

**INSTITUTE OF BANKERS IN MALAWI**

**DIPLOMA IN BANKING EXAMINATION**

**SUBJECT: INTRODUCTION TO BUSINESS STATISTICS (IOBM – D212)**

**Date: Wednesday, 6th May 2015**

**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 4 questions, each question carries 15 marks.

Answer **ALL** questions.

3 Section B consists of 4 questions, each question carries 20 marks. Answer **ANY TWO** 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 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 (60 MARKS)**

Answer **ALL** questions from this section

**QUESTION 1**

1. Define the following terms:
2. Conditional Probability.  *(2 marks)*
3. Internal Rate of Return.  *(2 marks)*
4. Confidence level. *(2 marks)*
5. A firm borrows K6000 from the bank at 13% compounded semi-annually.

If no repayments are made, how much is owed after 4 years. *(4 marks)*

1. A survey found that the average number of personal loans per week at Ndalama Bank is 16.3. A random sample of 10 weeks had a mean number of 17.7 personal loans. The sample standard deviation is 1.8.

Is there enough evidence to reject the surveys claim at ?  *(5 marks)*

**(Total 15 marks)**

**QUESTION 2**

1. Mr. Nchilamwera bought a second hand car for K125, 000. Using the reducing balance method of depreciation at 20% per annum. Calculate;
2. The value of the car after 3 years. *(3 marks)*
3. The number of years it will take for the value of the car to depreciate to K45, 000. *(4 marks)*
4. The following table is a record of butter stocks in thousands of tonnes in Malawi for a particular year;

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov |
| 216.9 | 225.1 | 234.6 | 237.2 | 235.2 | 230.1 | 224.4 | 226.1 | 220.2 |

Calculate (to 1D) a set of

1. Fixed base relatives (Mar=100). *(3 marks)*
2. Chain base relatives. *(3 marks)*
3. Comment on the results. *(2 marks)*

**(Total 15 marks)**

**QUESTION 3**

1. A researcher wishes to test the claim that the average cost of tuition and fees at a four year public college is greater than K570,000. She selects a random sample of 36 four-year public colleges and finds the mean to be K595,000.

The population standard deviation is K65,900. Is there evidence to support the claim at 0.05? *(5 marks)*

1. Cite any **three** components which make up a typical time series.  *(3 marks)*
2. The following table is a record of unemployed school leavers in Malawi (figures in thousands) is tabulated below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Year | January | April | July | October |
| 2012 | 22 | 12 | 110 | 31 |
| 2013 | 21 | 26 | 150 | 70 |
| 2014 | 50 | 36 | 146 | 110 |

By means of a moving average, find the trend and the seasonal adjustments.

*(7 marks)*

**(Total 15 marks)**

**QUESTION 4**

1. Give **two** types of composite index numbers. *(2 marks)*
2. The average amount of money a person has in a bank account at year end is K2,184.00. Assume that the standard deviation is K250 and the distribution is approximately normal.
3. Find the probability that a person selected at random has less than K2,240.00 at year end.  *(4 marks)*
4. If a sample of 40 individuals is selected, find the probability that the mean of the sample will be less than K2,240.00 at year end.  *(5 marks)*
5. The probability that Sam parks in a bank’s no-parking zone and gets a parking ticket is 0.06, and the probability that Sam cannot find a legal parking space and has to park in the no-parking zone is 0.20. On Tuesday, Sam arrives at a bank and has to park in a no-parking zone.

Find the probability that he will get a parking ticket. *(4 marks)*  **(Total 15 marks)**

**SECTION B (40 MARKS)**

Answer **ANY TWO** questions from this section

**QUESTION 5**

1. Mention and explain any **three** steps involved in solving problems using linear programming. *(6 marks)*
2. Mr. Juma borrowed K18,500 from a Building Society to buy a house. The loan is to be repaid over 25 years at a fixed 11% rate of interest and is amortized by equal annual payments.
3. How much are the annual payments?  *(5 marks)*
4. If the annual payment is divided by 12 and charged monthly (in arrears), what is the Society’s annual gain as a percentage of the original principal borrowed?

(Assuming the Society can invest at 9% compounded monthly). *(5 marks)*

1. A financial adviser suggests that his client select one of two types of bonds in which to invest K5000. Bond pays a return of 4% and has a default rate of 2%. Bond has a 2.5% return and a default rate of 1%.

Find the expected rate of return and decide which bond would be a better investment. When the bond defaults, the investor loses all the investment.

*(4 marks)*

**(Total 20 marks)**

**QUESTION 6**

1. Briefly describe the Central Limit Theorem. *(3 marks)*
2. The marks of 500 students in an Introduction to Business examination are normally distributed with a mean of 45 marks and a standard deviation of 20 marks.
3. Given that the pass mark is 41, estimate the number of candidates who pass the examination. *(4 marks)*
4. If 5% of the candidates obtain a distinction by scoring marks or more, estimate value of. *(5 marks)*
5. Given data for two commodities, why do we need to change the base in order to compare the two commodities? *(2 marks)*

1. The table below shows the number of television sets sold and number of TV licenses taken out for the years 2008 to 2014;

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| No. of TV sets sold (2010=100) | 61 | 88 | 100 | 135 | 165 | 192 | 210 |
| No. of TV licenses taken out (1992=100) | 210 | 230 | 250 | 300 | 360 | 410 | 500 |

Compare the figures given in the table and comment on the results. *(6 marks)*

**(Total 20 marks)**

**QUESTION 7**

1. The following data represent a sample of the assets (in billions of Kwacha) of 30 companies in Malawi.

|  |  |  |
| --- | --- | --- |
| 12 | 17 | 4 |
| 3 | 1 | 2 |
| 13 | 9 | 1 |
| 73 | 2 | 15 |
| 12 | 7 | 1 |
| 9 | 3 | 18 |
| 8 | 5 | 17 |
| 40 | 2 | 22 |
| 5 | 1 | 12 |
| 2 | 13 | 3 |

Find the 90% confidence interval of the mean. *(10 marks)*

1. A recent survey asked 100 people if they thought men in the bank should work at the front office. The results of the survey are shown in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Gender** | **Yes** | **No** | **Total** |
| Male | 32 | 18 | 50 |
| Female | 8 | 42 | 50 |
| Total | 40 | 60 | 100 |

Find the probability that.

1. The respondent answered yes, given that the respondent was a female.

*(3 marks)*

1. The respondent was a male, given that the respondent answered no.

*(3 marks)*

1. A survey found that one out of five bank customers had lodged a customer care complaint in any given month.

If 10 people are selected at random, find the probability that exactly 3 will have lodged a complaint last month. *(4 marks)*

**(Total 20 marks)**

**QUESTION 8**

1. Briefly explain **two** business uses of index numbers. *(4 marks)*
2. A cost accountant has derived the following information about basic weekly wage rates (W) and the number of people employed (E) in the factories of a large chemical company.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | July 2012 | | July 2013 | | July 2014 | |
| Technical group  of employees | W | E | W | E | W | E |
| Q | 60 | 5 | 79 | 4 | 80 | 4 |
| R | 60 | 2 | 65 | 3 | 70 | 3 |
| S | 70 | 2 | 85 | 2 | 90 | 1 |
| T | 90 | 1 | 110 | 1 | 120 | 2 |

1. Calculate a laspeyres (base weights) all-items index number for the July 2013 basic weekly wage rates with July 2012 =100.  *(3 marks)*
2. Calculate a Paasche (current weights) all-items index number for July 2014 basic weekly wage rates, with July 2012 = 100.  *(3 marks)*
3. Briefly compare your index numbers for the company with the official government figures for the Chemical and Allied Industries which are given below:

|  |  |  |  |
| --- | --- | --- | --- |
| Yearly annual average | | | |
|  | 2012 | 2013 | 2014 |
| Weekly wage rates | 156.3 | 187.4 | 203.4 |
| (July 2009 = 100) | | | |

*(4 marks)*

1. A Bank’s customer care center has four telephone lines. If the customer service assistant is unable to talk (i.e., during a tea break) or is talking to a person, the other callers are placed on hold. When all lines are in use, others who are trying to call in get a busy signal. The probability that 0, 1, 2, 3, or 4 people will get through is shown in the distribution.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 0 | 1 | 2 | 3 | 4 |
|  | 0.18 | 0.34 | 0.23 | 0.21 | 0.04 |

Find the variance and standard deviation for the distribution.  *(6 marks)*

**(Total 20 marks)**

**END OF EXAMINATION PAPER**