

**INSTITUTE OF BANKERS IN MALAWI**

**DIPLOMA IN BANKING EXAMINATION**

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

**Date:**

**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**

a. What is an index number? *(2 marks)*

b. Distinguish between quantity index and value index. *(4 marks)*

c. 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)*

c. 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**

a. Write down *two* major properties of a normal distribution curve. *(2 marks)*

b. From the standard normal tables given, find the probability between -1.5 and 1.65. *(6 marks)*

c. 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**

a. Define a random variable. *(2 marks)*

b. Explain the reason why the random variable, ‘morning meeting attendance at the bank’ is said to be discrete. *(2 marks)*

c. Describe a binomial random variable. *(2 marks)*

d. 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.

**Required:**

Find

(i). the probability that no teller will make an error. *(2 marks)*

(ii). the probability that two or less tellers will make errors. *(4 marks)*

(iii). The mean number of tellers that will make errors. *(3 marks)*

**(Total 15 marks)**

**QUESTION 4**

a. Briefly discuss the concept of time preference as used in finance. *(2 marks)*

b. How does simple interest differ from compound interest in terms of computations. *(4 marks)*

c. 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,

(i). if simple interest is paid monthly? *(4 marks)*

(ii). if compounded semi-annually? *(5 marks)*

**(Total 15 marks)**

**QUESTION 5**

a. Explain precisely what p(A|B) means. *(2 marks)*

b. Under what condition does p(A|B) = p(A). *(2 marks)*

c. Given that D is the event ‘the manager is not in the office’ and E is the event ‘the manager has gone out for official duties’. If p(D) = 0.3, p(E) = 0.5 and p(D|E) = 0.25, find

(i). p(D∩E). *(4 marks)*

(ii). p(DUE). *(3 marks)*

d. A wholesale stationer stocks heavy (2B), medium (HB), fine (2H) and extra-fine (3H) pencils which come in packs of 10. Currently in stock are 2 packs of 3H, 14 packs of 2H, 35 packs of HB and 8 packs of 2B.

**Required:**

If a pack of pencils is chosen randomly for inspection, what is the probability that they are not very fine. *(4 marks)*

**(Total 15 marks)**

**SECTION B (40 MARKS)**

Answer ANY **TWO** questions from this section

**QUESTION 6**

a. Distinguish between type I error and type II error in terms of circumstances they are committed in hypothesis testing. *(4 marks)*

b. 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:**

(i). Given a 95% bound on the error of estimation, calculate the margin of error. *(4 marks)*

(ii). Calculate a 95% confidence interval. *(9 marks)*

(iii). Interpret the confidence interval calculated in (ii) above. *(3 marks)*

**(Total 20 marks)**

**QUESTION 7**

a. Discuss what does a control chart show. *(2 marks)*

b. 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:**

(i). Construct a control chart for the sample means based on the initial production process to monitor the subsequent production. *(15 marks)*

(ii). Comment on whether the production process appears to be under control or not. *(3 marks)*

**(Total 20 marks)**

**QUESTION 8**

a. Briefly discuss what is meant by the term ‘investment Appraisal’. *(2 marks)*

b. 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)*

c. 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 9**

a. Mention the *three* major components of time series. *(3 marks)*

b. State the time series multiplicative model. *(2 marks)*

c. 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:**

(i). Plot the scattergraph. *(5 marks)*

(ii). Calculate semi-averages of the data to obtain the trend. *(7 marks)*

(iii). Draw a trend line using the semi-averages calculated in (ii) above on the same scattergraph drawn in (i). *(3 marks)*

**QUESTION 10**

a. In linear programming, what is a feasible region? (2 marks)

b. A company owns two flour mills: Mill A and Mill B, which have different production capacities for high, medium and low quality flour. The company has signed a contract to supply flour to firm every month with at least 8, 12 and 24 quintals of high, medium and low quality, respectively. It costs the company MK2000 and MK1500 per day to run Mill A and Mill B, respectively. On a day Mill A produces 6, 2 and 4 quintals of high, medium and low quality flour, Mill B produces 2, 4 and 12 quintals of high, medium and low quality flour, respectively. The company wants to determine the number of days per months each mill should be operated in order to meet the contract order most economically.

**Required:**

Formulate a linear programming model for the company. (Don’t solve!) *(6 marks)*

c. The probability is 0.3 that there is a strike at GM consulting firm. If a strike is on, the probability that the firm opens its offices is 0.2, while with no strike the probability is 0.8 that the firm opens its offices. Given that their offices are open today, find the probability that there is a strike. *(12 marks)*

**(Total 20 marks)**

**END OF EXAMINATON PAPER**