



Association of Accounting Technicians of Sri Lanka

AA1 Examination - January 2019

**Questions and Suggested Answers
Subject No. (AA 12)**

**QUANTITATIVE METHODS FOR BUSINESS
(QMB)**

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THE ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

EDUCATION AND TRAINING DIVISION

AA1 Examination - January 2019
(AA12) Quantitative Methods for Business

SUGGESTED ANSWERS

SECTION – A

Fifteen (15) compulsory questions

(Total 40 marks)

Suggested Answers to Question One:

1.1 (Chapter 01 - Mathematical Fundamentals)

$$5X + 7 = 23 + X$$

$$4y = 16$$

$$\underline{y = 4}$$

Answer (2)

(3 marks)

1.2 (Chapter 02 - Part II - Quantitative Finance Discounting)

$$A = \frac{x[1 - (1+r)^{-n}]}{r} \quad A = 100\,000, n = 4, r = 0.18$$

$$100\,000 = \frac{x[1 - 1.18^{-4}]}{0.18}$$

$$x = \frac{100\,000 \times 0.18}{[1 - 1.18^{-4}]}$$

$$\underline{x = 37,174}$$

Answer (4)

(3 marks)

1.3 (Chapter 03 - Financial Operative Measures)

$$TR = 4,500 + 30q - 3q^2$$

$$\underline{MR = 30 - 6q}$$

Answer (1)

(3 marks)

1.4 (Chapter 02 - Part I - Quantitative Finance - Interest)

$$I = prt \quad P = 150\,000, \quad r = 12.25\% = 0.1225, \quad t = 5$$

$$I = 150\,000 \times 0.1225 \times 5$$

$$I = \underline{91,875}$$

Answer (2)

(3 marks)

1.5 (Chapter 04 - Numerical Descriptive Measures)

$$\begin{aligned} 50+52+54+56+58+60+x &= 56 \times 7 \\ 330+x &= 392 \\ x &= 392 - 330 \\ x &= \underline{62} \end{aligned}$$

Answer (2)

(3 marks)

1.6 (Chapter 05 - Comparing Two Quantitative Variables)

$$r = \frac{n \sum XY - \sum X \cdot \sum Y}{\sqrt{(n \sum X^2 - (\sum X)^2)(n \sum Y^2 - (\sum Y)^2)}}$$

$$r = \frac{12 \times 6425 - 76 \times 913}{\sqrt{(12 \times 560 - 76^2)(12 \times 75\,153 - 913^2)}}$$

$$= \underline{0.9607}$$

Answer (2)

(3 marks)

1.7 (Chapter 06 - Part I - Index Numbers)

$$\text{Price Index } (LP_{1/0}) = \frac{\sum(p_1)}{\sum(p_0)} \times 100$$

$$= \frac{1110}{900} \times 100$$

$$= 123.33$$

$$= \underline{123\%}$$

Answer (1)

(3 marks)

1.8 (Chapter 07 - Part II - Probability and its applications - II)

$$0.05 + 0.20 + 0.10 + 0.04 + X = 1.00$$

$$\underline{X = 0.25}$$

Answer (2)

(3 marks)

1.9 (Chapter 07 - Part I - Probability and its applications - I)

Answer for the English medium paper is 0.47

Answer (3)

(3 marks)

1.10 (Chapter 01 – Mathematical Fundamentals)

$$T_n = 18 - 5n$$

$$T_1 = 18 - 5 \times 1 = 13$$

$$T_2 = 18 - 5 \times 2 = 8$$

$$\underline{\underline{d = 8 - 13 = -5}}$$

Answer (4)

(3 marks)

1.11 (Chapter 02 – Part II – Quantitative Finance - Discounting)

The best project is A, NPV of project A is positive and greater than project B & C.
Therefore best project is “A “

(2 marks)

1.12 (Chapter 01 – Mathematical Fundamentals)

A's share is Rs. X

B's share is Rs. X + 10 000

C's share is Rs. 2X

$$X + X + 10\,000 + 2X = 850\,000$$

$$4X = 850\,000 - 10\,000$$

$$X = 210\,000$$

A's share is Rs. 210 000

B's share is Rs. 220 000

C's share is Rs. 420 000

(2 marks)

1.13 (Chapter 05 – Comparing Two Quantitative Variables)

These two variables have **Strong positive linear relationship**

OR

These two variables have **Strong positive relationship**

(2 marks)

1.14 (Chapter 02 – Part II – Quantitative Finance - Discounting)

Statement is true

(2 marks)

1.15 (Chapter 07 – Part I – Probability and its Applications - I)

Statement is False

(2 marks)

End of Section A

Four (04) compulsory questions.
(Total 40 marks)

Suggested Answers to Question Two:

(a)

(Chapter 02 – Part I – Quantitative Finance - Interest)

$$\begin{aligned}
 I &= prt & P &= 225\,000, r = 14\% = 0.14, t = 2 \\
 I & & &= 225\,000 \times 0.14 \times 2 \\
 I & & &= 63\,000 \\
 63\,000 + 225\,000 & & &= \underline{\underline{288,000}}
 \end{aligned}$$

Total amount in his account at the end of 2 years is Rs. 288 000.00

(3 marks)

(b)

(Chapter 02 – Part I – Quantitative Finance - Interest)

(i) $A = 200\,000, n = 2, r = 0.08$

$$\begin{aligned}
 A &= P(1+r)^n \\
 A &= 200,000[1 + 8/100]^2 \\
 X &= \underline{\underline{233,280}}
 \end{aligned}$$

$$\text{Total Amount} = 500,000 + 233,280 = \underline{\underline{733,280}}$$

(3 marks)

(ii) $A = P(1+r)^n$

$$200,000(1 + (8/100 \times 1/4))^8$$

$$200,000 \times (1.02)^8$$

$$200,000 \times 1.171659381$$

$$\underline{\underline{234,339}}$$

$$\begin{aligned}
 \text{So, the interest} &= 234,331.88 - 200,000 \\
 &= \underline{\underline{34,311.88}}
 \end{aligned}$$

(4 marks)

(Total 10 marks)

Suggested Answers to Question Three:

(a)

(Chapter 03 - Financial Operative Measures)

$$TR = 700q, \quad TC = 12500 + 450q$$

(i) Profit function

$$\begin{aligned} TP &= TR - TC \\ TP &= 700q - (12500 + 450q) \\ \underline{\underline{TP}} &= \underline{\underline{250q - 12500}} \end{aligned}$$

(3 marks)

(ii) At the Break Even Point

$$\begin{aligned} TR &= TC \\ 700q &= 12500 + 450q \\ q &= 50 \\ \underline{\underline{\text{break-even quantity} = 50 \text{ units}}} \end{aligned}$$

Alternative Answer

$$\begin{aligned} TR &= TC \\ 700Q &= 12,500 + 450Q \\ 250Q &= 12,500 \\ Q &= \underline{\underline{50 \text{ units}}} \end{aligned}$$

(3 marks)

(b)

(Chapter 03 - Financial Operative Measures)

$$TP = -2x^2 + 100x + 600$$

When profit is maximized; $D_p(x) = 0$

$$\begin{aligned} -4x + 100 &= 0 \\ -4x &= -100 \\ \underline{\underline{x}} &= \underline{\underline{25}} \end{aligned}$$

Therefore, the profit is maximized at 25 units.

(4 marks)
(Total 10 marks)

Suggested Answers to Question Four:

a)

(Chapter 04 - Numerical Descriptive Measures)

A = 8

Minutes	f	x	d	fd	fd ²
1 - 3	6	2	-6	-36	216
4 - 6	11	5	-3	-33	99
7 - 9	12	8	0	0	0
10 - 12	13	11	3	39	117
13 - 15	8	14	6	48	288
	50			18	720

$$\begin{aligned}\text{Mean} &= A + \frac{\sum fX}{\sum f} \\ &= 8 + \frac{18}{50} \\ &= \underline{\underline{8.36}}\end{aligned}$$

(4 marks)

b)

$$\text{Standard Deviation} = \sqrt{\frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f}\right)^2}$$

$$\text{Standard Deviation} = \sqrt{\frac{720}{50} - \left(\frac{18}{50}\right)^2}$$

$$= \underline{\underline{3.78}}$$

(4 marks)

c)

$$\begin{aligned}\text{Coefficient of Variation} &= 3.78/8.36*100 \\ &= \underline{\underline{45.21}}\end{aligned}$$

Suggested Answers to Question Five:

$$\sum X = 1580, \sum Y = 1925, \sum XY = 229\,300, \sum X^2 = 293\,200, \sum Y^2 = 503\,325, n = 5$$

(a)

(Chapter 05 - Comparing Two Quantitative Variables)

$$b = \frac{n \sum XY - \sum X \cdot \sum Y}{(n \sum X^2 - (\sum X)^2)}$$

$$b = \frac{10 \times 229\,300 - 1580 \times 1925}{(10 \times 293\,200 - 1580^2)}$$

$$b = \underline{\underline{-1.72}}$$

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

$$a = 192.5 - (-1.7183) \times 158$$

$$a = \underline{\underline{463.9914}}$$

Regression line

$$Y = a + bx$$
$$= 464.26 + (-1.72)x$$

$$\underline{\underline{Y = 463.9914 - 1.72x}}$$

(7 marks)

(b) Substitute $x = 150$

$$Y = 463.9914 - 1.7183x$$

$$Y = 463.9914 - 1.7183 \times 150$$

$$Y = 206.2464$$

sales volume is 206.2464

Expected sales volume(in thousands)=206.25

(3 marks)

(Total 10 marks)

End of Section B

One (01) compulsory question.
(Total 20 marks)

Suggested Answers to Question Six:

(A)

(Chapter 06 - Part II - Time Series)

$$(i) \quad a = \frac{100 + 110 + 120 + 140}{4} = \underline{\underline{117.5}}$$

$$b = \frac{110 + 120 + 140 + 190}{4} = \underline{\underline{140}}$$

$$c = \frac{120 + 140 + 190 + 160}{4} = \underline{\underline{152.5}}$$

$$d = \frac{117.5 + 140}{2} = \underline{\underline{128.75}}$$

$$e = \frac{140 + 152.5}{2} = \underline{\underline{146.25}}$$

(5 marks)

(ii)

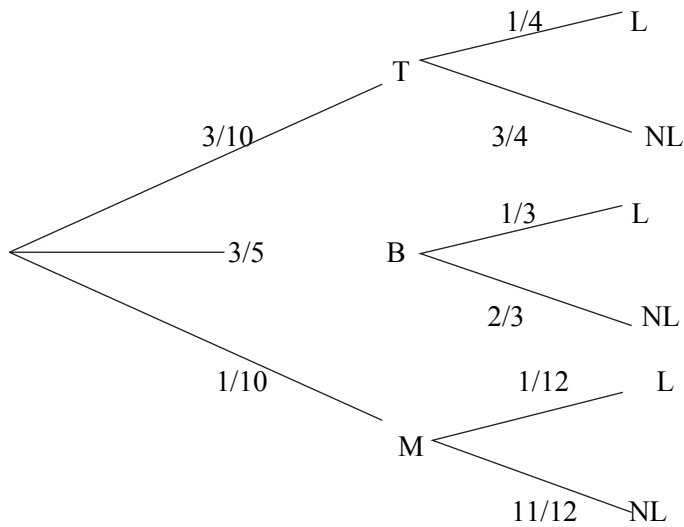
Year	Q1	Q2	Q3	Q4
2015	-	-	1.071	1.031
2016	1.057	0.985	0.87	0.957
2017	0.932	0.957	-	-
Total	-	-	1.941	
Average			0.9705	

$$Q3 = \underline{\underline{0.9705}}$$

(4 marks)

(B) (a)

(Chapter 07 - Part II - Probability and its applications - II)



- T - worker comes to work by Train
- B - worker comes to work by Bus
- M - worker comes to work by Motor Bicycle
- L - he will be late to office
- NL - he will not be late to office

(4 marks)

(b) probability that the worker comes to work on time
= $(3/10 * 3/4) + (3/5 * 2/3) + (1/10 * 11/12)$
= $(9/40) + (6/15) + (11/120)$
= $86/120$ or **0.72**

(4 marks)

(c)

(Chapter 07 - Part I - Probability and its applications - I)

Method 01

- A - Probability of students passed in mathematics paper
- B - Probability of students passed in science paper

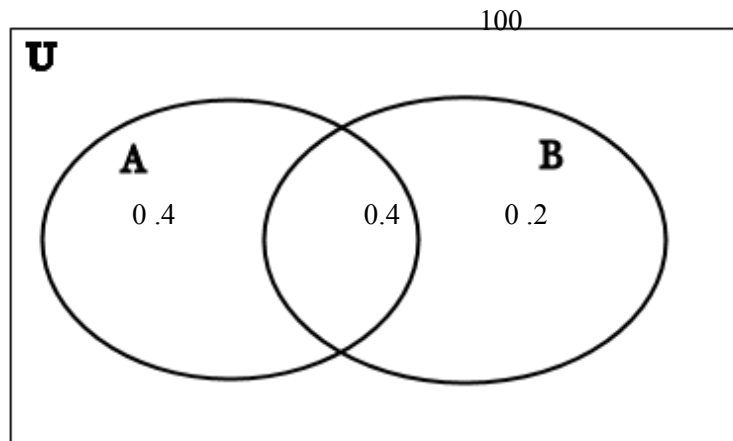
$P(A) = 0.8$ $P(B) = 0.6$ $P(A \cap B) = 0.4$

$P(A/B) = P(A \cap B) / P(B)$

= $0.4 / 0.6$

= **0.67 OR 2/3**

Method 02



U - All the students in a monthly examinations

A - students passed in mathematics paper

B - students passed in science paper

Probability of a student passing the mathematics paper if he passed the science paper

$$\begin{aligned} &= 0.40 / (0.4 + 0.2) \\ &= 4/6 \\ &= \underline{\underline{67\%}} \end{aligned}$$

(3 marks)
(Total 20 marks)

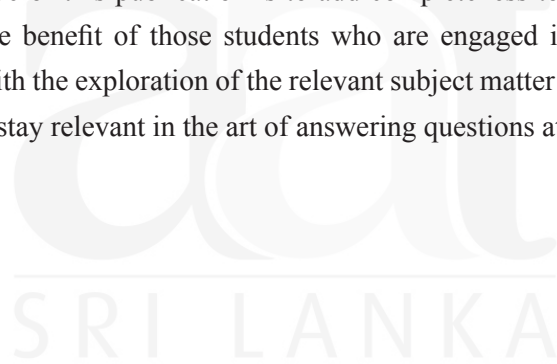
End of Section C

Notice :

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These should be understood as Suggested Answers to question set at AAT Examinations and should not be construed as the “Only” answers, or, for that matter even as “Model Answers”.

The fundamental objective of this publication is to add completeness to its series of study texts, designs especially for the benefit of those students who are engaged in self-studies. These are intended to assist them with the exploration of the relevant subject matter and further enhance their understanding as well as stay relevant in the art of answering questions at examination level.



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