

**MAE202N**

May/June 2015

**STATISTICS EDUCATION IN INTERMEDIATE AND SENIOR MATHEMATICS**

Duration 2 Hours

100 Marks

EXAMINATION PANEL AS APPOINTED BY THE DEPARTMENT

Use of a non-programmable pocket calculator is permissible

Closed book examination

This examination question paper remains the property of the University of South Africa and may not be removed from the examination venue

This paper consists of 4 pages

ANSWER ALL THE QUESTIONS

Question 1

- 1 1 State three sampling methods (3)
- 1 2 Discuss one advantage and one disadvantage of the sampling methods you have mentioned in 1 1 (6)
- 1 3 You have a group of 27 learners, 12 boys and 15 girls. You need to select 5 girls and 4 boys to go on a trip. Describe the sampling method you would use in this case to select the learners (3)
- 1 4 Give an example where you would use a systematic sampling method to draw a sample. Discuss the population in detail (3)
- 1 5 The frequency table below shows the number of runs scored by 36 learners in a cricket competition

Number of runs	Frequency
5	6
12	14
20	9
32	5
45	2

- 1 5 1 Draw a bar chart to represent the data from the cricket competition. (5)
- 1 5 2 State the value of the modal number (mode) of the runs (1)
- 1.5 3 Calculate the mean number of runs (4)

[25]

Question 2

The table below shows the number of candidates who gained marks within a given range of marks

Marks	Frequency	Cumulative frequency
$0 \leq x < 10$	4	4
$10 \leq x < 20$	12	16
$20 \leq x < 30$	24	
$30 \leq x < 40$	37	
$40 \leq x < 50$	54	
$50 \leq x < 60$	45	
$60 \leq x < 70$	17	
$70 \leq x < 80$	7	

- 2 1 Copy and complete the table above (3)
- 2 2 Write down the total number of pupils who took the examination (2)
- 2 3 Construct an OGIVE to represent the marks (5)
- Use the graph to estimate
- 2 3 1 The median mark (2)
- 2 3 2 The interquartile range (4)
- 2 3 3 The semi-interquartile range (2)
- 2 4 Draw a box-and-whisker plot of the examination marks (4)
- 2 5 Is the box-and-whisker plot symmetrical, positively skewed or negatively skewed? Explain your answer (3)

[25]

[TURN OVER]

**Question 3**

The table shows a grouped frequency distribution of the masses of 125 students, each measured to the nearest kilogram

Mass (Kg)	Number of students
40 – 44	3
45 – 49	13
50 – 54	22
55 – 59	27
60 – 64	29
65 – 69	24
70 – 74	7

- 3.1 What is the modal class of this data? (2)
- 3.2 What is the least mass which would be put in the class 40 – 44? (2)
- 3.3 Draw a histogram representing the data in the table (5)
- 3.3.1 Comment about the shape of the histogram (3)
- 3.4 Calculate an estimate of the mean mass of the students (4)
- 3.5 Calculate the standard deviation. (4)

$$\text{Standard deviation} = \sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} \quad [x \text{ is the midpoint of the groups and } \bar{x} \text{ is the mean}]$$

[20]

**Question 4**

- 4.1 Two dice are rolled at the same time
- 4.1.1 List all the possible total scores when two dice are rolled. (5)
- 4.1.2 Write down the probability that the total score will be 7 (3)
- 4.1.3 Write down the probability that the total score will be 12 or 10 (4)

[TURN OVER]

- 4 2 One thousand cars were stopped and tested for faults. The failure rate of two parts is shown below
- Light bulbs - 1 in 5 cars  
Brakes - 1 in 10 cars
- 4 2 1 How many of the cars checked had faulty brakes? (2)
- 4 2 2 What is the probability that a car does not have faulty brakes? (2)  
(The different faults on these cars are independent )
- 4 2 3 What is the probability that one of the cars checked had faulty light bulbs but not have faulty brakes? (4)
- 4 2 4 The failure rates shown are typical for cars. Two cars are stopped and the brakes are checked
- (i) Construct a tree diagram and list all the possible outcomes (4)
- (ii) Use your tree diagram to calculate the probability that
- a) both cars had faulty brakes (3)
- b) only one car had faulty brake (3)
- [30]**

---

**TOTAL 100**

Examiners

First: Dr T Nkambule

Second: Dr R Paulsen