



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

DEGREE IN ENVIRONMENTAL HEALTH SCIENCE

FINAL EXAMINATION PAPER 2019

TITLE OF PAPER : STATISTICS FOR HEALTH SCIENCES
COURSE CODE : EHS 301
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) Continuous random variable | [1 Mark] |
| (ii) Discrete random variable | [1 Mark] |
| (iii) Gaussian distribution | [1 Mark] |
| (iv) Random variable | [1 Mark] |
| (v) Empirical probability | [1 Mark] |
| (vi) Sample size | [1 Mark] |
| (vii) Nominal scale | [1 Mark] |
| (viii) Midpoint | [1 Mark] |
| (ix) Standard error of the estimator | [1 Mark] |
| (x) Ordinal scale | [1 Mark] |
- (b) Briefly explain how different values of δ and μ would alter the shape of graph.
[10 marks]
- (c) Given that the number of class intervals is 10, calculate the sample size.
[2.5 Marks]
- (d) Given that $n = 550$, what is the number of class interval you would obtain from this data?
[2.5 marks]

Total [25 Marks]

QUESTION TWO

- (a) What are the properties of poisson distribution? [3 Marks]
- (b) In a particular study 55% of residents responded that childhood obesity is a serious national health problem. If we pick ten residents at random, find the probability that exactly fewer than two will say is not a serious national health problem?
[12 Marks]
- (c) If the total cholesterol values for a certain population are approximately normally distributed with a mean of 200 mg/100 ml and standard deviation of 20 mg/100 ml, find the probability that an individual picked at random from this population will have a cholesterol value:
- | | |
|-------------------------------------|------------|
| (i) Less than 150 mg/100 ml, | |
| (ii) Greater than 225 mg/100ml, | |
| (iii) Between 180 and 200 mg/100 ml | [10 Marks] |

Total [25 Marks]

QUESTION THREE

- (a) What are the main difference between mean and standard deviation?
[5 Marks]
- (b) There is evidence that stress in a child's life leads to behavioural problems. To investigate this problem, a sample of five children who have a high level of social stress are asked to complete a youth self-report form. This form is standardized so that a score of 50 represents an average amount of behavioural problems. These are the scores obtained: 58, 53, 48, 62 and 51.

Test whether these five scores are significantly different from the established norm of 50. **[20 Marks]**

QUESTIONS FOUR

- (a) Briefly discuss main differences between range and confidence interval. **[5 Marks]**
- (b) Segal et al (2010) performed a study that examined two types of preoperative skin preparation before performing open heart surgery. These two preparations used aqueous iodine and insoluble iodine with the following results.

| Preparation Group | Comparison of Aqueous and Insoluble preparations | |
|-------------------|--|--------------|
| | Infected | Not Infected |
| Aqueous iodine | 14 | 94 |
| Insoluble iodine | 4 | 97 |

Does this data provide sufficient evidence to justify the conclusions that the type of skin preparation and infection are related? **[20 Marks]**

Total [25 Marks]

QUESTIONS FIVE

- (a) Briefly outline steps you could take in computing the Coefficient of Determination. **[5 Mark]**
- (b) A research was carried to compare different rainfall received in three (3) towns in Swaziland over a specified period (Table 1).

Table 1. Summary of rainfall recorded for the town of Mbabane, Manzini and Piggs Peak.

| | Average monthly rainfall) (mm) | | | |
|------------|--------------------------------|---------|----------|----------|
| | September | October | November | December |
| Mbabane | 90 | 160 | 189 | 225 |
| Manzini | 30 | 70 | 90 | 115 |
| Piggs Peak | 20 | 85 | 110 | 185 |

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

Total [25 Marks]