



# UNIVERSITY OF ESWATINI

FIRST SEMESTER MAIN EXAMINATION PAPER , APRIL 2021

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

COURSE CODE: STA131

TITLE OF PAPER: DESCRIPTIVE STATISTICS

TIME ALLOWED: 2 HOURS

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## Instruction

1. Answer **any three** questions

## Special Requirements

Scientific calculator

## Additional Material (s)

1. Graph paper

*Candidates may complete the front cover of their answer book when instructed by the Chief Invigilator and sign their examination attendance cards but must **NOT** write anything else until the start of the examination period is announced.*

*No electronic devices capable of storing and retrieving text, including electronic dictionaries and any form of foreign material may be used while in the examination room.*

**DO NOT turn examination paper over until instructed to do so.**

Question 1

The information below refers to the number of customers using an ATM each day for 70 days

Number of customers	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 - 99
Number of days (f)	4	9	10	18	16	7	6

Find the following

- i. The Mean
- ii. The Mean using the origin
- iii. The Variance
- iv. The Standard deviation

[4+5+6+5]

Question 2

- a) A mixture of six ingredients is prepared, the cost of the ingredients are E3, E4, E5, E6, E7 and E8 per kilogram. Use an appropriate **mean** to find the cost per kilogram of the mixture.
- b) Study the data below and use a suitable mean to calculate the average for the data

Data Item	1	2	3	4	5
A	14.6	13.3	12.1	11.0	10.0

- c) Residents of a certain township are classified by age group and sex as follows

Age-Group	Males	Females
0 - 9	57	59
10-19	49	51
20-29	45	46
30-39	32	38
40-49	28	34
50-59	20	26
60-69	12	15
70-79	7	9
80-89	4	6
Total	254	284

Find the coefficient of variation (C.V.) for males and females and comment on the results.

[5+5+10]

Question 3

Given the following data

Year	Average Monthly Income (Emalangen)	Retail Price Index (2011 = 100)
2011	505	100.0
2012	547	110.0
2013	596	123.0
2014	608	126.0
2015	631	129.0
2016	723	132.0
2017	780	136.0
2018	814	142.0
2019	933	156.0

- i) Deflate the average monthly income series
- ii) Compute indexes of real income using year 2011 as your base period (base period=2011)
- iii) Explain the results in i) and ii) above.

[8+8+4]

Question 4

The Table below reports the prices, and the number of units of each consumed by a typical family for several food items for the years 2008 and 2018

Item	2008		2018	
	Price (E)	Quantity	Price (E)	Quantity
Bread white (loaf)	7.70	50	19.80	55
Egg (dozen)	10.50	26	29.80	20
Milk (litres)	8.80	102	19.80	130
Apples, red (500g)	14.60	30	17.50	40
Orange juice (300ml concentrate)	15.80	40	17.00	41
Coffee, instant (400g)	44.00	12	47.50	12

Compute Laspeyres', Paasche's and Fisher's Ideal indexes and comment on the results.

[8+8+4]

Question 5

- a) Data-comp recently conducted a survey of 100 selected purchasers of their newly introduced laptop computer to obtain a gender-and-age profile of its new customers, summarized in the table below

Sex	Age (Years)			Total
	Under 30 (U)	30 to 45 (B)	Over 45 (O)	
Male (M)	30	10	20	60
Female (F)	20	15	5	40
<b>Total</b>	50	25	25	100

Find the following Probabilities

- i)  $P(F \text{ and } U)$
- ii)  $P(F \text{ or } B)$
- iii)  $P(M/U)$

[2+2+2]

- b) A company manufactures an electronic device to be used in a very wide temperature range. The company knows that the increased temperature shortens the life time of the device, and a study is therefore performed in which the life time is determined as of the temperature. The following is found;

Temperature in degrees Celsius (x)	10	20	30	40	50	60	70	80	90
Life Time in hours (y)	420	365	285	220	176	117	69	34	5

- i) Compute the mean Temperature ( $\bar{x}$ ) and the mean Life Time( $\bar{y}$ )
- ii) Compute the slope and the intercept.
- iii) Compute the coefficient of correlation and interpret it.
- iv) Determine the least square line.
- v) Is it appropriate to use your equation to predict the Life Time of an electronic device, when the applied temperature is 95 degrees Celsius? And why?

[2+4+4+2+2]

Question 6

a) Briefly explain the following:

- i) Stratified sampling
- ii) Sampling frame
- iii) Cluster Sampling
- iv) Systematic sampling
- v) Simple random sampling

[10]

b) The price of a Toyota Hilux alternator was priced at various auto parts outlets throughout Matsapha Industrial site, and the prices in Emalangeneni were as follows;

95	96	89	87	89	99	76	78	89	87
77	96	88	89	86	95	94	79	99	99
83	76	99	94	81	99	92	93	98	94

- i) Use a stem-and-leaf diagram to describe the distribution of the data.
- ii) What is the most commonly quoted price?
- iii) Find the median of the data (ungrouped).

[6+1+3]

End of Examination