

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

SSC1103

FACULTY OF APPLIED SCIENCES

BACHELOR OF SCIENCE HONOURS DEGREE EXAMINATIONS

DEPARTMENT OF SPORTS SCIENCE AND COACHING

**THEORY: SSC1103: STATISTICS IN SPORTS**

JANUARY 2004

3 HOURS (100 MARKS)

**INSTRUCTIONS**

Answer 4 questions only. Each question carries 25 marks. Where a question contains subdivisions, the mark value for each subdivision is given in brackets. Illustrate your answer where appropriate with large clearly labeled diagrams.

1. (a) Using examples from sports describe and explain the meaning of descriptive statistics and its importance. [12 marks]
- (b) Explain the main four common scales of measurement as per type of data used in sports. Give clear examples. [13 marks]
2. (a) Using appropriate formulas explain the three measures of central tendency. Include the advantages and disadvantages of each. [15 marks]
- (b) Considering the following frequency distribution table.
  - (i) Calculate each of the measures explained in (2a).
  - (ii) Considering that  $x$  represents the race positions of 100m athletes which of the main three measures of central tendency will best represent centrality? Explain. [10 marks]

**TABLE: FREQUENCY DISTRIBUTION TABLE**

<b>X</b>	<b>F</b>	<b>CF</b>	<b>C%</b>
5	1	20	100%
4	5	19	95%
3	8	14	70%
2	4	6	30%
1	2	2	10%

3. (a) By the use of a graph describe what a normal distribution is and why it is important in sports statistics? [11 marks]

(b) Assume that a person scored 70 runs on a test match with a mean of 40 runs and a standard deviation of 10.

- (i) Convert the normal distribution to the standard normal distribution using the above data. [5 marks]
- (ii) Explain the meaning of the Z score you calculated. [4 marks]
- (iii) If the scores scored by different batsmen during the test match were 20, 23, 10, 15, 122, 14, 108, 25, calculate the 1<sup>st</sup> quartile and comment on the performance of the batsmen. [5 marks]

4. (a) Explain what you understand by a skewed frequency distribution. [5 marks]

(b) Consider the following mathematical formula of skewness:

$$M_3 = \frac{1}{n - 1} \sum_{i=1}^n (x - \bar{x})^3$$

- (i) Illustrate the possible values of  $M_3$  using graphs, give examples where it is possible in sports to have such values and also express the relationship of  $M_0$ ,  $M_n$  and  $M_d$  for each value of  $M_3$ . [12 marks]
- (ii) A sample has 9 values equal to 4 and 2 values equal to 6. Find the Kurtosis and skewness of these data. Comment on your results. [8 marks]

5. (a) How does each of the following statistical techniques show the relationship of two variables?

- (i) Correlation. [12 marks]
- (ii) Regression.

**NOTE USE GRAPHS TO EXPLAIN YOUR ANSWER**

(b) In regression analysis:

- (i) State the properties of the regression line. [8 marks]
- (ii) State the general equation of the line and state how the two values, intercept and slope are related to the equation. [5 marks]

6. (a) Using examples describe and explain the three indices of correlation that are used to investigate non-linear relationships. [15 marks]

(b) Using examples and formulas show the difference between standard deviation and simple variance. [10 marks]

**END OF EXAM QUESTION PAPER**