UNIVERSITY OF ESWATINI

FIRST SEMESTER RESIT EXAMINATION PAPER, JUNE 2021

FACULTY OF SOCIAL SCIENCES

DEPARTMENT OF STATISTICS AND DEMOGRAPHY

COURSE CODE: STA131

TITLE OF PAPER: DESCRIPTIVE STATISTICS

TIME ALLOWED: 2 HOURS

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 ONE   [3+2+2+4+2+6+1]

The following stem and leaf diagram gives the distances in miles (in thousands of miles)driven during the past year by a sample of drivers in a city.

```
0 | 3 6 9
1 | 2 8 5 1 0 5
2 | 5 1 6
3 | 8
4 | 1
5 |
6 | 2
```

    i.   Compute the
           a. sample mean,
           b. median, and
           c. mode for the data on distances driven
   ii.   Compute the
           a. first and third quartile and
           b. hence the interquartile range
 iii.   Represent the information on a box and whisker diagram
 iv.   Comment on the skewness of the data

QUESTION TWO   [14+6]

In a study conducted by the Department of Mechanical Engineering at a university, the steel rods supplied by two different companies were compared. Ten sample springs were made out of the steel rods supplied by each company and a measure of flexibility was recorded for each. The data are as follows:

Company A: 9.3 8.8 6.8 8.7 8.5 6.7 8.0 6.5 9.2 7.0
Company B: 11.0 9.8 9.9 10.2 10.1 9.7 11.0 11.1 10.2 9.6

        a. Calculate the sample mean, median, and variance for the data for the two companies.
        b. Calculate the coefficient of variation for the two companies and comment.

QUESTION THREE   [5+2+3+4+3+1+1+1]

a. The table below shows data on the number of visitors to Swaziland in a month, x (1000s), and the amount of money they spent, y (E millions), for each of the eight months.

Number of visitors x (1000s)	2450	2480	2540	2420	2350	2290	2400	2460
Amount of money spent y (E millions)	1370	1350	1400	1330	1270	1210	1330	1350

     i.   Calculate and interpret r and r^2.
    ii.   Give a reason to support fitting a regression model of the form $y=a+bx$ to this data.
   iii.   Find the value of b and interpret it.
   iv.   Determine the equation of the regression line of y on x.
    v.   Use your answer to part iv. to estimate the amount of money spent when the number of visitors to Swaziland in a month was 2 500 000.

b. Which of the following statements are true and which are false?
     i.   A systematic sample is truly random. (True/False)
    ii.   Stratified sampling attempts to adequately represent differing groups and population.(True/False)
   iii.   A cluster sample will adequately represent a heterogeneous population. (True/False)

QUESTION FOUR   [12+2+2+2+2]

a. The country's X's trade deficit with country Y (billions of Emalangeni) from 2007 through 2014 is reported as shown below

Year :   2007 2008 2009 2010 2011 2012 2013 2014

Deficit: 15.5 16.6 32.1 51.9 52.8 48.2 51.7 66.5

Using exponential smoothing and the smoothing constant $\alpha = 0.7$, what deficit would have been forecast for 2015?

b. The result of a primary election of party AA of five aspirants in ascending order is: 22, 26, 32, 55, 71 and the result of a primary election of party AB of five aspirants in ascending order is: 12, 19, 28, 34, 88. If two aspirants one from AA and one from AB are picked, what is the probability that

     i.   The sum of their votes is greater than 80
    ii.   The sum of their votes is less than 60
   iii.   The vote of aspirant from party AA is greater than the vote of the aspirant from party AB
   iv.   The vote of aspirant from party AB is greater than the vote of the aspirant from AB.

QUESTION FIVE $[13+7]$

A major amusement park has the following number of visitors each quarter from 2001 through 2005:

Year	Number of Visitors (thousands)			
	1	2	3	4
2001	155	231	270	105
2002	182	255	351	294
2003	160	250	280	279
2004	210	310	356	353
2005	225	325	348	368

i.   Construct the four-quarter centred moving average for these data and determine the percentages of the moving average for the quarters.

ii. Determine the seasonal indexes for the quarters and de-seasonalize the original time series.

END OF EXAMINATION