

**INSTITUTE OF BANKERS IN MALAWI**

**DIPLOMA IN BANKING EXAMINATION**

**SUBJECT: INTRODUCTION TO BUSINESS STATISTICS (OIBM-D212)**

**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 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 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 (60 MARKS)**

Answer **ALL** questions from this section

**QUESTION 1**

1. What is an index number? *(2 marks)*
2. Distinguish between quantity index and value index. *(4 marks)*
3. A quantity index relative for the row materials used at a company for production of a commodity was calculated as 87 (2000 = 100) for the year 2005.

**Required:**

Interpret the quantity index relative calculated. *(2 marks)*

1. The production of Castel beer in Malawi for the first six months of the first year of production was recorded as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Month** | Jan | Feb | Mar | Apr | May | Jun |
| **Production** | 4563 | 4245 | 4841 | 4644 | 5290 | 5166 |

**Required:**

Calculate the simple quantity relative indices for all the months using March as the base month. *(7 marks)*

**(Total 15 marks)**

**QUESTION 2**

1. Write down *two* major properties of a normal distribution curve. *(2 marks)*
2. From the standard normal tables given, find the probability between -1.5 and 1.65.

*(6 marks)*

1. Packets of breakfast cereals are said to contain 550g. The manufacturer knows that the weights are normally distributed with mean 551.2g and standard deviation 15g.

**Required:**

What proportion of packets will contain more than the required weight? *(7 marks)*

**(Total 15 marks)**

**QUESTION 3**

1. Define a random variable. *(2 marks)*
2. Explain the reason why the random variable, ‘morning meeting attendance at the bank’ is said to be discrete. *(2 marks)*
3. Describe a binomial random variable. *(2 marks)*
4. At a particular bank branch, the probability that a bank teller makes an error on one or more money transactions on a particular day is 0.2. One day 6 tellers were deployed.

You are **required** to find:

1. the probability that no teller will make an error. *(2 marks)*
2. the probability that two or less tellers will make errors. *(4 marks)*
3. the mean number of tellers that will make errors. *(3 marks)*

**(Total 15 marks)**

**QUESTION 4**

1. Briefly discuss the concept of time preference as used in finance. *(2 marks)*
2. How does simple interest differ from compound interest in terms of computations?

*(4 marks)*

1. A firm borrows MK60000 from a bank at 24% interest per annum for 2 years.

**Required:**

How much money will the firm payback to the bank,

1. If simple interest is paid monthly? *(4 marks)*
2. If compounded semi-annually? *(5 marks)*

**(Total 15 marks)**

**SECTION B (40 MARKS)**

Answer ANY **TWO** questions from this section

**QUESTION 5**

1. Distinguish between type I error and type II error in terms of circumstances they are committed in hypothesis testing. *(4 marks)*
2. A sample of daily sales in a particular week was collected and recorded to the nearest thousand as follows:

18, 19, 21, 30, 34, 46

It is known that the daily sales have a population standard deviation of 14.3.

**Required:**

1. Given a 95% bound on the error of estimation, calculate the margin of error.

*(4 marks)*

1. Calculate a 95% confidence interval. *(9 marks)*
2. Interpret the confidence interval calculated in (ii) above. *(3 marks)*

**(Total 20 marks)**

**QUESTION 6**

1. Discuss what does a control chart show. *(2 marks)*
2. A manufacturer produces boxes of biscuits. The production process has been set up to produce boxes that have an average weight of 470 grams with a variance of 225 grams. During production a sample of 10 boxes is selected at the end of each two-hour period. The table below shows the average weights of the samples.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Time** | 2:00 | 4:00 | 6:00 | 8:00 | 10:00 | 12:00 | 14:00 | 16:00 | 18:00 | 20:00 | 22:00 | 24:00 |
| **Production** | 462 | 474 | 479 | 486 | 461 | 458 | 443 | 465 | 447 | 469 | 442 | 449 |

**Required:**

1. Construct a control chart for the sample means based on the initial production process to monitor the subsequent production. *(15 marks)*
2. Comment on whether the production process appears to be under control or not.

*(3 marks)*

(**Total 20 marks)**

**QUESTION 7**

1. Briefly discuss what is meant by the term ‘investment Appraisal’. *(2 marks)*
2. An investment of MK75000 grows to an amount of MK102000 where interest is compounded quarterly over 3 years.

**Required:**

What is the annual rate of interest? *(6 marks)*

1. A firm is considering buying a machine costing MK200000 and the expected net cash flows are as follows:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Year** | 1 | 2 | 3 | 4 | 5 |
| **Net Cash Flow** | 50000 | 55000 | 65000 | 75000 | 75000 |

**Required:**

If the cost of capital is 10%, use net present value method to advise the firm whether to by the machine or not. *(12 marks)*

**(Total 20 marks)**

**QUESTION 8**

1. Mention the **three** major components of time series. *(3 marks)*
2. State the time series multiplicative model. *(2 marks)*
3. The following table shows days lost through sickness at a factory.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Year\ Quarter** | **Quarter 1** | **Quarter 2** | **Quarter 3** | **Quarter 4** |
| **2003** | 30 | 20 | 15 | 35 |
| **2004** | 40 | 25 | 18 | 45 |
| **2005** | 45 | 30 | 22 | 55 |
| **2006** | 50 | 32 | 28 | 60 |
| **2007** | 60 | 35 | 30 | 70 |

**Required:**

1. Plot the scatter graph. *(5 marks)*
2. Calculate semi-averages of the data to obtain the trend. *(7 marks)*
3. Draw a trend line using the semi-averages calculated in (ii) above on the same scatter graph drawn in (i). *(3 marks)*

**END OF EXAMINATON PAPER**