

EXAMINATION No. _____

THE PUBLIC ACCOUNTANTS EXAMINATION
COUNCIL OF MALAWI

2011 EXAMINATIONS

ACCOUNTING TECHNICIAN PROGRAMME

PAPER TC 3: BUSINESS MATHEMATICS & STATISTICS

TUESDAY 31 MAY 2011

TIME ALLOWED: 3 HOURS
9.00 AM - 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. Mathematical Tables, 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 where necessary.
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 5 pages

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

SECTION A**ANSWER ALL QUESTIONS IN THIS SECTION**

1. (a) Factorise $x^2 - 4$ **1 Mark**
- (b) Determine the y –intercept of the equation $3y + 4x = 12$. **2 Marks**
- (c) Assume that the supply function is represented by $P = 0.05q + 10$, and the demand function is represented by $P = 17 - 0.02q$, where P is the price in K'000 and q is the quantity.

Required:

Find the equilibrium price.

4 Marks

- (d) The 2nd term of an arithmetic progression exceeds the 5th term by 18.

Required:

Find the common difference of the progression.

4 Marks**(TOTAL : 11 MARKS)**

2. (a) Evaluate $\log_2(32)$ **2 Marks**
- (b) A pot contains six red marbles and four black marbles all of equal size. Two marbles are drawn without replacement from the pot.

Required:

Find the probability that both marbles are black.

2 Marks

(c) Solve the following simultaneous equations:

$$\begin{aligned}x + 2y &= 1 \\x^2 + y^2 &= 10\end{aligned}$$

6 Marks**(TOTAL : 10 MARKS)**

3. Explain the meaning of the following in the context of statistics and in each case give an example:

- (a) Quantitative variable **2 Marks**
- (b) Qualitative variable **2 Marks**
- (c) Statistic **3 Marks**
- (d) Parameter **3 Marks**

(TOTAL : 10 MARKS)**Continued/.....**

4. (a) An amount of K30,000 is deposited in a bank paying an annual interest of 5% compounded monthly.

Required:

- (i) Find the total amount of this deposit (principal + interest) at the end of 4 years. **3 Marks**
- (ii) Find the total interest earned in 4 years. **1 Mark**

- (b) Students at a certain school were surveyed to find out the mode of transport they used when going to school. The results were:

Walking –9, Bicycle –10, Car –6 and Bus –15.

Required:

Construct a pie chart of radius 4cm to present this information. **5 Marks**
(TOTAL : 9 MARKS)

5. (a) You are given the following data:

Age (Years)	Frequency
21–30	5
31–40	8
41–50	15
51–60	11
61–70	5
71–80	1

Required:

Using the scales: 1 cm: 10 units on the horizontal axis and 2 cm: 10 units on the vertical axis, construct a less-than cumulative frequency curve or ogive of the data in the table above. **5 Marks**

- (b) State any **five** properties of a good questionnaire for a statistical survey. **5 Marks**
(TOTAL : 10 MARKS)

6. (a) A company bought a machine for K140,000 and it is depreciated at the rate of 20% per annum according to the reducing balance method of depreciation.

Required:

Calculate the value of the machine after 5 years. **4 Marks**

Continued/.....

- (b) The following table shows the ranking of 10 students according to the marks obtained for English Language and Mathematics in an examination held recently:

Students	A	B	C	D	E	F	G	H	I	J
English Language (Rank)	1	2	4	6	3	5	9	7	10	8
Mathematics (Rank)	4	5	3	1	9	7	6	8	2	10

Required:

Calculate the rank correlation coefficient of the data and comment on your answer.

6 Marks

(TOTAL : 10 MARKS)

SECTION B

ANSWER TWO QUESTIONS ONLY FROM THIS SECTION

7. (a) If an adult and a child take 4 days to complete a job and the adult alone can complete the job in 6 days, find how long it would take the child to complete the work. **6 Marks**
- (b) Two projects are expected to generate the following cash inflows during the next 4 years:

Period (Year)	Project A (K)	Project B (K)
1	200,000	150,000
2	50,000	150,000
3	50,000	50,000
4	100,000	50,000

The initial cost of each project is K215, 000. The cost of capital for these projects is 20% per annum.

Required:

Assuming that these cash inflows occur at the end of each year, calculate the Net Present Value of each project and comment on the Net Present Values obtained.

You may use the following discount factors:

Year	1	2	3	4
Discounting factor at 20%	0.8333	0.6944	0.5787	0.4823

5 Marks

Continued/.....

- (c) 100 students sat for a particular examination of which 60 were boys. The number of students who passed this examination was 40, of whom 20 were girls.

Required:

Find the probability of:

- (i) A student passing the examination **1 Mark**
 (ii) A girl passing the examination **1 Mark**
 (iii) A selected student who is a boy, failing the examination. **2 Marks**

- (d) You are given the following frequency distribution:

Class interval	Frequency
56 – 58	5
59 – 61	15
62 – 64	25
65 – 67	35
68 – 70	10

Required:

Find the standard deviation.

5 Marks
(TOTAL : 20 MARKS)

8. (a) Describe any **one** component of a time series. **2 Marks**
 (b) The table below shows sales of golf bags by quarter.

Year	Quarter	Sales ('000)
2006	4	15.2
	1	13.7
2007	2	17.9
	3	16.2
	4	15.4
	1	14.2
2008	2	18.6
	3	19.5
	4	16.3
	1	15.9
2009	2	21.9
	3	19.7
	4	16.8
	1	15.9

Required:

- (i) Using a scale of 1:1,000 units on the sales axis, construct a time series chart for the data. **4 Marks**

Continued/.....

- (ii) Find the trend equation using the method of least squares. **8 Marks**
- (iii) Using the multiplicative model, calculate the average seasonal factors. **7 Marks**
- (TOTAL : 20 MARKS)**

9. (a) Explain what is meant by each of the following terms in statistics:
- (i) Pilot survey **3 Marks**
 - (ii) Non-response **2 Marks**
 - (iii) Sampling frame **2 Marks**
 - (iv) Simple random sampling **2 Marks**
 - (v) Quota sampling **3 Marks**
- (b) Personal interview and postal questionnaire are two means of collecting data.

Required:

Mention **two** advantages and **two** disadvantages of each method. **8 Marks**
(TOTAL : 20 MARKS)

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