

**INSTITUTE OF BANKERS IN MALAWI**

**CERTIFICATE IN BANKING EXAMINATION**

**SUBJECT: FUNDAMENTALS OF BUSINESS STATISTICS**

**(IOBM – C103)**

**Date: Sunday, 16th November 2014**

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

**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, when 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 probability that an event happens is 0.42. What is the probability that the event will not happen?

(a) 0.42

(b) 0

(c) 0.58

(d) 1

2. Consider the following data: 310, 420, 45, 40, 220, 240, 180, 90. Compute the quartile Q3.

1. 220
2. 240
3. 200
4. 320

3. A researcher divided subjects into two groups according to gender and then selected members from each group for her sample. What sampling method was the researcher using?

(a) Cluster

(b) Random

(c) Systematic

1. Stratified

4. Name the scale on which data are classified according to colour.

(a) Nominal

(b) Ratio

(c) Ordinal

(d) Interval

5. A study that involves no researcher intervention is called

(a) An experimental study.

(b) A noninvolvement study.

(c) An observational study.

(d) A quasi-experimental study.

6. The arithmetic mean of a data set comprising 10 observations is 40. 8 of the observations are: 60, 34, 43, 37, 52, 48, 38, 18. The ninth observation is four times the tenth. Find the tenth observation.

(a) 14

(b) 16

(c) 56

(d) 40

7. A variable that interferes with other variables in a study is called

(a) A confounding variable.

(b) An explanatory variable.

(c) An outcome variable.

(d) An interfering variable.

8. What is the value of the mode when all values in the data set are different?

(a) 0

(b) 1

(c) There is no mode.

(d) It cannot be determined unless the data values are given.

9. When data are categorized as, for example, places of residence (rural, suburban, urban), the most appropriate measure of central tendency is the;

(a) Mean

(b) Median

(c) Mode

(d) Midrange

10. What is another name for the ogive?

(a) Histogram

(b) Frequency polygon

(c) Cumulative frequency graph

(d) Lorenz curve

11. What graph should be used to show the relationship between the parts and the whole?

(a) Histogram

(b) Pie graph

(c) Component bar chart.

(d) Ogive

12. Except for rounding errors, relative frequencies should add up to what sum?

(a) 0

(b) 1

(c) 50

(d) 100

13. When a financial analyst says that there is a 30% risk of default, what type of probability is he using?

(a) Classical

(b) Relative

(c) Empirical

(d) Subjective

14. In an IOB class of 20 students, 9 are male and 11 are female. 4 of the males and 3 of the females are in the athletics team. One person is chosen from the class to run the Mulanje Porters Race. Find the probability that the person chosen is a female and in the athletics team.

(a) 0.15

(b) 0.35

(c) 0.55

(d) 0.75

15. When two dice are rolled, the sample space consists of how many

outcomes?

(a) 6

(b) 36

(c) 12

(d) 54

16. For a given data set, it is known that x¯ = 10 and y¯ = 5. The gradient of the regression line y is 0.6. Estimate the value of y when x = 12.

(a) 7.1

(b) 5.2

(c) 6.8

(d) 9.43

17. A bank has 12 products in its product range. It wishes to advertise in the local newspapers, but due to space constraints, it is allowed to display 7 of its products at a time. How many different ways can this company compose a display in the newspaper?

(a) 3, 991, 680

(b) 7

(c) 792

(d) 84

18. Interviewing selected customers at a local bank can be considered an example of what type of sampling.

(a) Random

(b) Convenience

(c) Systematic

(d) Stratified

19. The number of customers applying for a replacement of an Auto teller card in a month is called:

(a) Nominal data

(b) Qualitative data

(c) Discrete data

(d) Continuous data

20. When all subjects under study are used, the group is called a

(a) Population

(b) Sample

(c) Large group

(d) Study group

**SECTION B (60 MARKS)**

Answer **ANY THREE** questions from this section

**QUESTION 1**

1. The probability that a banking hall is full and cannot accommodate any more customers is 0.06. Suppose that on average 143 customers arrive per hour, how many customers on average will be turned away?

*(4 marks)*

1. List down any **four** common mistakes committed when writing questions for a questionnaire. *(4 marks)*

(c) Define cluster sampling and list **two** advantages and **two** disadvantages of cluster sampling. *(6 marks)*

(d) Give **two** reasons why a sample is used to get information about a

population.  *(2 marks)*

(e) Briefly explain why most sample means differ somewhat from the population mean? *(2 marks)*

(f ) Define a scatter plot and give a reason why it is important.  *(2 marks)*

**(Total 20 marks)**

**QUESTION 2**

1. The following data sets were obtained from samples and have the same mean and range. By computing the standard deviation, show that the variation is different.

Sample a: 5, 7, 9, 11, 13, 15, 17.

Sample b: .5, 6, 7, 11, 15, 16, 17.

Sample c: 5, 5, 5, 11, 17, 17, 17*. (7 marks)*

(b) When two variables are correlated, can the researcher be sure the one variable causes the other? Explain your answer. *(3 marks)*

1. The following table shows the number of insurance policies, by class of business

(numbers expressed in thousands), issued by an insurance company during the years 2008 to 2012.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| PolicPolicy type | 2008 | 2009 | 2010 | 2011 | 2012 |
| Life | 24 | 27 | 32 | 31 | 33 |
| Motor | 42 | 37 | 31 | 29 | 26 |
| Household | 10 | 14 | 21 | 28 | 35 |
| Other | 7 | 5 | 8 | 7 | 4 |

1. Draw an appropriate chart to illustrate the data.  *(4 marks)*
2. Give **one** advantage and **one** disadvantage of the chart you have chosen. *(2 marks)*
3. A recent survey asked 100 people if they thought women only should work as bank tellers.

The results are compiled in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
| Gender | Yes | No | Total |
| Male | 32 | 18 | 50 |
| Female | 8 | 42 | 50 |

**Find:**

i. The probability that a respondent answered yes given that the respondent was a female.

*(2 marks)*

ii. The probability that the respondent was a male given that the respondent answered no. *(2 marks)*

**(Total 20 marks)**

**QUESTION 3**

(a) List **four** ways that statistics can be misused. *(4 marks)*

1. A coin is tossed 3 times. Find the probability of getting at least 1 tail.

*(4 marks)*

1. A bank employed 20 cyclists to promote a new product. The frequency distribution of kilometers that the cyclists covered during a given week is given below.

|  |  |
| --- | --- |
| Class boundary | Frequency |
| 5.5 − 10.5 | 1 |
| 10.5 − 15.5 | 2 |
| 15.5 − 20.5 | 3 |
| 20.5 − 25.5 | 5 |
| 25.5 − 30.5 | 4 |
| 30.5 − 35.5 | 3  2 |

35.5 – 40.5 2

1. Construct an ogive for the distribution. Use the ogive to find the median of the frequency distribution. *(8 marks)*
2. Use the frequency distribution to estimate the standard deviation. *(4 marks)*

**(Total 20 marks)**

**QUESTION 4**

(a) The data below was obtained in the study of age and life savings. Use the data to compute and interpret the value of the correlation coefficient.

|  |  |  |
| --- | --- | --- |
| Subject Subject | Age | Savings (K’000) |
| A | 43 | 128 |
| B | 48 | 120 |
| C | 56 | 135 |
| D | 61 | 143 |
| E | 67 | 141 |
| F | 43 | 152 |

*(8 marks)*

(b) What is the relationship between the sign of the correlation coefficient and the sign of the slope of the regression line? (2 *marks)*

1. Determine whether each statement is true or false. If the statement is false, explain why.
2. The mean cannot be found for grouped data when there is an open class.
3. A single, extremely large value can affect the median more than the mean.
4. One-half of all the data values will fall above the mode, and one-half will fall below the mode.
5. The range and midrange are both measures of variation.

v. If a person’s score on an exam corresponds to the 75th percentile, then that person obtained 75 correct answers out of 100 questions.

*(10 marks)*

**(Total 20 marks)**

**QUESTION 5**

(a) The table below shows the average price, in Kwacha, of a litre of petrol in

Malawi on 31 December each year from 2006 to 2014.

**Year 1 2 3 4 5 6 7 8 9**

**Price** 134.8 160.8 200.9 256.2 256.2 290 380 704 839

**Required:**

Draw a suitable graph of the data and describe briefly what the graph shows.  *(6 marks)*

(b) Determine the regression equation for the data in 5(a) and plot it on the same graph as in 5(a). *(8 marks)*

1. In a certain country, a customer can only have one transaction account. The percentages of customers with four different account types, Mpamba, Yabooka, NdiDhilu, Yobheba, are as follows.

|  |  |  |
| --- | --- | --- |
| **Account type Mpamba** | **Yabooka NdiDhilu** | **Yobheba** |
| **Percentage** 44% | 42% 10% | 4% |

1. Three people are chosen at random. Find the probability they have the account type NdiDhilu.

*(2 marks)*

1. Two people are chosen at random. Find the probability they have the same account type. *(4 marks)*

**(Total 20 marks)**

**END OF EXAMINATION PAPER**