

**INSTITUTE OF BANKERS IN MALAWI**

**CERTIFICATE IN BANKING EXAMINATION**

**SUBJECT: FUNDAMENTALS OF BUSINESS STATISTICS**

**(IOBM – C103)**

**Date: Sunday, 8th May 2016**

**Time Allocated: 3 hours (08:00 – 11:00 am)**

**INSTRUCTIONS TO CANDIDATES**

1 This paper consists of **TWO** Sections, A and B.

2 Section A consists of 20 multiple questions, each question carries 2 marks.

Answer **ALL** questions.

3 Section B consists of 5 questions, each question carries 20 marks. Answer **ANY THREE** questions.

4 You will be allowed **10 minutes** to go through the paper before the start of the examination, you may write on this paper but not in the answer book.

5 Begin each answer on a new page.

6 **Please write your examination number on each answer book used. Answer books without examination numbers will not be marked.**

7 All persons writing examinations without payment will risk expulsion from the Institute.

8 If you are caught cheating, you will be automatically disqualified in all subjects seated this semester.

9 DO NOT open this question paper until instructed to do so.

**SECTION A (40 MARKS)**

Answer **ALL** questions from this section.

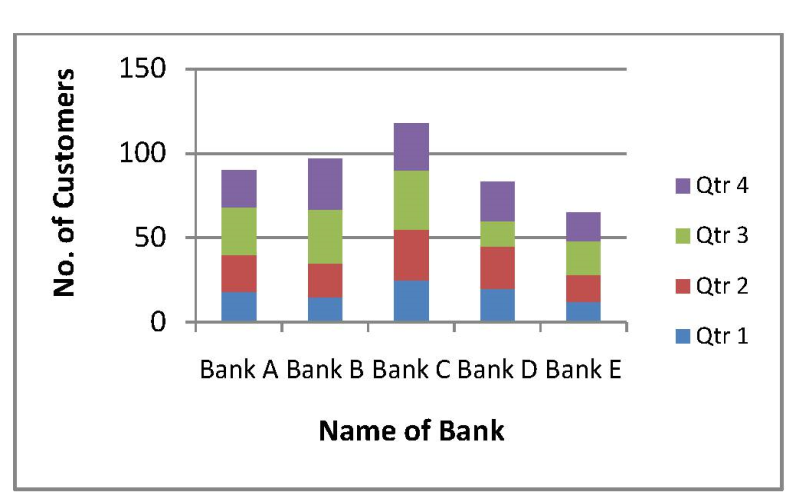
1. The following are fees charged by a bank for some of its services:

K2,500, K1,500, K1,000, K2,000 and K500.

What is the mean of the fees charged?

1. K2,000
2. K1,500
3. K1,000
4. K1,750

2. What is the name given to the following chart?



1. Multiple bar chart
2. Box chart
3. Histogram
4. Component bar chart

3. What is the best measure that is used to compare a distribution?

a) Mean  
b) Mode  
c) Variance  
d) Co-efficient of variation.

4. A numerical value used as a summary measure for a sample, such as sample mean, is known as a

1. population parameter
2. sample parameter
3. sample statistic
4. population mean

5. Which of the following is **NOT** a probability?

a)  b) 

c)  d) 

6. Which of the following is **NOT** an example of a data collection method?

1. Postal surveys
2. Direct observation
3. Telephone interview
4. Systematic sampling

**For questions 7, 8, 9**:

The following data show the number of hours worked by 200 bank employees.

|  |  |
| --- | --- |
| **Number of hours** | **Frequency** |
| 1 – 9 10 – 19 20 – 29 30 - 39 | 40 50 70 40 |

7. What is the class width for this distribution?

1. 9
2. 10
3. 11
4. It varies from class to class.

8. What is the number of employees working 19 hours or less?

1. 40
2. 50
3. 90
4. It cannot be determined without the original data.

9. What is the cumulative relative frequency for the class of 10 – 19?

1. 90
2. 0.25
3. 0.45
4. It cannot be determined from the information given.

10. What name is given to the difference between the largest and the smallest data values?

1. Variance
2. Interquartile range
3. Range
4. Coefficient of variation

11. Which option best completes the following statement?

The mean of a sample is:

1. always equal to the mean of the population
2. always smaller than the mean of the population
3. computed by summing the data values and dividing the sum by (n - 1)
4. computed by summing all the data values and dividing the sum by the number of items

12. Which option best completes the following statement?

The sum of the percent frequencies for all classes will always equal

1. 100
2. the number of classes
3. the number of items in the study
4. One.

13. Which of the following is a measure of central tendency?

a) Variance.   
b) Quartile.   
c) Standard deviation.   
d) Mode.

14. What do you expect about the slope of the regression line?

a) Positive  
b) Negative   
c) Zero  
d) All of these.

15. Which of the following is **NOT** a measure of dispersion?

1. the range
2. the 50th percentile
3. the standard deviation
4. The interquartile range.

16. What name is given to the most frequently occurring value of a data set?

a) Range  
 b) Mode  
 c) Mean  
 d) Median.

17. The variance of a sample of observations is 49. What is the standard deviation of the sample?

1. 7
2. 14
3. 21
4. 28

18. The qualities of good information include the following except

1. Timeliness
2. Relevance
3. Ease of access
4. Confidentiality

19. What name is given to a tabular summary of a set of data showing the fraction of the total number of items in several classes?

a) Frequency distribution  
 b) Relative frequency distribution  
 c) Frequency  
 d) Cumulative frequency distribution.

20. An analyst has collected the following sample data:

12 9 14 10 7 11.

What is the median of the data set?

1. 10.5
2. 11.5
3. 12.5
4. 9.5

**SECTION B (60 MARKS)**

Answer **ANY THREE** questions from this section

**QUESTION 2**

1. i) What is the difference between continuous data and discrete data? (*2 marks)*

(ii) Give **two** examples of continuous data and **two** examples of discrete data. (*4 marks)*

b) What is meant by mutually exclusive events? Illustrate your answer with an example. *(4 marks)*

c) A survey asked 300 bank customers to indicate their favourite banking services. The data were then categorized into the following contingency table of counts showing the relationship between age group and response.

|  |  |  |  |
| --- | --- | --- | --- |
| **Age (yrs)** | **Service** | | |
| **Internet banking** | **ATM** | **Asset finance** |
| Under 25  25 and under 35 35 and under 45 45 and above | 11 23 31 18 | 28 32 26 35 | 6 10 33 47 |

A customer is chosen at random.

**Required:**

1. What is the probability that the customer’s favourite service is internet banking? *(3 marks)*
2. What is the probability that the customer is 45 years and above or his/her favourite service is asset finance? *(5 marks)*
3. Find the probability that the customer is under the age of 25 and his/her favourite service is ATM? *(2 marks)*

**(Total 20 marks)**

**QUESTION 3**

a) (i) Describe briefly the concept of linear regression. *(2 marks)*

(ii) State any two uses of linear regression in business. *(4 marks)*

b) The following table shows a company’s sales volume in relation to advertising expenditure over a 10-month period:

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Month** | **Jan** | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | | **Oct** |
| Advertising expenditure (MK millions) | 12 | 8 | 1 | 13 | 7 | 4.5 | 3 | 6 | 9 | | 11 |
| Sales volume (MK millions) | 101 | 92 | 68 | 120 | 90 | 80 | 75 | 75 | 91 | 105 | |

**Required:**

1. Plot a fully-labeled scatter diagram to represent the data. *(4 marks)*
2. Determine the equation of the least squares regression line (line of best fit), rounding the values of a and b to 2 decimal places. *(6 marks)*
3. Estimate the sales volume (in MK million) if advertising expenses were as follows
4. K 5 million in November. *(2 marks)*
5. K 10 million in December. *(2 marks)*

**(TOTAL20 marks)**

**QUESTION 4**

a) (i) Define the term ‘sampling’. *(2 marks)*

(ii) Cite three advantages of sampling.  *(3 marks)*

1. Data may be classified as qualitative or quantitative. Consider the following:

(i) Number of minutes a cashier takes to serve a customer.

(ii) Gender of a bank customer.

(iii) Professional qualifications of members of staff.

1. Individual customers’ bank accounts.

**Required:**

Which data would you classify as qualitative and which data would you classify as quantitative?  *(4 marks)*

c) A bank is analyzing the relationship between the distance of its service centres from the city centre and the number of customers it serves in a single day .

The following table is a record of the data that were collected.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Bank** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** |
| Distance (Km) | 8 | 12 | 5 | 18 | 14 | 9 | 11 | 13 | 16 | 7 |
| No. of customers | 155 | 173 | 85 | 228 | 186 | 148 | 130 | 156 | 178 | 107 |

**Required:**

1. What is correlation? *(1 mark)*
2. Name any two ways for measuring correlation. *(2 marks)*
3. Calculate the Spearman’s rank correlation coefficient.  *(8 marks)*

**(Total 20 marks)**

**QUESTION 5**

a) Give **two** examples of graphs/charts or diagrams that are ideal for presentation of each of the following data type:

(i) Continuous data. *(2 marks)*

(ii) Discrete data. *(2 marks)*

b) The following set of data represents bank balances (in K’000) for 100 students recorded on 31 December 2015:

|  |  |
| --- | --- |
| **Bank balance** | **No. of customers** |
| 0 but less than 20  20 but less than 40  40 but less than 60  60 but less than 80  80 but less than 100  100 but less than 120 | 10  35  40  10  3  2 |

**Required:**

1. Construct a fully labelled histogram to represent the data. *(5 marks)*

1. Calculate the following:
2. The mean bank balance. *(4 marks)*
3. The standard deviation of the bank balances. *(5 marks)*

III. The coefficient of variation of the bank balances. *(2 marks)* **(Total 20 marks)**

**QUESTION 6**

Sampling methods are widely used for the collection of statistical data in industry and business for purposes of decision making. One of the sampling methods is quota

sampling.

**Required:**

(i) Describe briefly quota sampling. *(2 marks)*

(ii) Cite **two** advantages and **two** disadvantages of quota sampling. *(4 marks)*

1. The central bank has collected data on last year’s annual turnover for 200 registered financial institutions in the country. The relevant data are shown in the following table.

|  |  |
| --- | --- |
| **Turnover (K’000)** | **Number of institutions** |
| Below 100  100 and less than 200  200 and less than 300  300 and less than 400  400 and less than 500  500 and less than 600  600 and less than 700  700 and less than 800  800 and less than 900 | 48 35 30 26 18 16 13 9 5 |

**Required:**

1. Estimate the total annual turnover for the 200 institutions. *(4 marks)*
2. Construct a Lorenz curve for the distribution of the number of institutions and annual turnover.  *(8 marks)*
3. Considering the Lorenz curve constructed in part (ii) what would you conclude about the distribution of turnover between the 200 institutions? *(2 marks)* **(Total 20 marks)**

**END OF EXAMINATION PAPER**