXAMINATION PAPER 2017**

TITLE OF PAPER : STATISTICS FOR HEALTH SCIENCES  
COURSE CODE : EHM 300  
DURATION : 2 HOURS  
MARKS : 100

INSTRUCTIONS : READ THE QUESTIONS & INSTRUCTIONS CAREFULLY  
: ANSWER **ANY FOUR** QUESTIONS.  
: EACH QUESTION **CARRIES 25** MARKS.  
: WRITE NEATLY & CLEARLY  
:  
: BEGIN EACH QUESTION ON A SEPARATE SHEET OF PAPER.

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.**

**QUESTION ONE**

(a) Define the following terms, as applied in statistics:

- (i) Gaussian distribution **[1 Mark]**
- (ii) Poisson distribution **[1 Mark]**

(b) Table (1) below shows the number of hours 45 hospital patients slept following the administration of a certain anaesthetic.

**Table 1.** Number of hours different patients slept following the administration of a certain anaesthetic.

7	10	12	4	8	7	3	8	5
12	11	3	8	1	1	13	10	4
4	5	5	8	7	7	3	2	3
8	13	1	7	17	3	4	5	5
3	1	17	10	4	7	7	11	8

- (i) Construct a frequency distribution and a relative frequency distribution for the data in Table 1. **[12 marks]**
- (ii) If a patient is picked at random, what is the probability that they slept for more than 8 hours after the administration of the anaesthetic? **[2.5 marks]**
- (iii) If a patient is picked at random, what is the probability that they slept for less than 5 hours after the administration of a the anaesthetic? **[2.5 marks]**
- (iv) In a statistics test students were asked to construct a frequency distribution of the blood creatine levels (units/liter) for 300 healthy subjects. The mean was 95, and the standard deviation was 38. The following numbers of class interval were used by the students: 1; 5; 10; 15; 20; and 25.

Comment on the appropriateness of these choices of widths. **[6 marks]**  
**[25 Marks]**

**QUESTION TWO**

- (a) Briefly outline two main situations where you can employ Chi-Square to analyze data. **[5 Mark]**
- (b) Research was carried out to compare different amounts of rainfall received in three (3) towns in Swaziland over a specified period (Table 2).

**Table 2.** Summary of rainfall recorded for the town of Mbabane, Manzini and Piggs Peak.

	Average monthly rainfall) (mm)			
	September	October	November	December
Mbabane	66	135	170	199
Manzini	38	70	118	107
Piggs Peak	15	78	107	99

Using appropriate statistical tool carry out an analysis to check if there's any significant difference in the rainfall of the three (3) towns listed: Mbabane, Manzini and Peak Piggs. **[20 marks]**  
**[25 Marks]**

**QUESTION THREE**

- (a) Define the following:
- (i) Reliability coefficient, [1 Mark]
  - (ii) Standard error of estimator, [1 Mark]
  - (iii) Standard deviation of the mean. [1 Mark]

(b) A 3<sup>rd</sup> year nursing student specializing in midwifery from Mbabane Campus was taking head circumferences of babies at birth as shown in the Table (3) below.

**Table 3.** The head circumferences of 10 separate infants (centimeters) at birth in one hospital in Swaziland.

33.38	32.16	33.99	34.11	33.97
34.34	33.95	33.42	33.85	32.73

Another nursing student at nursing university recorded head circumferences of 34.9 centimeters. Carry out statistical analysis to establish if there is any significance in the head circumferences recorded by the two students. [22 marks]

[25 marks]

**QUESTION FOUR**

It is thought that abrasion loss in certain steel specimens should be a linear function of Rockwell hardness measure. A sample of six specimens gave the following results:

Rockwell Hardness (x)	62	53	63	65	75	72
Abrasion Loss (y)	258	245	267	235	221	210

- (a) Calculate the Slope, Intercept, Coefficient of Correlation and Coefficient of Determination. [22 marks]
- (b) Comment on your Coefficient of Correlation. [3 marks]
- [25 Marks]

**QUESTION FIVE**

There are 22 male students and 12 female students in the final year Environmental Health Science class at Mbabane campus.

- (a) Choose an appropriate statistical mode that can help you to test if the given proportions are statistically different. [1 Mark]
- (b) Compute the necessary statistical tests and draw some conclusion. [16 Marks]
- (c) Discuss how the normal distribution graph is influenced by  $\mu$  and  $\delta$ . [8 marks]
- [25 Marks]