

**INSTITUTE OF BANKERS IN MALAWI**

**CERTIFICATE IN BANKING EXAMINATION**

**SUBJECT: FUNDAMENTALS OF BUSINESS STATISTICS (IOBM-C103)**

**Date: Wednesday, 14th November 2018**

**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. The number of times an ATM broke down each month of the last half of 2017 is given as follows:

23 12 27 18 9 10.

What is the median number of breakdowns?

1. 12
2. 15
3. 18
4. 16.5

2. Which of the following statistical measures is the most likely to be affected by extreme values in the data set?

1. Range
2. Mean
3. Median
4. Mode

3. If two events are independent, then

1. they must be mutually exclusive
2. the sum of their probabilities must be equal to one
3. their intersection must be zero
4. None of the above alternatives is correct.

4. Convenience sampling is an example of

1. probabilistic sampling
2. random sampling
3. non-probabilistic sampling
4. cluster sampling
5. The range of probability is  
   a) any value larger than zero.  
   b) any value between minus infinity to plus infinity.  
   c) zero to one.  
   d) any value between -1 to 1.

6. The number of cheques that were referred to drawer at a service centre in a week were as follows:

19 7 17 5 23 13.

What is the range of the data?

1. 23
2. 5
3. 19
4. 18

7. Given that event E has a probability of 0.25, the probability of the complement of event E

1. cannot be determined with the above information
2. can have any value between zero and one
3. must be 0.75
4. is 0.25

8. A subset of a population selected to represent the population is a

1. sample frame.
2. sample.
3. small population.
4. None of the above is correct.

9. Which of the following graphs shows a pattern that would be appropriately described by the equation ?

1. B.

C. D.

10. The following is an example of an external data source:

1. A public library like one ran by the Malawi National Library Service;
2. A company’s marketing data such as advertising expenditure;
3. A bank’s human resources data such as timesheets;
4. A brewery’s production data such as stock sheets.

11. Bar charts are preferable to pie charts because:

1. they are more appropriate for just a few components or items;
2. they provide more details;
3. they are easily drawn;
4. none of the above.

12. In a customer satisfaction survey, savings and current account holders were asked to indicate their level of satisfaction with customer service that a bank provides. The following were the results:

|  |  |  |  |
| --- | --- | --- | --- |
| **Opinion** | **Current account holders** | **Savings account holders** | **Total** |
| Satisfied | 37 | 58 | 95 |
| Unsatisfied | 44 | 41 | 85 |
| **Total** | **81** | **99** | **180** |

What is the probability that a randomly selected customer who happens to be unsatisfied is a saving account holder?

1. 
2. 
3. 
4. 

13. The correlation coefficient of some sample data is 0.94. Which of the following is the approximate corresponding coefficient of determination?:

1. 0.88
2. 0.94
3. 0.06
4. - 0.06

14. A bank has 5 executives that it can use to market its products but it can only deploy 3 members at any one time. How many possible groupings of 3-member teams can the bank deploy for marketing?

1. 10.
2. 5.
3. 3.
4. 6.

15. If A and B are any two disjoint events, then  is:

1. 1.
2. - 1.
3. 0.
4. None of the above.

16. A population characteristic, such as a population mean, is called:

1. a statistics.
2. a parameter.
3. a sample.
4. the mean deviation.

17. Which of the following variables is **NOT** categorical?

1. The salary of a bank manager.
2. Gender of a bank employee.
3. Nationality of an employee.
4. Marital status of an employee.

18. The following is an example of a measure of dispersion.

1. Standard deviation.
2. Mode.
3. Median.
4. Mean.

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

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

20. Which of the following **CANNOT** be the value of the probability of an event?

1. 0.61
2. - 0.42
3. 0.93
4. 0.25

**SECTION B (60 MARKS)**

Answer **ANY THREE** questions from this section

**QUESTION 2**

A bank is monitoring the number of visits its marketing executives make against the number of deals clinched. The following table summarises the number of visits made and the number of deals clinched by a sample of marketing executives. The figures all refer to the same period of time.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **No. of visits** | 160 | 90 | 180 | 100 | 120 | 200 | 110 | 240 |
| **No. of deals** | 80 | 60 | 100 | 60 | 80 | 105 | 50 | 140 |

**Required:**

(a) Construct a fully labeled scatter diagram to illustrate this information.

*(4 marks)*

(b) (i) Calculate the least squares regression line of the number of deals on number of visits made. *(7 marks)*

(ii) If 145 visits were made, how many deals would likely be clinched? *(2 marks)*

(c) Calculate the product moment correlation coefficient and briefly comment on the result obtained.  *(4 marks)*

Hence, or otherwise, calculate the coefficient of determination and interpret the result you obtain. *(3 marks)* **(Total 20 marks)**

**QUESTION 3**

(a) (i) Distinguish measures of location from measures of dispersion.

*(3 marks)*

(ii) Give an example for each measure. *(2 marks)*

(b) Thandizo Bank is studying the number of customers that use its hotlines on a particular day. The bank’s analyst collects data for 20 consecutive days as shown below.

45 55 51 17 19 37 35 38 48 46

29 39 26 27 36 28 49 35 18 16

**Required**

1. Construct a stem and leaf display. *(4 marks)*
2. Use the stem and leaf display constructed in part (i) to find the following:
3. mode *(1 mark)*
4. median *(3 marks)*
5. Use a method of your choice to find the standard deviation. *(6 marks)*

**(Total 20 marks)**

**QUESTION 4**

(a) Sampling methods are widely used for the collection of statistical data in industry and business for purposes of decision making.

**Required:**

Describe any **two** sampling techniques and for each state any **two** advantages and **two** disadvantages. *(12 marks)*

(b) A bank is analysing the number of agents that four of its service centres has recruited over a 4-year period.

|  |  |
| --- | --- |
| **Year** | **Service Centre** |
| **A B C D** |
| 2014  2015  2016  2017 | 90 50 60 75  85 60 50 70  60 40 40 80  70 45 35 60 |

**Required:**

1. The bank desires to use a single chart in the presentation of the data. Why do you think a pie chart would be inappropriate for this purpose?

*(2 marks)*

*(*ii) Construct a fully labeled component bar chart to present these data. You are advised to put period (years) on the horizontal axis. *(6 marks)*

**(Total 20 marks)**

**QUESTION 5**

(a) A bank’s logistics department is analyzing the distance (in km) covered by vehicles that its marketing team used in January 2018. These are given below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vehicle No. | A | B | C | D | E | F | G |
| Distance covered (km) | 400 | 600 | 450 | 500 | 750 | 700 | 480 |

**Required:**

Use the data to calculate the harmonic mean. *(3 marks)*

(b) The management of Zotheka Bank is comparing the profit patterns of two of its service centres over a 6-month period. Records show the following distribution of profits for the two service centres:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Service Centre | Monthly expenditure (K million) | | | | | |
| Jan | Feb | Mar | Apr | May | June |
| A | 20 | 40 | 30 | 20 | 30 | 15 |
| B | 19 | 1 | 15 | 20 | 3 | 1 |

**Required:**

1. For each centre, calculate the following:
2. Mean. *(4 marks)*
3. Standard deviation. *(7 marks)*
4. Coefficient of variation. *(4 marks)*
5. Provide an interpretation of the coefficient of variation results obtained.

*(2 marks)*

**(Total 20 marks)**

**QUESTION 6**

(a) (i) Distinguish between ordinal scaled data from nominal scaled data.

*(4 marks)*

(ii) Give **one** example for each data type in specified in part (i), *(2 marks)*

(b) A bank may gauge customer satisfaction by employing any data collection methods that it deems appropriate.

**Required:**

Describe any **two** data collection methods that you would recommend to a bank to employ in a customer satisfaction survey and for each method state any **one** advantage and **one** disadvantage. *(10 marks)*

(c) A bank salesman makes two trips per day and on each trip is likely to make a sale with probability 0.20.

**Required:**

Assuming that making a sale on the second trip is independent of the previous trip, what is the probability a salesman will make exactly one sale in a day?

*(4 marks)*

**(Total 20 marks)**

**END OF THE EXAMINATION PAPER**