ASSOCIATION OF ACCOUNTING TECHNICIANS

OF SRI LANKA

CURRICULUM 2025

PILOT PAPER

Level 01

1902 - BUSINESS MATHEMATICS AND STATISTICS (BMS)

A publication of the Education and Training Division

Association of Accounting Technicians of Sri Lanka
1902-Business Mathematics and Statistics (BMS)
Pilot Paper

Instructions to Candidates (Please Read Carefully)

Time Allowed:

Writing : 03 hours

Structure of Question Paper:

- This paper consists of three Sections: Section A, Section B and Section C.
- All the questions of Section A, Section B and Section C should be answered.

Marks:

- Allocation of marks for each section:

Section	Marks
Section A	40
Section B	40
Section C	20
Total	**100**

- Marks for each question are shown with the question.
- The pass mark for this paper is 50%.

Answers:

- All answers should be written in the booklet provided, answers written on the question paper will not be considered for marking.
- Begin your answer of each question on a new page.
- All workings should be clearly shown.
- Do not write on the Margins.

Answer Booklets:

- Instructions are shown on the front cover of each answer booklet.

Calculators:

- Candidates may use any calculator except those with the facility for symbolic algebra and differentiation. No programmable calculators are allowed.

Attached:

- Action verb checklist – 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 checklist.

Objective Test Questions (OTQs)

Fifteen (15) compulsory questions
(Total = 40 marks)

SECTION A

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 Factorize and simplify.

$$2a^2 + a - 10$$

(1) $(a - 2)(2a + 5)$ (2) $(2a - 2)(a + 5)$ (3) $(2a + 2)(a - 5)$ (4) $(a + 2)(2a - 5)$

(03 marks)

1.2 Concrete is made by mixing cement, sand, and water in the ratio 1:4:3 respectively. Sand needed to make 160 kg of concrete mix would be:

(1) 20 kg (2) 40 kg (3) 60 kg (4) 80 kg

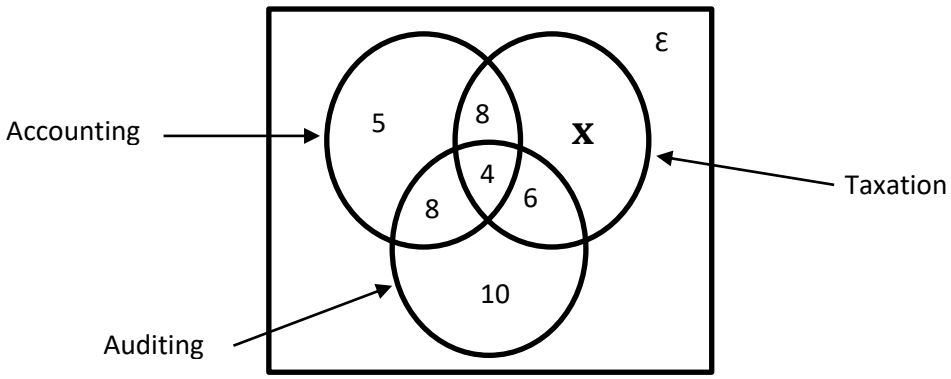
(03 marks)

1.3 A commercial bank offers interest at 12% per annum for their fixed deposits. If the interest is compounded bi-annually, the Effective Interest Rate (EIR) would be:

(1) 11.50% (2) 12.00% (3) 12.36% (4) 13.47%

(03 marks)

1.4 A well-known audit firm conducted an entrance examination, consisting of three subjects namely Accounting, Auditing, and Taxation, to recruit an Audit Officer for their firm. Fifty (50) candidates passed these subjects and the details are shown in the following Venn Diagram:



Based on the above information, the number of candidates who passed the Taxation subject would be:

(1) 18 (2) 27 (3) 28 (4) 41

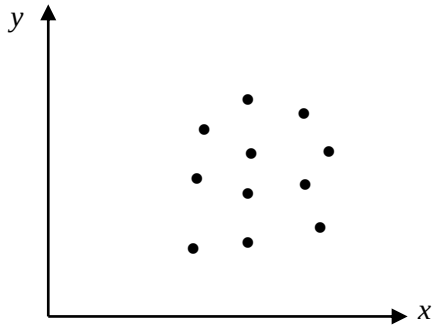
(03 marks)

1.5 **Mr. Perera** rented out his land for 5 years for Rs.50,000/- per year. The rental is directly remitted to **Mr. Perera's** bank account of by the tenant at the beginning of each year. If the bank pays 8% interest per annum for this account, the present value of the rent received at the end of 5^{th} year would be *(approximately)*:

(1) Rs.205,420/- (2) Rs.210,480/- (3) Rs.214,500/- (4) Rs.215,600/-

(03 marks)

1.6 The following graph shown the correlation between the variables x and y:



The coefficient of correlation of the above graph would be:

(1) r = + 0.9 (2) r = - 0.9 (3) r = + 0.5 (4) r = 0

(03 marks)

1.7 **ABC (Pvt) Ltd.** is engaged in manufacturing and selling wooden furniture. The Total Revenue Function (TR) and the Total Cost Function (TC) of the company for the last week are given as:

$TR = 4{,}000q - 2q^2$ and $TC = 2{,}000q + 250{,}000 - 2q^2$ respectively.

Based on the above information, the Break-Even Quantity (in units) would be:

(1) 150 units (2) 200 units (3) 125 units (4) 4,000 units

(03 marks)

1.8 You are given the following information with reference to the marks obtained by Grade 10 students in the mathematics examination:

Mean	48.6
Median	39
Standard Deviation	39.5

Based on the above information, the coefficient of skewness is:

(1) 0.85 (2) 0.73 (3) 0.65 (4) 0.50

(03 marks)

1.9 The summary of statistics relating to the price (x) and demand (y) of a product is as follows:

$$\sum x = 54, \quad \sum y = 100, \quad \sum xy = 516 \quad \sum x^2 = 652, \quad \sum y^2 = 2664 \quad n = 6$$

Based on the above information, the Pearson's correlation coefficient between "x" and "y" of the above product would be:

(1) + 0.8572 (2) − 0.8304 (3) − 0.9437 (4) + 0.9441

(03 marks)

1.10 The following details are extracted from the books of **ABC Ltd** in relation to quarterly sales (in units) of a **product X** for the year 2024:

	Q1	**Q2**	**Q3**
Sales Units	1600	4800	1960
Seasonal Variation	-20%	+100%	-30%

The trend value of the sales for the 1st quarter of 2024 would be:

(1) 2,400 (2) 2,200 (3) 2,000 (4) 1,800

(03 marks)

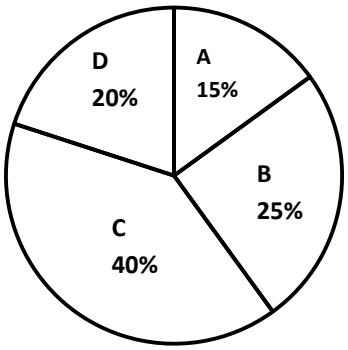
Write the answers for question No. 1.11 to 1.13 in your answer booklet with the number assigned to the question.

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) Descriptive statistics	(1) It is a type of inferential statistics.
(B) Future Value	(2) It helps reduce the risk of relying on biased options or faulty assumptions.
(C) Data-Driven Decision-Making	(3) This involves summarizing data using measures like mean, median, mode, standard deviation, and variance.
(D) Hypothesis testing	(4) It refers to what money is expected to be worth in the future.

(01 mark each, 04 marks)

1.12 A survey of 800 applicants who applied for a job opportunity at a popular company in Sri Lanka revealed that they had obtained degrees from one of four universities: **A, B, C** or **D**. The percentages of these job applicants from each university are shown in the pie chart below.



Using the above pie chart,

Calculate the difference between the number of applicants who graduated from university **A** and **B**. (02 marks)

1.13 Identify two (02) statistical tools used for decision making in business. (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 If A and B are the mutually Exclusive Events, then n (A∩B) = 0. (01 mark)

1.15 Times series analysis will not assist with future planning. (01 mark)

(Total 40 marks)

End of Section A

Short Scenario Questions (SSQs)
Four Compulsory questions
Answer all questions
(Total = 40 marks)

SECTION B

Question 02

(a) **Silva** intends to deposit Rs.500,000/- in a fixed deposit with a commercial bank that offers interest at a rate of 10% per annum compound bi-annually. However, since he only had Rs.400,000/- in hand, he borrowed Rs.100,000/- from his friend **Sunil** at 6% simple interest per annum and deposited a total of Rs.500,000/- in that bank.

You are required to:

(i) **Calculate** the amount of interest received by **Silva** at the end of 2 years from the fixed deposit**.** (02 marks)

(ii) **Calculate** the amount of interest that **Silva** will pay to **Sunil** over 2 years. (02 marks)

(b) One of your friends, **Ashoka** seeks your advice on investing in a project. Suppose you have obtained the following information from him in order to advise him.

- Investment amount – Rs.100,000/-
- Cash inflows for the first year – Rs.30,000/-
  for the second year – Rs.35,000/-
  for the third year – Rs.40,000/-

The discounting factor (cost of capital) of the company is 15% per annum.

You are required to:

(i) **Calculate** the Net Present Value (NPV) of the project. (02 marks)

(ii) **State** your advice to **Ashoka**. (01 mark)

(c) **Satham** is the owner of an electronic equipment shop. He sold a laptop to one of his customers for Rs.200,000/-. The customer paid Rs.34,250/- and promised to pay the remaining amount with 17% interest per annum, in 3 equal annual installments of Rs.75,014.09 each, payable at the end of each year.

You are required to:

Prepare the amortization schedule to illustrate the repayments of the customer until the loan is fully settled. (03 marks)

(Total 10 marks)

Question 03

(a) A bag contains 6 red marbles and 4 green marbles. All marbles are of equal size.

(i) **Calculate** the probability that a randomly drawn marble from the bag is red. (02 marks)

(ii) If the first marble is drawn from the bag and its colour is marked without not putting it back to the bag and then the second marble is drawn.

(a) **Present** the above data in a tree diagram. (02 marks)

(b) **Calculate** the probability that both marbles are of the same colour. (02 marks)

(c) **Calculate** the probability that both marbles drawn are of different colours. (02 marks)

(b) The heights of dancers of a dancing group may be modeled by a normal distribution with a mean 150 cm and standard deviation 4.2 cm.

You are required to:

Determine the probability that a randomly selected dancer from the group will have a height less than 140 cm. (02 marks)

(Total 10 marks)

Question 04

(a) The following table shows the marks obtained by 50 students in a computer examination conducted by the **High Tech Ltd.**:

Marks	40 - 49	50 - 59	60 - 69	70 - 79	80 - 89	90 – 99
No. of Students (*f*)	4	6	18	10	8	4

Using the above data,

You are required to:

Calculate the following;

(i) Mode (02 marks)

(ii) Mean (02 marks)

(iii) Standard Deviation (03 marks)

(b) The following table shows the weights of 100 students:

Weight (kg)	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
No. of students (*f*)	12	16	28	24	20

Prepare a histogram of weights to represent the above data. (03 marks)

(Total 10 marks)

Question 05

(a) **Mala** bought 20 pencils and 30 books for Rs.4,600/- and **Geetha** bought 50 pencils and 20 books for Rs.3,800/- to donate to an orphanage. There were 37 children in the orphanage and child was given 1 pencil and 1 book.

You are required to:

(i) **Calculate** the price of a pencil and a book. (04 marks)

(ii) **Calculate** the total cost of pencils and books remained after the distribution. (02 marks)

(b) Consider the following inequalities:

$$2x + 4y \leq 8, \qquad 6x + 3y \leq 18, \qquad x, y \geq 0$$

You are required to:

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

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

(Total 10 marks)

End of Section B

Medium-sized Scenario Question (MSQ)
One question which carries 20 marks.
Answer ALL parts of the question
(Total = 20 marks)

SECTION C

Question 06

(A) (a) **Arun** deposits Rs.30,000/- in his savings account at the beginning of each year and continues to do so annually. The bank offers interest rate of 10% per annum and the interest is compounded annually.

You are required to:

Calculate the total amount in the savings account at the end of 5^{th} year. (03 marks)

(b) **Leena (Pvt) Ltd.** is a well-known manufacturing company in Sri Lanka. It has a forecasted cash flow of Rs.15,000/- in its last forecast year, a weighted average cost of capital is 10%, and an assumed long-term growth rate is 4%.

You are required to:

Calculate the Terminal Value (TV) of **Leena (Pvt) Ltd.** (02 marks)

(B) You are given the following information related to a "**Product X**" of a manufacturing company per month. (*where 'q' is the number of units produced during the month*).

Demand function (D) = $5{,}000 - q$

Variable Cost (VC) = $2{,}000q - q^2$

Fixed Cost (FC) = 250,000

Using the above information,

You are required to:

(a) **Identify** the Total Revenue (TR) function and Total Cost (TC) function of the company per month. (03 marks)

(b) **Calculate** the number of units at which the cost is minimized. (02 marks)

(C) The following table shows the profits and advertising expenditure of a company over the last 5 years:

Profit *(x)* (Rs. million)	5	7	10	11	15
Advertising expenditure *(y)* (Rs. million)	2.1	2.4	3.4	3.5	4.2

You are required to:

(a) **Identify** the Least Squares Regression Line in the form of $y = a + bx$ that shows the relationship between the company's profit and advertising expenditure. (04 marks)

(b) **Calculate** the expected advertising expenditure to be incurred to get a profit of Rs.5 million. (01 mark)

(D) The following table shows the selling price and quantities of three products for the years 2020 and 2025 of the following items **A, B, C**:

Year / Item	2020		2025	
	Price (P_0)	**Quantity (q_0)**	**Price (P_1)**	**Quantity (q_1)**
A	10	120	12	135
B	15	142	18	150
C	18	110	25	110

Consider 2020 as the base year.

Based on the above information,

You are required to:

(a) **Calculate** the price relative of item C, considering the year 2020 as the base year. (02 marks)

(b) **Calculate** the Laspeyre's Price Index for the year 2025. (03 marks)

(Total 20 marks)

End of Section C

FORMULAE SHEETS & MATHEMATICAL TABLES

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:

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

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

$S = na$ Otherwise $r = 1$

Quantitative Finance:

Simple interest:

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

Compound Interest:

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

Discounting:

Present Value = 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 $M_d = L_1 + \left(\frac{\frac{n}{2} - F_c}{f_m}\right) X\ C$

Mode:

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

Standard deviation σ:

For ungrouped data:

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

For grouped data:

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

Coefficient of variation (CV):

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

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

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:

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

PRESENT VALUE OF Re. 1

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092
26	0.772	0.598	0.464	0.361	0.281	0.220	0.172	0.135	0.106	0.084
27	0.764	0.586	0.450	0.347	0.268	0.207	0.161	0.125	0.098	0.076
28	0.757	0.574	0.437	0.333	0.255	0.196	0.150	0.116	0.090	0.069
29	0.749	0.563	0.424	0.321	0.243	0.185	0.141	0.107	0.082	0.063
30	0.742	0.552	0.412	0.308	0.231	0.174	0.131	0.099	0.075	0.057

PRESENT VALUE OF Re. 1

(Continued)

Period	*11%*	*12%*	*13%*	*14%*	*15%*	*16%*	*17%*	*18%*	*19%*	*20%*
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026
21	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.022
22	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018
23	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015
24	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013
25	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010
26	0.066	0.053	0.042	0.033	0.026	0.021	0.017	0.014	0.011	0.009
27	0.060	0.047	0.037	0.029	0.023	0.018	0.014	0.011	0.009	0.007
28	0.054	0.042	0.033	0.026	0.020	0.016	0.012	0.010	0.008	0.006
29	0.048	0.037	0.029	0.022	0.017	0.014	0.011	0.008	0.006	0.005
30	0.044	0.033	0.026	0.020	0.015	0.012	0.009	0.007	0.005	0.004

CUMULATIVE PRESENT VALUE OF Re. 1

This table shows the present value of Re. 1 per annum, receivable or payable at the end of each year for n years

Period	*1%*	*2%*	*3%*	*4%*	*5%*	*6%*	*7%*	*8%*	*9%*	*10%*
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.292	8.649
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.442	8.772
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.580	8.883
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.707	8.985
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077
26	22.795	20.121	17.877	15.983	14.375	13.003	11.826	10.810	9.929	9.161
27	23.560	20.707	18.327	16.330	14.643	13.211	11.987	10.935	10.027	9.237
28	24.316	21.281	18.764	16.663	14.898	13.406	12.137	11.051	10.116	9.307
29	25.066	21.844	19.188	16.984	15.141	13.591	12.278	11.158	10.198	9.370
30	25.808	22.396	19.600	17.292	15.372	13.765	12.409	11.258	10.274	9.427

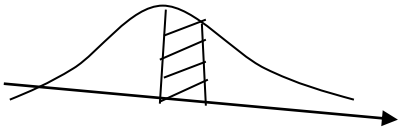
CUMULATIVE PRESENT VALUE OF Re. 1

(Continued)

	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870
21	8.075	7.562	7.102	6.687	6.312	5.973	5.665	5.384	5.127	4.891
22	8.176	7.645	7.170	6.743	6.359	6.011	5.696	5.410	5.149	4.909
23	8.266	7.718	7.230	6.792	6.399	6.044	5.723	5.432	5.167	4.925
24	8.348	7.784	7.283	6.835	6.434	6.073	5.746	5.451	5.182	4.937
25	8.422	7.843	7.330	6.873	6.464	6.097	5.766	5.467	5.195	4.948
26	8.488	7.896	7.372	6.906	6.491	6.118	5.783	5.480	5.206	4.956
27	8.548	7.943	7.409	6.935	6.514	6.136	5.798	5.492	5.215	4.964
28	8.602	7.984	7.441	6.961	6.534	6.152	5.810	5.502	5.223	4.970
29	8.650	8.022	7.470	6.983	6.551	6.166	5.820	5.510	5.229	4.975
30	8.694	8.055	7.496	7.003	6.566	6.177	5.829	5.517	5.235	4.979

AREA UNDER THE STANDARD NORMAL CURVE

This table gives the area under the normal curve between the mean and a point of Z score above the mean. The corresponding area for deviations below the mean can be found by symmetry



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2995	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.49977	0.49978	0.49978	0.49979	0.49980	0.49981	0.49981	0.49982	0.49983	0.49983

End of Paper

Action Verbs Check List

Level	Action Verb	Definition	Detailed Instructions for Students
REMEMBER Recalling facts, terms, basic concepts, or answers without necessarily understanding what they mean.	Identify	Recognition of someone or something.	Find and name key parts of the topic.
	Define	Meaning of a word or concept.	Provide a clear meaning of a term or concept.
	Recognise	Awareness of something seen before.	Spot and acknowledge something from previous learning.
	State	Clear and concise expression of information.	Express key facts or concepts in a straightforward way.
	List	A series of names, numbers, or items.	Write down key points in an organized manner.
	Record	Entry of details into a system (not accounting).	Enter relevant details clearly and accurately.
UNDERSTAND Comprehending the meaning of informational materials and being able to interpret or explain it.	Construct	Formation of something by combining elements.	Bring together different parts into a meaningful whole.
	Differentiate	Recognition of differences between two or more things.	Highlight distinctions between concepts or items.
	Discuss	Consideration of different ideas and opinions about a topic.	Explore various perspectives and provide insights.
	Explain	Clarification of something in greater detail.	Provide a logical and detailed description.
	Illustrate	Use of examples, charts, or visuals to clarify a point.	Support explanations with appropriate examples or visuals.
	Interpret	Explanation of the meaning of information or actions.	Explain what something means in your own words.
	Describe	A detailed account of something.	Provide relevant details in a structured manner.
	Summarise	A brief statement of the main points.	Present key information concisely.
APPLY Using learned material in new and concrete situations. It requires the practical application of knowledge and skills.	Apply	Use of knowledge, skills, or rules in a situation.	Utilise relevant knowledge or techniques to achieve an outcome.
	Calculate	Determination of a value through mathematical or logical methods.	Use numerical or logical processes to reach a solution.
	Determine	Establishment of something through research or calculation.	Find out or conclude something after calculation or research.
	Demonstrate	Display of a process or method.	Show a clear example through structured steps.
	Prepare	Organisation of materials or information for use.	Arrange necessary details before engaging in a task.
	Use	Application of a concept, tool, or method for a purpose.	Implement relevant knowledge or resources appropriately.
	Present	Sharing of information effectively.	Deliver key insights clearly and professionally.

Level	Action Verb	Definition	Detailed Instructions for Students
ANALYSE 1Breaking down information into its components to understand its structure and relationships.	Analyse	Detailed examination of something to understand its components.	Break down information into key parts for better understanding.
	Compare	Examination of similarities and/or differences.	Point out the key commonalities and distinctions.
	Distinguish	Recognition of unique characteristics.	Identify what makes things different from each other.
	Examine	Inspection of something to determine its nature.	Look at something closely to understand it better.
	Outline	Summary of the main points.	Provide an organised overview of key aspects.
	Conduct	Organisation of elements for an experiment, survey, or study.	Follow structured steps to carry out a task systematically.
	Report	Structured presentation of findings.	Present analysed information in a clear and logical format.
EVALUATE Making judgments about the value or quality of ideas or materials based on criteria or standards.	Advise	Offering of suggestions or recommendations.	Provide informed guidance based on analysis.
	Evaluate	Critical assessment of value, effectiveness, or impact.	Judge the quality or relevance of something based on criteria.
	Formulate	Development of a structured approach or plan.	Create a well-defined method or strategy.
	Recommend	Suggestion of a suitable course of action.	Propose an approach backed by logical reasoning.
CREATE Combining elements in novel ways to form a coherent or functional whole; the ability to generate new ideas, products, or ways of understanding.	Create	Generation of something new.	Develop something original and purposeful.
	Assess	Estimation or evaluation of quality, ability, or nature.	Provide a reasoned judgment based on available information.
	Develop	Expansion or refinement of an idea, product, or concept.	Strengthen and improve an idea over time.
	Propose	Suggestion of a plan or concept for consideration.	Present an idea or structured recommendation.
	Synthesis	Combination of different elements to form a coherent whole.	Integrate multiple ideas or insights into a meaningful conclusion.
	Design	Creation of a structured plan for something	Formulate a detailed structure for a product or process.
	Compile	Assembly of information from various sources.	Organise collected data into a comprehensive format.

ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

CURRICULUM 2025

SUGGESTED ANSWERS

Level 01

1902 - BUSINESS MATHEMATICS AND STATISTICS (BMS)

A publication of the Education and Training Division

Objective Test Questions (OTQs)
(Total 40 marks)

SECTION A

Answers for Question 01

1.1 $2a^2 + a - 10$
$= 2a^2 - 4a + 5a - 10$
$= 2a(a - 2) + 5(a - 2)$
$= \boldsymbol{(a - 2)(2a + 5)}$ **…….. Ans (1)**

1.2 Cement : Sand : Water
1 : 4 : 3

Sand $\frac{4}{8} \times 160 =$ **80 kg**. **…….. Ans (4)**

1.3 Effective Interest Rate $= P\left(1 + \frac{r}{n}\right)^{nt}$

$= 1\left(1 + \frac{0.12}{2}\right)^{1\times 2}$

$= 1.1236 - 1$

$= 0.1236$

$= \mathbf{12.36\%}$ **…….. Ans (3)**

1.4 5 + 8 + 4 + 8 + 6 + 10 + X = 50
X = 9
The number of candidates who passed the taxation subject
= 8 + 4 + 6 + X
= 8 + 4 + 6 + 9
= **27** **…….. Ans (2)**

1.5 Present Value (PV) = A × (1 + *C.D.F.*(r%, (n-1) years)
= 50,000 x [1 + C.D.F. (8%, 4 years)]
= 50,000 x [1 + 3.312]
= 215,600 **…….. Ans (4)**

OR

PV = $50{,}000 \times \frac{[1 - (1 + 0.08)^{-5}]}{0.08}$

= $50{,}000 \times 3.992^{7} \times 1.08$

= 215,606.342

1.6 r = 0 **…….. Ans (4)**

1.7 At Break-even point,

TR = TC

$4000q - 2q^2 = 2000q + 250000 - 2q^2$

$2000q = 250{,}000$

q = 125 units **…….. Ans (3)**

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

$= 3 \times \frac{(48.6-39)}{39.5}$

$= 3 \times \frac{(48.6-39)}{39.5}$

$= \mathbf{0.73}$ **…….. Ans (2)**

1.9 $r = \frac{n\sum xy - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2][n\sum y^2 - (\sum y)^2]}}$

$r = \frac{(6 \times 516) - (54 \times 100)}{\sqrt{[(6 \times 652) - (54 \times 54)][6 \times 2664 - 100 \times 100]}}$

$r = \frac{3096 - 5400}{\sqrt{[3912 - 2916][15984 - 10000]}}$

$r = \frac{-2304}{\sqrt{[996][5984]}}$

$r = \frac{-2304}{2441.32}$

$r = -0.9437$ **…….. Ans (3)**

1.10 Trend value for 1st quarter = Y/S

= 1600/0.8

= 2,000 units **…….. Ans (3)**

1.11 **(A)** – (3)

(B) – (4)

(C) – (2)

(D) – (1)

1.12 A ➡ $\frac{15}{100} \times 800$ = **120**

B ➡ $\frac{25}{100} \times 800$ = **200**

Difference between **A** and **B** = 200 – 120 = 80

1.13 (1) Regression Analysis.

(2) Hypothesis Testing.

(3) Forecasting Models.

(4) Probability Analysis.

(5) ANOVA.

(6) Time Series Analysis.

1.14 True

1.15 False

End of Section A

Short Scenario Questions (SSQs)
Four Compulsory questions

Answer all questions.
Total = 40 marks.

SECTION B

Answers for Question 02

Unit 2	–	**Financial Mathematics for Business.**
Learning outcomes	-	Calculate both simple and compound interest based on given parameters.
	-	Calculate the effective interest rate considering compounding periods per year, facilitating accurate interest rate comparisons.
	-	Calculate the net present value (NPV) of cash flows by subtracting the present value of cash outflows from the present value of cash inflows and interpret the NPV results to make investment decisions.
	-	Prepare a loan amortization schedule that outlines the periodic payments, interest, principal repayments, and outstanding loan balances over the loan term.

(a) **(i)** $S = X(1+r)^n$

$= 500{,}000\ (1 + \frac{0.1}{2})^{2\times2}$

$= 500{,}000 \times (1.05)^4$

$= 607{,}753.125$

$\cong$ Rs. 607,753

The amount of interest that the bank will pay to **Silva** = 607,753 – 500,000

= **Rs. 107,753/-.**

(ii) $I = Pnr$

$= 100{,}000 \times 2 \times 0.06$

$= 12{,}000$

The amount of interest that **Silva** will pay to **Sunil = Rs. 12,000/-.**

(b) **(i)**

Year	Cash follow	Discounting Factor (15%)	Present Value
0	(100,000)	1	(100,000)
1	30,000	0.870	26,100
2	35,000	0.756	26,460
3	40,000	0.658	26,320
		NPV	**– 21,120**

(ii) NPV < 0, **Not recommended** to invest on this project.

(c)

Year	Balance as at beginning of the year	Interest to be paid @ 17% per annum	Installment	Balance as at end of year
1	165,750	28,177.50	75,014.09	118,913.41
2	118,913.41	20,215.27	75,014.09	64,114.60
3	64,114.60	10,899.48	75,014.09	-

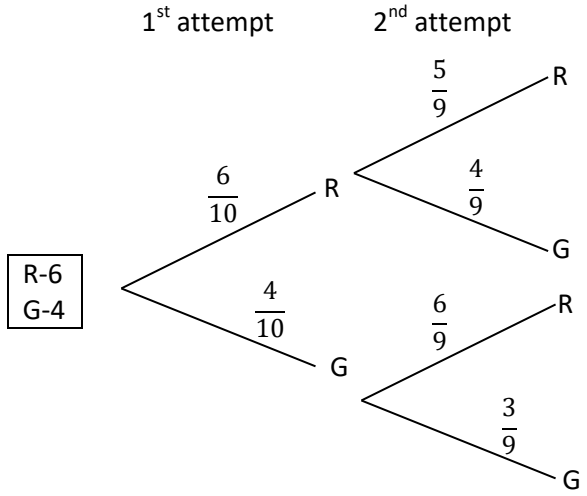
Answers for Question 03

Unit 6 – Probability and Its Applications

Learning outcomes –
- Calculate probabilities of events using basic probability, basic tree diagrams and basic Venn diagrams, considering both simple and conditional probabilities.
- Identify the normal distribution as a symmetric bell-shaped curve characterized by its mean and standard deviation.
- Calculate probabilities associated with standard normal distribution using z-scores and the standard normal distribution table

(a)

(i) $\frac{6}{10}$



(ii) **(a)** $P_{(RR)} + P_{(GG)} = \frac{6}{10} \times \frac{5}{9} + \frac{4}{10} \times \frac{3}{9}$

$= \frac{30}{90} + \frac{12}{90}$

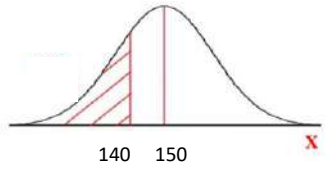
$= \mathbf{\frac{42}{90}}$

(b) $P_{(RG)} + P_{(GR)} = \frac{6}{10} \times \frac{4}{9} + \frac{4}{10} \times \frac{6}{9}$

$= \frac{24}{90} + \frac{24}{90}$

$= \mathbf{\frac{48}{90}}$

(b)



$Z = \frac{140 - 150}{4.2} = -2.3809$

$P(X < 140) = P(Z < -2.38) = (P > 2.38)$

$= 0.5 - 0.4913$

$= 0.0087$

$= \mathbf{0.87\%}$

Answers for Question 04

Unit 4	–	**Data Presentation and Descriptive Measures.**
Learning outcomes	–	Prepare a frequency distribution table and/or histogram to organize and display data, showing the frequency of values or intervals within a data set.
	–	Calculate the mean, median, and mode of data sets to determine central tendencies and interpret their significance in business decisionmaking, such as assessing average performance or identifying typical values.

(a) (i) Mode class = 60 - 69

$$\text{Mode} = L_{(MO)} + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2}\right) C_{(MO)}$$

$$= 59.5 + \left(\frac{18-6}{(18-6)+(18-10)}\right) \times 10$$

$$= 59.5 + \left(\frac{12}{12+8}\right) \times 10$$

$= \mathbf{65.5}$

Marks	Mid-point (x)	No. of Students (f)	fx	fx^2
40 – 49	44.5	4	178	7,921.0
50 – 59	54.5	6	327	17,821.5
60 – 69	64.5	18	1,161	74,884.5
70 – 79	74.5	10	745	55,502.5
80 – 89	84.5	8	676	57,122.0
90 – 99	94.5	4	378	35,721.0
		$\Sigma f = 50$	$\Sigma fx = 3{,}465$	$\Sigma fx^2 = 248{,}972.5$

(ii) Mean = $\frac{\Sigma fx}{\Sigma f} = \frac{3465}{50}$ = **69.3**

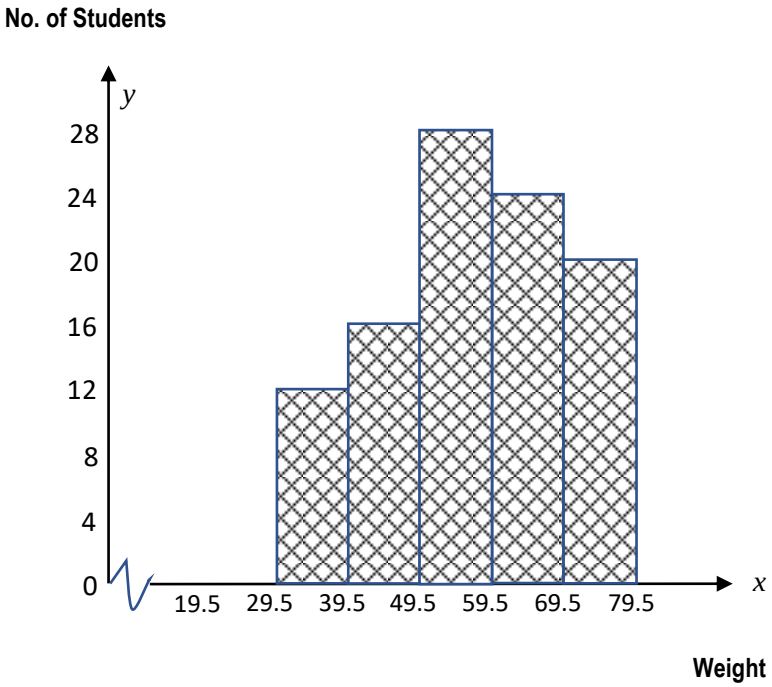
(iii) Standard Deviation = $\sqrt{\frac{\Sigma fx^2}{\Sigma f} - \bar{x}^2} = \sqrt{\frac{248{,}972.5}{50} - 69.3^2}$

$= \sqrt{4{,}979.45 - 4{,}802.49}$

$= \sqrt{176.96}$

$= \mathbf{13.3}$

(b)



Answers for Question 05

Unit 1	–	**Basic Mathematics for Business.**
Learning outcomes	–	Identify and determine the quantitative variable(s) involved in business scenarios.
	–	Describe inequalities and prepare graphical representations to identify and inequalities relevant to business contexts.

(a) (i) Assume that, Price of a Pencil – x, and Price of a book – y.

$20x + 30y = 4600$ ---------- (1)

$50x + 20y = 3800$ ---------- (2)

(1) x 2, $40x + 60y = 9{,}200$ ---------- (3)

(2) x 3, $150x + 60y = 11{,}400$ ---------- (4)

(4) – (3), $110x = 2{,}200$

$$x = 20.$$

Substitute $x = 20$ in eq^{n}. (1),

$20 \times 20 + 30y = 4600$

$30y = 4600 - 400$

$30y = 4200$

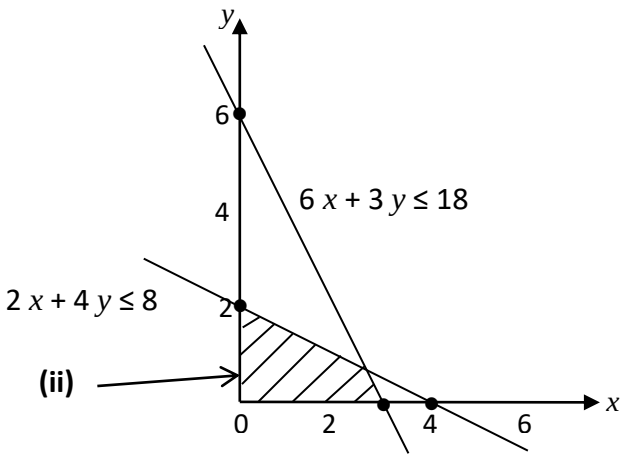
$$y = 140$$

(ii) Price of a Pencil = Rs.20/-

Price of a Book = Rs.140/-

Cost of remaining pencils (70 – 37) 20	=	660
Cost of remaining Books (50 – 37) 140	=	1,820
Cost of remaining pens & Books	**=**	**2,480**

(b) (i)



$2x + 4y \leq 8$

$x + 2y = 4$

if $x = 0$ $\underline{\boldsymbol{y = 2}}$

$6x + 3y = 18$

$2x + y = 6$

If $x = 0$, $\underline{\boldsymbol{y = 6}}$

$2x + y = 6$

$y = 0$

$2x = 6$

$\underline{\boldsymbol{x = 3}}$

$x + 2y = 4$

$y = 0$, $x = 4$

End of Section B

Medium-sized Scenario Question (MSQ)
One question which carries 20 marks.
(Total = 20 marks)

SECTION C

Answers for Question 06

Unit 2	–	**Financial mathematics for Business.**
Unit 3	–	**Financial Operative Measures for Business.**
Unit 5	–	**Comparing Two Quantitative Variables.**
Unit 7	–	**Index Numbers and Time series Analysis.**
Learning outcomes	–	Calculate the terminal value of investment plans based on projected cash flows and growth rates and the required size of investment to achieve specific terminal values.
	–	Calculate the present value of an infinite series of equal cash flows received or paid at regular intervals, applying appropriate discounting techniques.
	–	Identify linear and quadratic functions.
	–	Calculate the profit maximizing or cost minimizing output level and price.
	–	Identify the regression line, which represents the best-fit line through a scatter plot, using either the free-hand method or the least square method to minimize the sum of squared residuals and explain regression analysis outputs..
	–	Identify price and quantity relatives to measure changes in prices and quantities over time.
	–	Calculate simple aggregate indices by summing price relatives and weighted aggregate indices by considering both price and quantity weights and interpret these indices to assess changes in overall prices or quantities relative to a base period.

(A) (a) $S_n = \frac{AR(R^n-1)}{R-1}$ Here, R = r + 1

$$S_n = \frac{30{,}000 \times 1.1[(1.1)^5 - 1]}{1.1 - 1}$$

$$S_n = \frac{30{,}000 \times 1.1[(1.1)^5 - 1]}{1.1 - 1}$$

$$S_n = \mathbf{201{,}468.30}$$

i.e. the total amount that will be in the account at the end of 5 years is Rs.201,468.30

(b) Terminal value (TV) = $\frac{[FCF*(1+g)]}{d-g}$

Here, FCF – Forecasted Cash Flow

d – discount rate (weighted average cost of capital)

g – Perpetuity terminal growth rate

Terminal Value = $\frac{[15{,}000 \times (1+4\%)]}{0.10-0.04}$

Terminal Value = $\frac{15{,}000 \times 1.04}{0.10-0.04} = \frac{15{,}600}{0.06}$ **Rs.260,000/-**

(B) (a) Total Revenue (TR) function = $(5{,}000 - q) \times q$

$= 5{,}000q - q^2$

Total Cost (TC) function = Variable Cost + Fixed Cost

$= 2{,}000q - q^2 + 250{,}000$

(b) TC = $2{,}000q - q^2 + 250{,}000$

$\frac{d(TC)}{dq} = 2000 - 2q$

When cost is minimized, $\frac{d(TC)}{dq} = 0$

$2000 - 2q = 0$

$2q = 2000$

$q = 1000$ units.

(C) (a)

x	y	xy	x^2
5	2.1	10.5	25
7	2.4	16.8	49
10	3.4	34	100
11	3.5	38.5	121
15	4.2	63	225
48	**15.6**	**162.8**	**520**

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

$$b = \frac{(5 \times 162.8) - (48 \times 15.6)}{(5 \times 520) - (48 \times 48)}$$

$$= \frac{814 - 748.8}{2{,}600 - 2{,}304}$$

$$= \frac{65.2}{296}$$

b = 0.2202

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

$$a = \frac{15.6}{5} - 0.2202 \times \frac{48}{5}$$

$$a = 3.12 - 2.114$$

$$a = 1.006 \cong 1.006$$

Regression Line --- $y = 1.006 + 0.2202x$

(b)

$$y = 1.006 + 0.2202\ x\ 5$$

$$y = 2.107$$

Expected Advertising Expenditure = **Rs.2,107,000/-**

(D) **(a)** Price relative = $\frac{25}{18}$ x 100%

= **<u>139%</u>**

(b)

Item	(P_0)	(q_0)	(P_1)	(q_1)	P_1q_0	P_0q_0
A	10	120	12	135	1,440	1,200
B	15	142	18	150	2,556	2,130
C	18	110	25	110	2,750	1,980
					ΣP_1q_0 = 6,746	ΣP_0q_0 = 5,310

Laspeyre's Price Index = $\frac{\Sigma P1q0}{\Sigma P0q0} \times 100\%$

= $\frac{6746}{5310} \times 100\%$

= $\underline{127.04\%}$

End of Section C