

**INSTITUTE OF BANKERS IN MALAWI**

**CERTIFICATE IN BANKING EXAMINATION**

**SUBJECT: FUNDAMENTALS OF STATISTICS (IOBM – C103)**

**Date: Wednesday, 15th May 2019**

**Time Allocated: 3 hours (13:30 – 16:30 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. Which of the following variates is discrete?
2. Age of customers.
3. Accounts balances.
4. Number of employees at the bank’s branches.
5. Overdrafts amounts processed in a given month.
6. If the probability of an event occurring is known, what probability rule can be used to obtain the probability that the same event cannot occur?
7. Equal likelihood
8. Complementary probabilities
9. Additional rule
10. Multiplicative rule

**For questions 3, 4 and 5 choose the best option that correctly fills the blank space.**

1. Two events are said to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, if they cannot occur at the same time.

a) exhaustive

b) mutually exclusive

c) equally likely

d) independent

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is any attribute or characteristic that is being measured or observed.
2. A sampling unit
3. Data
4. A statistic
5. A variable
6. If and , then
7. -0.05
8. 0.13
9. 0.92
10. 1.24
11. An electronic device consists of two components. The probability that the first component will fail the guarantee period is 0.2 and that of the other component failing the guarantee period is 0.15. What is the probability that both components will fail the guarantee period?
12. 0.03
13. 0.35
14. 0.17
15. 0.75
16. What type of statistical analysis that computes the strength of the relationship between two numeric variables?
17. Correlational analysis
18. Linear regression
19. Descriptive analysis
20. Probability
21. The following is the outline of the major stages of statistical analysis in management decision making:
22. Data Information Statistical Analysis Decision Making
23. Information Statistical Analysis Data Decision Making
24. Data Statistical Analysis Information Decision Making
25. Information Data Statistical Analysis Decision Making
26. The number of new accounts opened per day at a bank’s service centre has a coefficient of skewness of -2.78. This means that the daily numbers of new accounts are :
27. perfectly left skewed
28. strongly right skewed
29. weakly right skewed
30. strongly left skewed
31. A value given to the probability of an event that cannot occur is
32. 0
33. 1
34. 0.5
35. -1
36. In an attempt to study the relationship between number of adverts on sales, the sales manager calculated the regression equation; for Which of the following statements is true for the interpretation of these results?

a) About 5 adverts are required for a sale of one item.

b) About 21 sales will be made for no advert.

c) About 21 sales will be made for 5 adverts.

d) About 26 sales will be made for a single additional advert.

1. Managers need good statistical information to make sound business decisions. Good information must be:

1. timely, accurate, relevant and adequate.
2. new, timely, accurate and relevant.
3. adequate, timely, accurate and random.
4. relevant, important, accessible and accurate.
5. The following are factors which influence data quality, except
6. data type
7. data sampling
8. data source
9. data collection methods
10. The difference between the first quartile and the third quartile is called
11. interquartile range
12. semi-interquartile range
13. quartile deviation
14. mean deviation
15. Given that the correlation () of two numerical variables is 0.82. What is the corresponding coefficient of determination?
16. 0.18
17. 0.91
18. 1.82
19. 0.67
20. The interpretation of the coefficient of determination of two numerical variables is that:

a) 87% of the dependent variable is explained by the independent variable

b) 87% of the independent variable is explained by the dependent variable

c) 13% of the dependent variable is explained by the independent variable

d) 13% of the independent variable is unexplained by the dependent variable

1. Which of the following graphs is the best way of showing a grouped frequency distribution?
2. Pie chart
3. Histogram
4. Bar graph
5. Ogive

**Use the following information to answer question 28 and 29**

Four local banks established a fund to help victims of natural disasters.

The following table shows a record of their annual contributions for four years. (in thousands)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bank Name** | **Year** | | | |
| **1** | **2** | **3** | **4** |
| Madziko | 385 | 350 | 326 | 341 |
| Ligowe | 86 | 78 | 124 | 112 |
| Msazi | 40 | 56 | 87 | 88 |
| Mindano | 112 | 65 | 156 | 143 |

1. What is the percent contribution made by Madziko in the first year?
2. 385
3. 27
4. 62
5. 44
6. What type of a bar chart can be drawn in order to relatively compare yearly contributions made by the four banks?
7. Simple
8. Component
9. Multiple
10. Percentage
11. What is the advantage of stratified sampling over simple random sampling?
12. Stratified sampling achieves greater representation than simple random sampling
13. Stratified sampling gives unbiased sample than simple random sampling
14. In stratified sampling major groups are reflected which is not the case with simple random sampling
15. In stratified sampling one does not need a list of all items as in simple random sampling.

**SECTION B (60 MARKS)**

Answer **ANY THREE** questions from this section.

* Show all your working clearly.
* Where appropriate, leave the final answer correct to 2 decimal places.

**QUESTION 2**

1. (i) Write down the *two* major components of statistics as a discipline. *(2 marks)*

(ii) What is the difference between a **statistic** and a **parameter** as used in Business Statistics? *(4 marks)*

(iii) State the *three* major methods of collecting primary data. *(3 marks)*

1. A survey among a random sample of 68 branch managers were asked to identify the performance appraisal system the bank uses. The options were: 1 = a trial method, 2 = a behavioral method and 3 = a results method. The survey found that only 18% used the trail method while 44% used the result method.

**Required:**

1. Identify the variable of interest. *(2 marks)*
2. What is the sampling unit in this scenario? *(2* marks*)*
3. Why is it important that the sample of branch managers be randomly selected? *(2 marks)*
4. Find the number of branch managers who used behavioural method. *(5 marks)*  **(Total 20 marks)**

**QUESTION 3**

a. Discuss the difference between primary data and secondary data *(2 marks)*

b. A bank wanted to find out whether loan applications received are influenced by the current loan interest rate. The manager selected 7 monthly periods where different interest rates were applied and recorded the number of loan applications received. The data is given in the following table.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Interest Rate (%)** | 7 | 6.5 | 5.5 | 6 | 8 | 8.5 | 6 |
| **Loan Application** | 18 | 22 | 30 | 24 | 16 | 18 | 28 |

**Required:**

(i). Identify the independent variable and the dependent variable and

explain your answer. *(4 marks)*

(ii) . Compute the correlation coefficient, between the rate of interest and

the number of loan applications received. *(12 marks)*

(iii). Comment on the strength of the association between interest rate and the number of loan applications basing on the correlation coefficient calculated in (ii) above. *(2 marks)*

**(Total 20 marks)**

**QUESTION 4**

1. (i) Briefly discuss what is meant by **data enrichment** in statistical analysis. *(2 marks)*

(ii) In a survey, a sample of 150 loan applications is required from a total of 5000 loan applications. It is believed that low, middle and high class income earners differ in loan trends. There are 1500 loan applications from low class income earners, 3000 from middle class income earners and 500 from high class income earners.

**Required:**

Explain clearly how you would take a stratified sample of the required size, showing all your calculations. *(9 marks)*

1. The following are withdrawal amounts (in thousands) from Mr Phiri’s account in a given month.

50 34 33 48 52 45 41 38 24 43

**Required:**

(i) Find the average amount of withdrawals. *(4 marks)*

(ii) Using tens in the stem, construct a stem-and-leaf diagram to display the distribution of these withdrawal. *(5 marks)*

**(Total 20 marks)**

**QUESTION 5**

1. The human resources department of a bank analysed the qualifications profile of their 129 managers in terms of their highest qualifications. The findings are presented in the following two-way pivot table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Qualification** | **Managerial Level** | | | |
| **Section Head** | **Department Head** | **Division Head** | TOTAL |
| **MSCE** | 28 | 14 | 8 | 50 |
| **Diploma** | 20 | 24 | 6 | 50 |
| **Degree** |  | 10 | 14 | 29 |
| TOTAL | 53 |  | 28 | **129** |

**Required:**

1. Copy and complete the pivot table. *(3 marks)*
2. Mention the **two** variables in this analysis. *(2 marks)*
3. What is the probability that a manager selected at random is a departmental head and had a degree? *(3 marks)*
4. What is the probability that a manager selected at random is a departmental head given that the manager had a degree? *(4 marks)*
5. A bank supervisor has to assign one worker to each of the three desks. There are five workers to choose from.

**Required:**

(i) How many distinct assignments of workers to these three desks are possible? *(4 marks)*

(ii) How many possible groupings of these workers can the supervisor make? *(4 marks)*

**(Total 20 marks)**

**QUESTION 6**

1. (i) Data clearing is a process whereby data for statistical analysis to address a particular management problem is manipulated to make it essential for valid statistical findings.

**Required:**

Mention **three** important aspects to consider when doing data clearing.

*(3 marks)*

(ii) From government spending surveys, it is known that spending on food, housing, petrol and heating is in the ratio 8:4:1:3. Given that in the last year the cost of food increased by 8%, the cost of housing by 4% and the cost of petrol by 5%, but the cost of heating fell by 5%, the following table was constructed.

|  |  |  |
| --- | --- | --- |
| **Item** | **Weight** | **% Change** |
| Food | 8 | 108 |
| Housing | 4 | 104 |
| Petrol | 1 | 105 |
| Heating | 3 | 95 |

**Required:**

Calculate a weighted mean change in price of all the four items combined. *(7 marks)*

1. A company has 10 members in each of its three sections: Production, Packaging and Quality Assessment. Two members are needed for a training course from any of these sections.

**Required:**

1. Draw a tree diagram to represent this information. *(7 marks)*
2. What is the probability that both are from production section? *(3 marks)*

**(Total 20 marks)**

**END OF THE EXAMINATION PAPER**