

EXAMINATION NO. _____



2015 EXAMINATIONS

ACCOUNTING TECHNICIAN PROGRAMME

PAPER TC 3: BUSINESS MATHEMATICS & STATISTICS

TUESDAY 1 DECEMBER 2015

**TIME ALLOWED : 3 HOURS
9.00AM - 12.00 NOON**

INSTRUCTIONS

1. You are allowed **15 minutes** reading time **before the examination begins** during which you should read the question paper and, if you wish, make annotations on the question paper. However, you are **not** allowed, **under any circumstances**, to open the answer book and start writing or use your calculator during this reading time.
2. Number of questions on paper - 9.
3. The paper is divided into **Sections A** and **B**. **ALL** questions to be answered in **Section A** and **ANY TWO** from **Section B**.
4. The maximum number of marks for each answer is indicated against each question.
5. Formulae sheets and graph paper are provided.
6. Use of non-programmable calculators is allowed.
7. Show all your workings in order to gain full marks. Method marks will be awarded throughout.
8. Final answers must be given correct to 2 decimal places, unless otherwise stated.
9. Begin **each** answer on a fresh page.
10. **DO NOT OPEN THIS PAPER UNTIL YOU ARE INSTRUCTED BY THE INVIGILATOR.**

This question paper contains 6 pages

This question paper must **not** be removed from the examination hall.

SECTION A

ANSWER ALL QUESTIONS IN THIS SECTION

1. Given the function $f(x) = x^3 - 2x + 4$, evaluate the following:

(a) $f'(10)$ **3 Marks**

(b) $\int_0^1 f(x) dx$ **5 Marks**

(TOTAL: 8 MARKS)

2. (a) Simplify the following:

$$\frac{x-3}{2} + \frac{2-x}{3} - \frac{x+1}{4}.$$

4 Marks

(b) Solve the following equation:

$$\frac{2y+5}{y} = \frac{2y}{y-3}$$

5 Marks

(TOTAL: 9 MARKS)

3. (a) According to the Reserve Bank of Malawi, the economy has been growing at the following rates over the past 7 years:

Year:	2008	2009	2010	2011	2012	2013	2014
Growth rate:	9.8%	8.9%	6.7%	4.3%	1.8%	6.3%	6.0%

Required:

Use the geometric mean to calculate the average rate of growth. **4 Marks**

(b) During a tree planting week, a student planted 4 trees on the first day, 12 trees on the second, 36 trees on the third and so on. By the end of the period, he had planted 4,372 trees.

Required:

How many days did it take the student to plant the 4,372 trees? **7 Marks**

(TOTAL: 11 MARKS)

Continued/.....

4. (a) Explain the principle of 'time value of money'. **2 Marks**
- (b) Sungani deposits K5,000 into an account that pays 6% annual interest compounded monthly.

Required:

How long will it take for the money to amount to K8,000 in the account? .

7 Marks

(TOTAL: 9 MARKS)

5. (a) A company is planning to construct a 3 star hotel in Salima. It will consist of 100 rooms. There will be 25 luxury rooms, 30 deluxe rooms and 45 standard rooms. The total cost of construction will be K100 Million. The cost allocation ratio for total luxury, total deluxe and total standard rooms will be 5 : 3 : 2 respectively.

Required:

Calculate the construction cost allocated for one luxury room.

4 Marks

- (b) In a market survey within Kawale township, it was discovered that 6 exercise books and 12 pens cost K1,440. On the other hand, 8 exercise books and 10 pens cost K1,320.

Required:

Determine the price of an exercise book and the price of a pen.

6 Marks

(TOTAL: 10 MARKS)

6. (a) (i) Define a random sample. **2 Marks**
- (ii) Describe how a simple random sample of 5 members can be obtained from a set of 20 ICAM candidates. **2 Marks**

- (b) In 2012, out of a total of 2,000 students at ICAM College, 1,400 had enrolled into the Technician programme (TP) and the rest had enrolled into the Professional programme (PP). Out of the 1,400 TP students, 100 were girls. However, in all, there were 600 girls in the college. In 2013, the number of TP students had increased to 1,700, out of whom 250 were girls, but the number of PP students had fallen to 500 of whom only 50 were boys. In 2014, out of 800 girls, 650 were for TP, whereas the total number for TP was 2,200. In that year, the number of boys and girls in PP classes was equal.

Required:

Present these data in a tabular form to enable anyone to read and understand the situation very easily.

9 Marks

(TOTAL: 13 MARKS)

Continued/.....

SECTION B

ANSWER TWO QUESTIONS ONLY FROM THIS SECTION

7. (a) Give **two** reasons why bar charts are preferred to pie charts when presenting discrete data. **2 Marks**
- (b) A company buys four products with the following features:

Products	Number of units bought		Price (K'000) paid per unit	
	2012	2015	2012	2015
A	20	24	10	11
B	55	51	23	25
C	63	84	17	17
D	28	34	19	20

Required:

Calculate

- (i) the Laspeyres quantity index for 2015 for the products. **4 Marks**
- (ii) the Paasche price index for 2015 for the products. **4 Marks**
- (c) A firm is considering buying a machine costing K200,000 and the expected net cash flows from its use are as follows:

Year	1	2	3	4	5
Net cashflow (K)	50,000	55,000	65,000	75,000	75,000

Required:

Assuming the cost of capital is 10%, should the firm buy the machine? Use the Internal Rate of Return (IRR) method with 15% as the other rate. **10 Marks**
(TOTAL : 20 MARKS)

Continued/.....

8. (a) Which time series component (trend, seasonal or irregular) would you associate with the following:

- (i) increase in reservations due to an uncommon hot summer,
- (ii) increase in reservations in the run up to Christmas and New Year festivities?

2 Marks

(b) A local company manufactures scientific and graphing calculators. Each scientific calculator requires 1 hour for cutting and 3 hours for assembling. Each graphing calculator requires 2 hours for cutting and 4 hours for assembling. The company has a maximum of 32 work hours for cutting and 84 work hours for assembling each day. The company makes a profit of K800 on each scientific calculator and K1,200 on each graphing calculator sold.

Required:

Using the graphical method, calculate the number of calculators of each type that should be manufactured each day to maximise the total daily profit. Assume that all calculators manufactured are sold.

10 Marks

(c) A manager decided to check the accuracy of data in a database system. The posting is done by three members of staff: Bertha, Kwalimba and Tione. A sample of 1,000 transactions was selected. 300 were posted by Bertha, 300 by Kwalimba and 400 by Tione. The error rates for Bertha, Kwalimba and Tione are estimated to be 2%, 5% and 3% respectively. From a sample of 1,000 transactions, one transaction was selected.

Required:

Calculate the probability that it:

- (i) was posted by Kwalimba or Tione.
- (ii) contained an error.

3 Marks

5 Marks

(TOTAL: 20 MARKS)

Continued/.....

9. (a) Data may be classified as continuous or discrete.

Required:

For each data type, give **two** examples of graphs/charts or diagrams that are ideal for their presentation. **4 Marks**

- (b) A researcher has analysed the distribution of annual incomes of people living in a semi-urban area. The number of people has been expressed as a percentage of the total number of people in 2011 and 2014.

Annual income (K)	% number of people	
	2011	2014
Less than 25,000	23	12
25,000 but less than 50,000	32	20
50,000 but less than 75,000	16	12
75,000 but less than 100,000	19	24
100,000 but less than 150,000	6	21
150,000 but less than 200,000	1	4
200,000 but less than 350,000	2	5
350,000 but less than 500,000	1	2

Required:

- (i) Compile the cumulative frequencies for 2011 and 2014. **4 Marks**
- (ii) Using graph paper provided, plot the corresponding ogives on the same pair of axes. **6 Marks**
- (iii) Determine the lower and upper quartiles for 2014 and interpret the results. **6 Marks**

(TOTAL: 20 MARKS)

END