ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

LEVEL I EXAMINATION - JANUARY 2026

(102) BUSINESS MATHEMATICS AND STATISTICS

25-01-2026
Morning
[09.00 – 12.00]

No. of Pages : 10
No. of Questions : 06

- **Instructions to candidates** (Please Read Carefully)**:**
  - (1) ***Time:*** *03 hours.*
  - (2) ***All questions should be answered.***
  - (3) ***Answers*** *should be in* ***one language****, in the* ***medium*** *applied for, in the* ***booklets*** *provided.*
  - (4) *Submit all workings and calculations. State clearly assumptions made by you, if any.*
  - (5) *Use of Non-programmable calculators is* ***only*** *permitted.*
  - (6) ***Mathematical Tables*** *and* ***Graph Papers*** *will be provided.*
  - (7) ***Action Verb Check List*** *with definitions is attached. Each question will begin with an* ***action verb*** *excluding OTQ's. Candidates should answer the questions based on the* ***definition*** *of the verb given in the Action Verb Check List.*
  - (8) ***Formulae Sheets*** *are attached.*
  - (9) *100 Marks.*

SECTION A

Objective Test Questions (OTQs)

(Total 40 marks)

Question 01

Select the most correct answer for question No. ***1.1*** *to* ***1.10****. Write the number of the selected answer in your answer booklet with the number assigned to the question.*

1.1 If, $6x + 8 = 3x + 29$, the value of x is:

(1) 4 (2) 3 (3) 7 (4) 5

(03 marks)

1.2 **Ramya** deposited Rs.100,000/- in a bank at an interest rate of 16% per annum. If the interest is compounded quarterly, the annual effective interest rate would be:

(1) 16.64% (2) 17.17% (3) 16.99 % (4) 17.25%

(03 marks)

1.3 The probability that **Ramesh** passes the driving test is $\frac{3}{5}$ and the probability of **Kasun** fails the same test is $\frac{2}{3}$.

The probability that both of them pass the test is:

(1) $\frac{2}{5}$ (2) $\frac{1}{5}$ (3) $\frac{4}{15}$ (4) $\frac{2}{15}$

(03 marks)

1.4 In 2020, the price of one litre of petrol was Rs.130/-. By 2025, the price increased up to Rs.300/-. The price relative of petrol considering 2020 as the base year is *(to the nearest integer)*:

(1) 43% (2) 231% (3) 131% (4) 433%

(03 marks)

1.5 The "x" in the simple linear regression model "$y = a + bx$" is known as:

(1) Independent variable. (2) Dependent variable.

(3) Constant. (4) Regression coefficient. (03 marks)

1.6 You are given the following frequency distribution:

x	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69
f	10	35	42	52	61	38	29

The mode of the above frequency distribution is:

(1) 40.34 (2) 42.31 (3) 34.76 (4) 46.25

(03 marks)

1.7 The following table shows the prices and quantities of three brands of medicine for the years 2021 and 2025:

Brand	**Quantity (in units)**		**Price (Rs.)**	
	2021 (q_0)	**2025 (q_1)**	**2021 (p_0)**	**2025 (p_1)**
P	8	5	225	175
Q	15	4	400	125
R	20	8	550	250

Based on the above information,

The Laspeyre's Price Index for the year 2025, considering 2021 as the base year is:

(1) 227.19% (2) 47.37% (3) 211.11% (4) 44.02%

(03 marks)

1.8 **Dhammika** obtained a loan of Rs.130,000/- from a friend at the simple interest rate of 6% per annum. If the loan is settled at the end of 3rd year, the total payable at the end of 3rd year would be *(to the nearest integer)*:

(1) Rs.146,068/- (2) Rs.137,800/- (3) Rs.153,400/- (4) Rs.164,122/-

(03 marks)

1.9 Sales Department of the **Mega (Pvt) Ltd.** wishes to forecast their quarterly sales of **Product A**. The Sales Department calculated the following seasonal index values:

	1st quarter	**2nd quarter**	**3rd quarter**	**4th quarter**
Seasonal Index	1.5	0.95	1.00	0.85

If the estimated trend value for the 2nd quarter was 9,420, the forecasted sales value for the 2nd quarter is:

(1) 9,420 (2) 8,949 (3) 9,415 (4) 9,425

(03 marks)

1.10 The following summary statistics are provided in relation to variables ***x*** and ***y***:

$$\sum x = 63\,,\quad \sum y = 71\,,\quad \sum x^2 = 881\,,\quad \sum y^2 = 1{,}049\,,\quad \sum xy = 838\,,\quad n = 5$$

Based on the above data, the correlation coefficient between ***x*** and ***y*** would be:

(1) 0.9849 (2) -0.9489 (3) 0.9489 (4) -0.9849

(03 marks)

*Write the answers for question No. **1.11** to **1.13** in your answer booklet with the number assigned to the question.*

1.11 Relate the terms given on the left hand side of the following table with the number of the appropriate explanation given on the right hand side:

Term	**Explanation**
(A) Simple interest rate	**(1)** The event that represents everything that does not happen when a specific event occurs.
(B) Equally likely events	**(2)** The sum of present value of cash flows over a period of time at a given rate of discount.
(C) Net Present Value	**(3)** The percentage of interest paid or earned only on the principal, at a fixed rate, over a period of time.
(D) Complementary event	**(4)** Events that have the same probability of occurring.

(01 mark each, 04 marks)

1.12 A sports club introduces a membership plan where the membership fee increases by Rs.150/- in each month within the first 3 years of joining the club. The membership fee at the time of enrolment is Rs.1,000/-.

Calculate the membership fee in the 12th month from the month of joining. (02 marks)

1.13 The following table shows the probability distribution of the number of customers arriving to a small coffee shop during a 10 minute interval:

Customers (X)	0	1	2	3	4
Probability P(x)	0.10	0.20	0.25	0.30	***x***

Calculate "***x***" value from the probability distribution given above. (02 marks)

*State whether each of the following statements (**1.14** and **1.15**) is **True** or **False**. Write the answer (True/False) in your answer booklet with the number assigned to the question:*

1.14 The direction in which the time series is going in the long run is trend. (01 mark)

1.15 Quota sampling is a random sampling technique. (01 mark)

(Total 40 marks)

End of Section A

SECTION B

(Total 40 marks)

Question 02

(a) A recipe requires 01 cup of milk for 2½ cups of flour to make a cake that serves 10 people.

You are required to:

Calculate the number of cups of milk and flour needed to make the cake to serve 15 people. (02 marks)

(b) There are 5 boys and 4 girls in a dancing group. The price of costumes of 2 boys' was Rs.1,000/- more than the price of costumes of 3 girls. The total cost of all the costumes of the dancing group was Rs.14,000/-.

You are required to:

Calculate the price of a boy's costume and a girl's costume separately. (04 marks)

(c) Consider the following inequalities:

$$2x - y \leq 6 \qquad x + 3y \leq 12 \qquad x\,,\ y \geq 0$$

You are required to:

(i) **Draw** the above inequalities in a graph paper. (03 marks)

(ii) **Identify** the area where all the inequalities are satisfied. (01 mark)

(Total 10 marks)

Question 03

(a) A firm produces **Product C**. The Total Revenue (TR) function and Total Cost (TC) function of **product C** per month are as follows:

$$TR = 1{,}400q - 6q^2$$

$$TC = 1{,}500 + 80q$$

(Where "q" is the quantity of units produced / sold during the month.)

You are required to:

(i) **Identify** the profit function. (03 marks)

(ii) **Calculate** the number of units at which the profit is maximized. (04 marks)

(b) The Total Cost (TC) function of a firm is $2x^2 - 6x + 3{,}600$ and the Total Revenue (TR) function is $66x + 2x^2$. (Where "*x* " is the number of units produced per month.)

You are required to:

Calculate the Break-Even Quantity in units. (03 marks)

(Total 10 marks)

Question 04

The following table shows advertising cost incurred during the last 7 months for **Product A** and sales quantity of the product:

Advertising Cost (*x*) (Rs.'000)	4	6	7	9	10	14	20
Sales quantity (*y*) ('000)	5	8	9	12	14	20	30

Using the above data,

You are required to:

(a) **Identify** the least squares regression line given by $y = a + bx$ to represent the relationship between advertising cost and sales quantity. (07 marks)

(b) **Calculate** expected sales quantity when the advertising cost is Rs.12,000/-. (03 marks)

(Total 10 marks)

Question 05

The fruit vendor has collected the following data on the number of mangoes that can be filled in a 1 kg bag as shown in the table below:

No. of Mangoes in 1 kg Bag	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 – 59
No. of Bags (*f*)	3	7	12	10	6	2

Using the above data,

You are required to:

Calculate the following:

(a) Median. (03 marks)

(b) Mean. (03 marks)

(c) Standard Deviation. (04 marks)

(Total 10 marks)

End of Section B

SECTION C

(Total 20 marks)

Question 06

(A) (a) A bank grants a loan of Rs.800,000/- to **Lakshitha** to be settled in equal annual installments in 5 years at an annual interest rate of 14%.

You are required to:

Calculate the annual installment of the loan. (04 marks)

(b) **Shehani** invested Rs.50,000/- in a fixed deposit for 3 years at an interest rate of 12% per annum compounded annually.

You are required to:

Calculate the total interest earned at the end of 3rd year. (03 marks)

(B) **XYZ PLC** is planning to make an investment project. The initial investment cost of the project is Rs.150,000/-.

The following table presents the expected net cash inflows over the next 5 years:

Year	**1**	**2**	**3**	**4**	**5**
Net Cash Inflows (Rs.)	25,000	20,000	32,000	80,000	60,000

The discounting factor (Cost of Capital) of the company is 10% per annum.

You are required to:

Calculate the Net Present Value (NPV) of the project. (04 marks)

(C) **Bag A** contains 10 marbles of which 2 are red and 8 are black. **Bag B** contains 12 marbles of which 4 are red and 8 are black. A marble is drawn at random from each bag.

You are required to:

Calculate the probability that:

(a) Both marbles drawn are red colour. (02 marks)

(b) At least one is a red marble. (02 marks)

(D) The weekly wages of 10,000 workers in a company are normally distributed with a mean payment of Rs.6,000/- and a standard deviation of Rs.500/-.

You are required to:

Calculate the number of workers whose weekly Wages are more than Rs.7,500/-.

(05 marks)
(Total 20 marks)

End of Section C

ACTION VERBS CHECK LIST

Level of Competency	Description	Action Verbs	Verb Definitions
Knowledge (1)	Recall Facts and Basic Concepts.	**Draw**	Produce a picture or diagram.
		Relate	Establish logical or causal connections.
		State	Express details definitely or clearly.
		Identify	Recognize, establish or select after consideration.
		List	Write the connected items.

Level of Competency	Description	Action Verbs	Verb Definitions
Comprehension (2)	Explain & Elucidates Ideas and Information.	**Recognize**	Show validity or otherwise, using knowledge or contextual experience.
		Interpret	Translate into understandable or familiar terms.
		Describe	Write and communicate the key features.
		Explain	Make a clear description in detail using relevant facts.
		Define	Give the exact nature, scope or meaning.

Level of Competency	Description	Action Verbs	Verb Definitions
Application (3)	Use and Adapt Knowledge in New Situations.	**Reconcile**	Make consistent / compatible with another.
		Graph	Represent by graphs.
		Assess	Determine the value, nature, ability or quality.
		Solve	Find solutions through calculations and/or explanation.
		Prepare	Make or get ready for a particular purpose.
		Demonstrate	Prove or exhibit with examples.
		Calculate	Ascertain or reckon with mathematical computation.
		Apply	Put to practical use.

Level of Competency	Description	Action Verbs	Verb Definitions
Analysis (4)	Draw Connections Among Ideas and Solve Problems.	**Communicate**	Share or exchange information.
		Outline	Make a summary of significant features.
		Contrast	Examine to show differences.
		Compare	Examine to discover similarities.
		Discuss	Examine in detail by arguments.
		Differentiate	Constitute a difference that distinguishes something.
		Analyze	Examine in details to find the solution or outcome.

FORMULAE SHEETS

Mathematical Fundamentals:

Quadratic equation:

The solutions of a quadratic equation, $ax^2 + bx + c = 0$ is given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Arithmetic sequence:

Term of an arithmetic sequence:

$T_n = a + (n - 1)\, d$

The sum of first n terms of an AP:

$$S = \frac{n}{2}\{2a + (n-1)d\}$$

Geometric sequence:

The term of a geometric sequence,

$T_n = ar^{n-1}$

The sum of first n terms of a GP:

$$S = a\,\frac{\{r^n - 1\}}{\{r-1\}} \quad \text{if} \quad r > 1$$

$$S = a\,\frac{\{1-r^n\}}{\{1-r\}} \quad \text{if} \quad r < 1$$

$$S = na \quad \text{Otherwise} \quad r = 1$$

Quantitative Finance:

Simple interest:

$S = X\,(1 + nr)$

Compound Interest:

$S = X\,\{1 + r\}^n$

Discounting:

$$\text{Present Value} = \text{Future Value} \times \frac{1}{(1+r)^n}$$

Repayment of mortgage / Loan:

$$A = \frac{SR^n(R-1)}{\{R^n - 1\}}$$

Effective Interest Rate:

$EIR = \{(1 + r)^n - 1\}\,100\%$

Numerical Descriptive Measures:

Mean $\bar{x}$:

For ungrouped data: $\frac{\sum x}{n}$

For grouped data: $\frac{\sum fx}{\sum f}$

Median:

For Ungrouped data $M_d = \frac{(n+1)^{th}}{2}$ term

For Grouped data $M_d = L_1 + \left(\frac{\frac{n}{2} - F_c}{f_m}\right) \times C$

Mode:

Grouped data $M_0 = L_1 + \frac{\Delta_1}{\Delta_1 + \Delta_2} \times C$

Standard deviation σ:

For ungrouped data:

$$\sqrt{\frac{\sum(x - \bar{x})^2}{n}} \quad \text{or} \quad \sqrt{\frac{\sum x^2}{n} - \bar{x}^2}$$

For grouped data:

$$\sqrt{\frac{\sum f(x - \bar{x})^2}{\sum f}} \quad \text{or} \quad \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$$

Coefficient of variation (CV):

$$\frac{Standard\ deviation}{Mean} = \frac{\sigma}{\bar{x}} \times 100$$

$$\text{Coefficient of skewness} = \frac{3(\text{Mean} - \text{Median})}{\text{Standard Deviation}}$$

Comparing Two Quantitative Variables:

Correlation coefficient (r):

$$\frac{[n\sum xy - \sum x \sum y]}{\sqrt{\{[n\sum x^2 - (\sum x)^2] \times [n\sum y^2 - (\sum y)^2]\}}}$$

Regression line under least square method (a and b):

$$b = \frac{[n\sum xy - \sum x \sum y]}{[n\sum x^2 - (\sum x)^2]}$$

$a = \bar{y} - b\bar{x}$

Comparison over time with Economic variables

Index Numbers:

Price Relative $= \frac{p_1}{p_0} \times 100$

Quantity Relative $= \frac{q_1}{q_0} \times 100$

Value Relative $V_{1/0} = \frac{p_1 q_1}{p_0 q_0} \times 100$

Simple aggregate price index $= \frac{\sum p_1}{\sum p_0} \times 100$

Simple aggregate quantity index $= \frac{\sum q_1}{\sum q_0} \times 100$

Average price relative $= \frac{1}{n} \sum \frac{p_1}{p_0} \times 100$

Average quantity relative $= \frac{1}{n} \sum \frac{q_1}{q_0} \times 100$

Weighted aggregate indices

1) Base-weighted / Laspeyre's:

   Price index $= \frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$

   Quantity index $= \frac{\sum q_1 p_0}{\sum q_0 p_0} \times 100$

2) Current-weighted / Paasche's:

   Price index $= \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$

   Quantity index $= \frac{\sum q_1 p_1}{\sum q_0 p_1} \times 100$

3) Using standard weights

   Price index $= \frac{\sum p_1 w}{\sum p_0 w} \times 100$

   Quantity index $= \frac{\sum q_1 w}{\sum q_0 w} \times 100$

Weighted average of relatives

Price index $= \frac{\sum [w \times I_p]}{\sum w} \times 100$

Quantity index $= \frac{\sum [w \times I_q]}{\sum w} \times 100$

Time Series:

Multiplicative Model

$Y = T \times S \times C \times R$

Sets and Probability

$\cup$ - Union; A∪B defines all elements in A plus all elements in B, no element being counted twice.

$\cap$ - Intersection; A∩B defines all elements included in both A and B.

P (A) – Probability of event A
P (A/B) – Probability of event A, given B

General rules:

P (A∪B) = P (A) + P (B) – P (A∩B)

$P(A/B) = \frac{P(A \cap B)}{P(B)}$

Expectation and Variance of a discrete random variable:

$E(X) = \sum(probability \times pay\ off) = \sum p \times x$

$VAR(X) = \sum px^2 - (\sum px)^2$

Normal Distribution:

$Z = \frac{x - \mu}{\sigma}$