



# ZIMBABWE SCHOOL EXAMINATIONS COUNCIL

## General Certificate of Education Ordinary Level

**STATISTICS**  
**PAPER 2**

**4073/2**

**SPECIMEN PAPER**

2 hours 30 minutes

Additional materials: Answer paper Electronic calculator Mathematical Set

**Allow candidates 5 minutes to count pages before the examination.**

**TIME** 2 hours 30 minutes

### INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces at the top of the answer paper or answer booklet.

Write your centre and candidate number in the boxes on the top right corner of every page of this paper.

Check if the booklet has all the pages and ask the invigilator for a replacement if there are duplicate or missing pages.

Answer **all** questions in Section A and any **four** questions in Section B.

Omission of essential working will result in loss of marks.

Decimal answers which are not exact should be given to three significant figures unless stated otherwise.

### INFORMATION FOR CANDIDATES

The number of marks is given in brackets [ ] at the end of each question.

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**This question paper consists of 7 printed pages and 1 blank page.**

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## 2

### Section A [36 marks]

Answer *all* questions in this section.

- 1 (a) Distinguish between descriptive statistics and inferential statistics. [2]
- (b) State any **two** uses of statistics in life. [2]
- 2 (a) Define the following terms as they are used in Statistics.
- (i) Population [1]
- (ii) Sample [1]
- (iii) Census [1]
- (b) State any **one** advantage and any **one** disadvantage of using census for data collection. [2]
- 3 Table 3.1 shows the probability distribution for a random variable  $X$ .

Table 3.1

| $X$        | 1   | 2             | 3    | 4             | 5             |
|------------|-----|---------------|------|---------------|---------------|
| $P(X = x)$ | $k$ | $\frac{1}{4}$ | $2k$ | $\frac{1}{3}$ | $\frac{2}{5}$ |

Calculate,

- (a) the value of  $k$ , [1]
- (b)  $P(2 \leq X < 4)$ , [2]
- (c)  $E(X)$ . [2]

### 3

- 4 The probability that Tom is early for school is  $\frac{2}{3}$  and that John is late for school is  $\frac{3}{5}$ .

Giving each answer as a common fraction in its lowest terms, find the probability that on a given day,

- (a) Tom is late for school, [1]
  - (b) they are both early, [2]
  - (c) either Tom or John is late for school. [2]
- 5 (a) State any **two** measurement scales and give an example of each. [4]
- (b) (i) Define the term **sampling**. [2]
  - (ii) State any **one** technique of data collection, giving any **one** advantage and any **one** disadvantage. [3]
  - (iii) State any **two** reasons why sampling is important. [2]
- 6 A sports equipment company sells three types of tennis shoes (Trainer, Balance and Dura), as shown in **Table 6.1**.

**Table 6.1**

| Shoe Type      | 2005       | 2006       | Value   |
|----------------|------------|------------|---------|
|                | Price (\$) | Price (\$) | Weights |
| <b>Trainer</b> | 32         | 90         | 10      |
| <b>Balance</b> | 44         | 23         | 15      |
| <b>Dura</b>    | 56         | 54         | 12      |

- (a) Using 2005 as the base year, calculate the price relatives for
  - (i) Trainer [1]
  - (ii) Balance [1]
  - (iii) Dura [1]
- (b) Calculate the weighted aggregate cost index. [3]

## 4

### Section B (64 marks)

*Answer any **four** questions*

- 7 **Table 7.1.** shows the lengths of 30 leaves.

**Table 7.1**

| Length of leaf (cm) | 10 – 14 | 15 – 19 | 20 – 24 | 25 – 29 | 30 – 39 |
|---------------------|---------|---------|---------|---------|---------|
| Frequency           | 3       | 8       | 11      | 6       | 2       |

- (a) Calculate, correct to 2 decimal places, the

- (i) mean length, [3]
- (ii) standard deviation [4]
- (iii) median. [3]

- (b) (i) Draw a histogram to illustrate the data in **Table 7.1.** [4]
- (ii) Use the histogram to estimate the mode. [2]

- 8 **Table 8.1** gives information about two districts **X** and **Y**.

**Table 8.1**

| District X |        |            | District Y            |            |                       |
|------------|--------|------------|-----------------------|------------|-----------------------|
| Age group  | Deaths | Population | Standard Population % | Death rate | Standard Population % |
| 0 - 19     | 150    | 80 000     | 25                    | 4          | 25                    |
| 20 - 39    | $a$    | 60 000     | 30                    | 3          | 30                    |
| 40 -59     | 200    | 50 000     | 25                    | 5          | 25                    |
| 60+        | 160    | 60 000     | 20                    | 25         | 20                    |

- (a) Given that the death rate for the **20 – 39** age group is 3 per thousand for district **X**, find the value of  $a$ . [2]

## 5

8 (b) Calculate the crude death rate for district X. [4]

(c) (i) For district X, calculate the death rates for the age groups.

1. 0 – 19

2. 40 – 59

3. 60+ [3]

(ii) Calculate the standard death rate for district X, [3]

(iii) Calculate the standard death rate for district Y, [2]

(d) Comment, giving a possible reason, on your results in c(ii) and (iii). [2]

9 Table 9.1 shows the marks obtained by 10 students in Mathematics and Statistics tests.

**Table 9.1**

|                        |    |    |    |    |    |    |    |    |    |    |
|------------------------|----|----|----|----|----|----|----|----|----|----|
| <b>Mathematics (X)</b> | 50 | 67 | 42 | 80 | 50 | 40 | 97 | 81 | 70 | 75 |
| <b>Statistics (Y)</b>  | 55 | 70 | 59 | 70 | 38 | 55 | 62 | 80 | 76 | 70 |

(a) Using a scale of 2 cm to represent 10 marks on both axes, plot a scatter diagram for the information in **Table 9.1**. [2]

(b) (i) Calculate  $\bar{x}$  and  $\bar{y}$  [2]

(ii) Calculate the semi averages [4]

(iii) Plot the points on the graph. [1]

(iv) Draw the line of best fit on the graph. [1]

## 6

- (c) The line of best fit is defined by the equation  $y = mx + c$ .
- (i) Use your graph to find the value of
1.  $m$ , correct to 2 decimal places, [2]
  2.  $c$ , to the nearest whole number. [1]
- 9 (c) (ii) Write down the equation of the line of best fit. [1]
- (d) Use the line of best fit to estimate the Statistics mark, if the student scored 64 in Mathematics. [2]
- 10 (a) **Table 10.1** shows the sales in thousands of dollars of a wholesale for four successive years.

**Table 10.1**

|                               | Year |      |      |      |
|-------------------------------|------|------|------|------|
|                               | 2000 | 2001 | 2002 | 2003 |
| <b>1<sup>st</sup> quarter</b> | 20   | 18   | 21   | 20   |
| <b>2<sup>nd</sup> quarter</b> | 24   | 30   | 28   | 32   |
| <b>3<sup>rd</sup> quarter</b> | 50   | 60   | 62   | 65   |
| <b>4<sup>th</sup> quarter</b> | 25   | 27   | 28   | 30   |

- (i) Using a scale of 2 cm to represent 2 quarters on the horizontal axis and 2 cm to represent \$10 000 on the vertical axis, draw a time series graph. [4]
- (ii) Calculate the
1. 4 point moving averages, [2]
  2. centred moving averages. [3]
- (iii) Plot the centred moving averages on the graph. [2]
- (iv) Draw the trend line on the graph. [1]
- (v) Comment on the two graphs in (iii) and (iv). [2]
- (b) Explain why it is necessary to calculate centred moving averages. [2]

- 11** Table 11.1 shows the frequency distribution of the ages of 56 people in a village.

**Table 11.1**

| Age (years) | 10 – 19 | 20 – 29 | 30 – 39 | 40 – 49 | 50 – 59 | 60 – 69 | 70 – 79 |
|-------------|---------|---------|---------|---------|---------|---------|---------|
| Frequency   | 3       | 4       | 8       | 18      | 17      | 4       | 2       |

- (a) (i) Construct a cumulative frequency table. [2]
- (ii) Using a scale of 2 cm to represent 10 years on the horizontal axis and 2 cm to represent 5 people on the vertical axis, draw a cumulative frequency curve. [5]
- (b) Use the curve to estimate the
- (i) number of people who are less than 57 years, [1]
- (ii) number of people who are more than 61 years, [2]
- (iii) median, [2]
- (iv) interquartile range. [4]

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