

**INSTITUTE OF BANKERS IN MALAWI**

**CERTIFICATE IN BANKING EXAMINATION**

**SUBJECT: FUNDAMENTALS OF BUSINESS STATISTICS**

**(IOBM – C103)**

**Date: Wednesday, 15th November 2017**

**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. All answer books without examination number 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 by circling the right answers in the answer sheet provided.

1. A numerical value used as a summary measure for a sample, such as sample mean, is known as a
2. population parameter
3. sample parameter
4. sample statistic
5. population mean
6. The mean of a sample is
7. always equal to the mean of the population
8. always smaller than the mean of the population
9. computed by summing the data values and dividing the sum by (n - 1)
10. computed by summing all the data values and dividing the sum by the number of items
11. The sum of the percent frequencies for all classes will always equal . . .
12. one
13. the number of classes
14. the number of items in the study
15. 100
16. Since the mode is the most frequently occurring data value, it . . .
17. can never be larger than the mean
18. is always larger than the median
19. is always larger than the mean
20. None of the above answers is correct.

**For questions 5 to 8, use the following information.**

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

Number of Hours Frequency

0 - 9 40

10 - 19 50

20 - 29 70

30 - 39 40

1. The class width for this distribution
2. is 9
3. is 10
4. is 11
5. varies from class to class

1. The number of tellers working 19 hours or less
2. is 40
3. is 50
4. is 90
5. cannot be determined without the original data

1. The relative frequency of tellers working 9 hours or less
2. is .2
3. is .45
4. is 40
5. cannot be determined from the information given

1. The cumulative relative frequency for the class of 10 - 19
2. is 90
3. is .25
4. is .45
5. cannot be determined from the information given
6. The difference between the largest and the smallest data values is the
7. variance
8. interquartile range
9. range
10. coefficient of variation
11. If a data set has an even number of observations, the median
12. cannot be determined
13. is the average value of the two middle items
14. must be equal to the mean
15. is the average value of the two middle items when all items are arranged in ascending order.
16. In a sample of 800 members of staff in a bank, 160, or 20%, are Institute of Bankers’ graduates. Based on the above information, the Business Magazine reported that "20% of all the members of staff at the bank are Institute of Bankers graduates." This report is an example of
17. a sample
18. a population
19. statistical inference
20. descriptive statistics
21. A tabular summary of a set of data showing the fraction of the total number of items in several classes is a
22. frequency distribution
23. relative frequency distribution
24. frequency
25. cumulative frequency distribution
26. The measure of dispersion that is influenced most by extreme values is
27. the variance
28. the standard deviation
29. the range
30. the interquartile range
31. A researcher has collected the following sample data,

3 5 12 3 2

### If the mean of the sample is 5, find the variance.

1. 80
2. 4.062
3. 13.2
4. 16.5
5. If the variance of a data set is correctly computed with the formula using n - 1 in the denominator, which of the following is true?
6. the data set is a sample
7. the data set is a population
8. the data set could be either a sample or a population
9. the data set is from a census
10. A coefficient of correlation is computed to be - 0.95 means that
11. The relationship between two variables is weak.
12. The relationship between two variables is strong and positive
13. The relationship between two variables is strong and but negative
14. Correlation coefficient cannot have this value
15. When regression line passes through the origin then the
16. Regression coefficient is zero
17. Correlation is zero
18. Intercept is zero
19. Association is zero
20. If the scatter diagram is drawn the scatter points lie on a straight line then it indicate
21. Perfect correlation
22. No correlation
23. Skewness
24. None of the above
25. In correlation both variables are always
26. Random
27. Non-random
28. Same
29. None
30. Relationship between correlation coefficient and coefficient of determination is that
31. both are unrelated
32. The coefficient of determination is the coefficient of correlation squared
33. The coefficient of determination is the square root of the coefficient of correlation
34. both are equal

**SECTION B (60 MARKS)**

Answer **ANY THREE** questions from this section

**QUESTION 2**

1. In how many ways can a committee of 5 people be chosen out of 9 people?

*(4 marks)*

1. A ball is drawn at random from a box containing 6 red balls, 4 white balls and 5 blue balls.

**Required:**

Determine the probability that it is:

1. Not red. *(3 marks)*
2. Red or white. *(3 marks)*
3. The following list gives the academic positions of 25 female members of staff in a bank:

|  |  |  |  |
| --- | --- | --- | --- |
| Supervisor | Teller | Teller | Supervisor |
| Departmental Head | Teller | Departmental Head | Teller |
| Branch Manager | Departmental Head | Supervisor | Teller |
| Branch Manager | Departmental Head | Tellers | Supervisor |
| Teller | Teller | Departmental Head | Teller |
| Branch Manager | Teller | Teller | Teller |
| Departmental Head |  |  |  |

**Required:**

1. Construct a frequency distribution for these data. *(4marks)*
2. What conclusion can you draw from the frequency distribution? *(1 mark)*
3. Find the slope and y-intercept for the following straight lines.
4. *(2 marks)*
5. *(3 marks)*

**(Total 20 marks)**

**QUESTION 3**

1. What are the main advantage and disadvantage of the range as a measure of dispersion? *(2 marks)*
2. The following table gives the annual returns for 30 randomly selected mutual funds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10.5 | 12.5 | 14.5 | 22.0 | 12.5 |
| -2.5 | 20.2 | 3.5 | 7.5 | 14.5 |
| 14.0 | 17.5 | 14.0 | 12.0 | 17.0 |
| 20.3 | 27.5 | 22.5 | 10.5 | 40.0 |
| 5.5 | 12.7 | 35.5 | 38.0 | 10.5 |
| 4.0 | -5.5 | 19.0 | 14.5 | 10.5 |

**Required:**

1. Find the range. *(3 marks)*
2. Find the standard deviation for the annual returns of the mutual funds.

(*8 marks)*

1. A bank auditor selects 11 checking accounts and records the amount in each of the accounts. The 11 observations in increasing order are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 150.25 | 175.35 | 195.00 | 200.00 | 235.00 | 240.45 |
| 250.55 | 256.00 | 275.50 | 290.10 | 300.55 |  |

**Required:**

Determine the median amount. *(2 marks)*

1. Do mutually exclusive events cover all the possibilities in an experiment? Explain your answer. *(2 marks)*
2. Event A and B are mutually exclusive and and .

**Required:**

Find . *(3 marks)*

**(Total 20 marks)**

**QUESTION 4**

1. The following is the frequency distribution for the total number of ATM withdrawals of 45 account holders of Khusa Bank in 1 year.

|  |  |
| --- | --- |
| Number of Withdrawals | Frequency |
| 170 – 189 | 3 |
| 190 – 209 | 10 |
| 210 – 229 | 17 |
| 230 – 249 | 13 |
| 250 – 269 | 2 |

**Required:**

Give the lower and upper class boundaries and class mark for each class. *(2 marks)*

1. The mean yearly salary of all the employees at Savers Bank is K42,500 and the standard deviation is K4,000. The mean number of years of education for the employees is 16 and the standard deviation is 2.5 years.

**Required:**

Which of the **two** variables has the higher relative variation? *(7 marks)*

1. People produce statements such as “the probability of snow tonight is 70%,” “the probability that it will rain today is 20%,” and “the probability that a new computer software package will be successful is 99%”.

**Required:**

What type of probability assignment are these examples? *(3 marks)*

1. The cumulative frequency distribution for the annual account balances in K’000 for 25 current accounts in a research study as given below.

|  |  |
| --- | --- |
| Account Balance  Less Than | Cumulative  Frequency |
| 500 | 0 |
| 550 | 3 |
| 600 | 11 |
| 650 | 20 |
| 700 | 22 |
| 750 | 25 |

**Required:**

1. Construct an Ogive for this distribution. *(6 marks)*
2. Draw a conclusion from the Ogive. (*2 marks)*

**(Total 20 marks)**

**QUESTION 5**

1. The probability that a machine does not produce a defective ATM card during a particular shift is 0.90.

**Required:**

1. What is the compliment of the event that a machine does not produce a defective ATM card during that particular shift? *(2 marks)*
2. What is the probability of that complimentary event in (i)? *(3 marks)*
3. The number of hours spent per week viewing TV, , and the number of years of education, , were recorded for 10 randomly selected individuals. The results are given in the table below.

|  |  |
| --- | --- |
| Number of Years  of Education | Hours Spent Per Week Viewing TV |
| 12 | 10 |
| 14 | 9 |
| 11 | 15 |
| 16 | 8 |
| 16 | 5 |
| 18 | 4 |
| 12 | 20 |
| 20 | 4 |
| 10 | 16 |
| 12 | 15 |

**Required:**

1. Draw a scatter plot. *(4 marks)*
2. Find the least squares line for these data. (*9 marks)*
3. Use regression line to estimate the number of hours that would be spent viewing TV by an individual with 21 years of education. *(2 marks)*

**(Total 20 marks)**

**QUESTION 6**

1. The distribution of the cause of death due to accidents or violence for males during a recent year is given below:

|  |  |
| --- | --- |
| **Cause of Death** | **Number** |
| Motor vehicle accident | 305 |
| All other accidents | 275 |
| Suicide | 202 |
| Homicide | 83 |

**Required:**

1. What is the modal cause of death due to accident or violence for males?

*(2 marks)*

1. Can the mean or median be calculated for the cause of death? Give reasons for your answer. *(2 marks)*
2. Define the following terms:
3. Classical probability. *(2 marks)*
4. Mutually exclusive events. *(2 marks)*
5. Complimentary events. *(2 marks)*
6. Dependent events. *(2 marks)*
7. A store manager notes that for 250 randomly selected customers, 75 use debit cards in their purchases.

**Required:**

1. What definition of probability should the manager use to compute the probability that a customer will use debit cards in their store purchases? *(2 marks)*
2. What probability should be assigned to this event in (i)? *(3 marks)*
3. The following are annual returns for 30 randomly selected mutual funds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 10.5 | 12.5 | 14.5 | 22.0 | 12.5 |
| -2.5 | 20.2 | 3.5 | 7.5 | 14.5 |
| 14.0 | 17.5 | 14.0 | 12.0 | 17.0 |
| 20.3 | 27.5 | 22.5 | 10.5 | 40.0 |
| 5.5 | 12.7 | 35.5 | 38.0 | 10.5 |
| 4.0 | -5.5 | 19.0 | 14.5 | 10.5 |

**Required:**

Find the mean for the annual returns. *(3 marks)*

**(Total 20 marks)**

**END OF THE EXAMINATION PAPER**