

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF MEDICINE

MEDICAL SCHOOL

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY DEGREE
PART 1 EXAMINATION

(MSM 1102) STATISTICS AND EPIDEMIOLOGY

DATE: DECEMBER 2005

TIME: 3 HOURS

Instructions to Candidates

- 1) Answer all questions
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SECTION A

1. Define the following terms:

- a. center
- b. variation
- c. distribution
- d. outliers

(4)

2. The following figures are the ages of people admitted in the adult ward in a rural hospital.

57	61	57	40	42	58	61	45	37	46	60	66
	77	30	38	40	45	39	55	52	47	44	41
	36	55	54	56	61	63	62	66	58	35	22
	81	92	21	55	52	65	69				

Find the:

- (a) mean (2)
- (b) median (2)
- (c) mode (2)
- (d) midrange (2)
- (e) range (2)
- (f) standard deviation . (2)

3. The serum cholesterol levels in men aged 18 to 24 are normally distributed with a mean of 178.1 and a standard deviation of 40.7. Units are mg/100ml and the data is based on the National Health Survey
- If a man aged 18 to 24 is randomly selected, find the probability that his serum cholesterol level is greater than 260, a value considered to be “moderately high.” (2)
 - The Providence Health Maintenance Organization wants to establish a criterion for recommending dietary changes if cholesterol levels are in the top 3%. What is the cut off for men aged 18 to 24? (3)
4. A Media Research Company in Bulawayo wants to estimate the mean amount of time (in hours) that full-time students at NUST spend watching TV each weekday. Find the sample size necessary to estimate that mean with a 0.25hr (15 min) margin of error. Assume that a 95% confidence is desired. Also assume that a pilot study showed that the standard deviation is estimated to be 1.87 hr. (5)
5. Draw a contingency table to illustrate Type I and Type II error as well as the correct decision taken concerning a hypothesis. (5)
6. Briefly describe the important properties of the Student t Distribution. (5)
7. A medical researcher obtains the systolic blood pressure readings (in mm Hg) in the accompanying list from a sample of women aged 18 – 24 who have a new strain of viral infection. (Healthy women in that age group have readings that are normally distributed with a mean of 114.8 and a standard deviation of 13.1)

134.9 78.7 108.9 133.0 123.7 96.1 126.9 89.8

132.0 134.7 132.1 121.7 112.3 150.2 158.3 154.4

- Find the sample mean and standard deviation s (2)
- Use a 0.05 significance level to test the claim that the sample comes from a population with a mean blood pressure equal to 114.8 (2)
- Use the sample data to construct a 95% confidence interval for the population mean μ . Do the confidence interval limits contain the value of 114.8 (which is the mean for healthy women)? (2)
- Use a 0.05 significance level to test the claim that the sample comes from a population with a standard deviation equal to 13.1 (which is the standard deviation for healthy women aged 18 – 24). (2)

- e. Based on the preceding results, what conclusions can be drawn? (2)
 - 8. Identify the guidelines to use for selecting a regression equation. (5)
 - 9. Use a scatter diagram to illustrate the types of mathematical models you can use to describe real world data. Discuss the principles to use in deciding on a particular model. (15)
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SECTION B

- 1. Summarize the **three** basic methods of study used in epidemiology. (20)
- 2. Discuss the relationship between epidemiology and patient care. (20)