WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF AGRICULTURE

DIPLOMA IN ENVIRONMENTAL MANAGEMENT

MAIN PAPER

DE 124   :   **ENVIRONMENTAL STATISTICS**

INTAKE 10   :   **FIRST YEAR FIRST SEMESTER**

DATE   :   **JUNE 2021**

TIME   :   **3 HOURS**

INSTRUCTIONS TO CANDIDATES
Answer any **four** questions.

Question 1

These are the times, in seconds, that 15 members of an athletics club took to run 800 metres.

139 148 151 140 162

182 154 171 157 142

145 178 132 148 166

(i) Draw a stem-and-leaf diagram of the data. [9 Marks]

(ii) Find the median, the upper and lower quartiles and the interquartile range. [8 Marks]

(iii) Draw a box-and-whisker plot of the data. [8 Marks]

Question 2

A number of trees in two woods were measured. Their diameters, correct to the nearest centimetre, are summarised in the table below.

Diameter (cm)	1–10	11–15	16–20	21–30	31–50		Total
Mensah's Wood	10	5	3	11	1		30
Ashanti Forest	6	8	20	5	1		40

(Trees less than ½ cm in diameter are not included.)

(i) Write down the actual class boundaries. [6 Marks]

(ii) Draw two separate histograms to illustrate this information. [6 Marks]

(iii) State the modal class for each wood. [6 Marks]

(iv) Describe the main features of the distributions for the two woods. [7 Marks]

Question 3

(i) For the following data set, find the median and interquartile range.

2 8 4 6 3 5 1 8 2 5 8 0 3 7 8 5 [7 Marks]

Use your answers to part (i) to deduce the median and interquartile range for each of the following data sets.

(ii) **32 38 34 36 33 35 31 38 32 35 38 30 33 37 38 35** [6 Marks]

(iii) **20 80 40 60 30 50 10 80 20 50 80 0 30 70 80 50** [6 Marks]

(iv) **50 110 70 90 60 80 40 110 50 80 110 30 60 100 110 80** [6 Marks]

Question 4

The probability that Henk goes swimming on any day is 0.2. On a day when he goes swimming, the probability that Henk has burgers for supper is 0.75. On a day when he does not go swimming, the probability that he has burgers for supper is x. This information is shown on the following tree diagram.
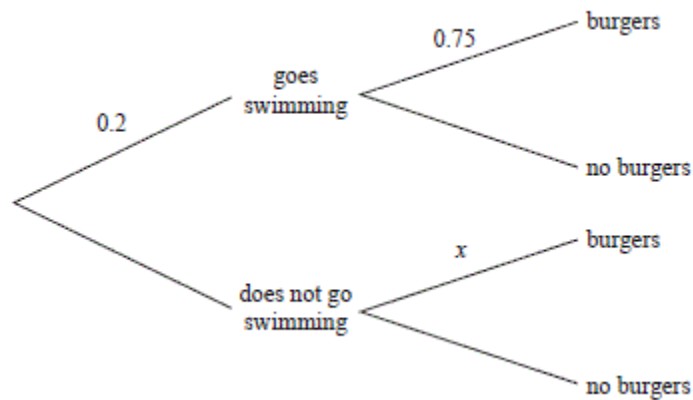
The probability that Henk has burgers for supper on any day is 0.5.

(i) Find x. [12 Marks]

(ii) Given that Henk has burgers for supper, find the probability that he went swimming that day. [13 Marks]

Question 5

100 cars are entered for a road-worthiness test which is in two parts, mechanical and electrical. A car passes only if it passes both parts. Half the cars fail the electrical test and 62 pass the mechanical. 15 pass the electrical but fail the mechanical test.

Find the probability that a car chosen at random

(i) passes overall [8 Marks]

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(ii) fails on one test only [8 Marks]

(iii) given that it has failed, failed the mechanical test only. [9 Marks]

Question 6

Every year two teams, the Ramblers and the Strollers, meet each other for a quiz night. From past results it seems that in years when the Ramblers win, the probability of them winning the next year is 0.7 and in years when the Strollers win, the probability of them winning the next year is 0.5. It is not possible for the quiz to result in the scores being tied. The Ramblers won the quiz in 2009.

(i) Draw a probability tree diagram for the three years up to 2012. [7 Marks]

(ii) Find the probability that the Strollers will win in 2012. [6 Marks]

(iii) If the Strollers win in 2012, what is the probability that it will be their first win for at least three years? [6 Marks]

(iv) Assuming that the Strollers win in 2012, find the smallest value of n such that the probability of the Ramblers winning the quiz for n consecutive years after 2012 is less than 5%. [6 Marks]

END