

**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**UNIVERSITY EXAMINATION 2016/2017**

**1ST YEAR 1ST SEMESTER EXAMINATION FOR THE DEGREE**

**OF BED (SCIENCE) AND BSC. (ACTUARIAL SCIENCE)**

**(REGULAR)**

**COURSE CODE: SCS 1215**

# TITLE: STATISTICAL ANALYSIS AND DESCRIPTIVE MODELS

**DATE: TIME: 9.00-11.00 AM**

**DURATION: 2 HOURS**

**INSTRUCTIONS**

1. **This paper contains SIX (6) questions**
2. **Answer question 1 (Compulsory) and ANY other 2 Questions**
3. **Write all answers in the booklet provided**

# QUESTION ONE- COMPULSORY (30 MARKS)

a]An experiment measuring the percent shrinkage on drying of 50 clay specimens produced the following data:

18.2 21.2 23.1 18.5 15.6 20.8 19.4 15.4 21.2 13.4

16.4 18.7 18.2 19.6 14.3 16.6 24.0 17.6 17.8 20.2

17.4 23.6 17.5 20.3 16.6 19.3 18.5 19.3 21.2 13.9

20.5 19.0 17.6 22.3 18.4 21.2 20.4 21.4 20.3 20.1

19.6 20.6 14.8 19.7 20.5 18.0 20.8 15.8 23.1 17.0

i. Draw a stem and leaf plot for these data.based on the key 13⁄9 → 13.9 ,

23⁄10 → 24.0 and the exclusive classes of the type 13 − 15 (5 mks )

ii. Identify the sample mode and write down its stem and leaf symbol (2 mks )

iii. Estimate the 85th percentile for the sample (3 mks )

b]Based on the data below, compute Fisher’s ideal index number and Marshall-Edgeworth

index for 1994 and 1995 using 1993 as the base year. Make concise comments on the cost of living in 1994 as compared to 1995 based on the values obtained. (10 mks )

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **993** |  | **1994** | |  | **1995** | |
| **item** | **Price** | **quantity** | **Price** |  | **quantity** | **Price** |  | **quantity** |
| A | 2 | 25 | 3 |  | 30 | 5 |  | 28 |
| B | 3 | 15 | 4 |  | 20 | 2 |  | 25 |
| C | 15 | 4 | 20 |  | 3 | 3 |  | 4 |

c]. The number of deaths in a particular village between 1990-1995 was recorded as follows

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| year | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
| deaths | 25 | 24 | 18 | 29 | 21 | 24 | 20 | 22 | 27 |

Obtain the smoothened values using 4-point moving averages hence estimate the trend value for 1992 and 1995 (15 mks )

# QUESTIONS TWO (20MARKS)

a] Compute Karl-Pearson’s coefficient of skewness for the given distribution hence sketch

a graph for skewness. (15 mks )

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| marks | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
| frequency | 2 | 5 | 7 | 13 | 21 | 16 | 8 | 3 |

b]Distinguish between skewness and kurtosis giving examples. (5 mks )

# QUESTION THREE (20 MARKS)

1. i). Establish the known relationship between the Arithmetic mean, the Geometric mean

and the Harmonic mean based on the following data. (9 mks )

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| masses | 20 | 21 | 22 | 23 | 24 | 25 |
| containers | 4 | 2 | 7 | 1 | 3 | 1 |

ii).Explain under what special circumstances one may fail to obtain each of the three averages (3mks )

1. The data below represents daily profits of a supermarket

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Sun | Mon | Tue | Wed | Thu | Fri |
| Week 1 | 35 | 38 | 25 | 33 | 37 | 25 |
| Week 2 | 34 | 36 | 23 | 35 | 31 | 24 |

* 1. Using a 6-point moving averages draw a time series graph and a trend line on the same pair of axis. (6 mks )
  2. What advice in your opinion would be best for the business manager? (2 mks )

# QUESTION FOUR (20 MARKS)

1. Define correlation. (2 mks )
2. Compute the rank correlation coefficient for the following data and explain its

significance (8 mks )

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Math | 90 | 88 | 77 | 89 | 76 | 75 | 90 | 77 | 50 | 63 | 78 | 80 |
| English | 88 | 91 | 76 | 70 | 52 | 68 | 76 | 80 | 63 | 70 | 55 | 78 |

1. The following table gives the marks obtained by some students in an examination

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| class | 35-43 | 45-53 | 55-63 | 65-73 | 75-83 | 85-93 |
| frequency | 13 | 20 | 35 | 47 | 5 | 3 |

* 1. Using the coding method, calculate the simple average and the standard deviation [2mks]
  2. Estimate the quartile deviation [2mks]
  3. Suppose a value 2 was multiplied to each of the data set and then 4 was added to each results, obtain the new average and standard deviation. (6mks )

# QUESTION FIVE (20 MARKS)

a] The computed arithmetic mean of 20 values is 45. If one of these values was taken as 64 instead of 46, and that a constant 10 was to be added to each of the 20 values before computing the mean, find the corrected value. (3 mks )

1. Calculate the mode given the following information.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| masses | 0-50 | 50-  100 | 100-  150 | 150-  200 | 200-  250 | 250-  300 | 300-  350 | 350-  400 | Above  400 |
| frequency | 5 | 14 | 40 | 91 | 150 | 87 | 60 | 38 | 15 |

(4 mks )

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| c | Compute Bowley’s coefficient of skewness for the following data: | | | | | | | | | | | | |  |
|  | 391,384,591,407,672,522,777,733,1490,2488 | | | | | | | | | | | | | (6 mks ) |
| d | Find out which of the following batsmen is more consistent in scoring | | | | | | | | | | | | | (7 mks ) |
| Batsman A | | | 5 | 7 | 16 | 27 | 39 | 53 | 56 | 61 | 80 | 101 | 105 |
| Batsman B | | | 0 | 4 | 16 | 21 | 41 | 43 | 57 | 78 | 83 | 93 | 95 |