



Association of Accounting Technicians of Sri Lanka

July 2017 Examination - AA1 Level

**Questions and Suggested Answers
Subject No : AA12**

**QUANTITATIVE METHODS FOR BUSINESS
(QMB)**

Association of Accounting Technicians of Sri Lanka
No. 540, Ven. Muruththettuve Ananda Nahimi Mawatha,
Narahenpita, Colombo 05.

Tel : 011-2-559 669

A publication of the Education and Training Division

THE ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

EDUCATION AND TRAINING DIVISION

AA1 Examination - July 2017

(AA12) Quantitative Methods for Business

SUGGESTED ANSWERS

SECTION – A

Objective Test Questions (OTQs)

Fifteen (15) compulsory questions

(Total 40 marks)

Suggested Answers to Question One:

$$\begin{aligned} 1.1 \quad 2(4x - 5) &= 3x \\ 8x - 10 &= 3x \\ 8x - 3x &= 10 \\ 5x &= 10 \\ \underline{\underline{x}} &= 2 \end{aligned}$$

Answer (1)

$$\begin{aligned} 1.2 \quad A &= P(1 + r)^n \\ P &= 140\,000 \quad r = 0.09 \quad n = 2 \\ A &= 140\,000 \times 1.09^2 \\ A &= \underline{\underline{166,340}} \end{aligned}$$

Answer (3)

$$\begin{aligned} 1.3 \quad P_{1/0} &= \frac{30}{22} \times 100 \\ &= 136.36\% \\ &= \underline{\underline{136\%}} \end{aligned}$$

Answer (2)

1.4 Answer (2)

1.5 Answer (1)

$$\begin{aligned} 1.6 \quad TC &= q^2 - 20q + 1000 \\ \frac{dTC}{dq} &= 2q - 20 \\ \underline{\underline{MC}} &= 2q - 20 \end{aligned}$$

Answer (3)

$$\begin{aligned}
 1.7 \quad \text{Total weight of 12 trainees is} &= 12 \times 52 \\
 &= 642 \text{ kg} \\
 \text{Total weight of 12 trainees and the manager is} &= 13 \times 53.5 \\
 &= 695.5 \\
 \text{Weight of the manager is} &= 695.5 - 642 \\
 &= \underline{\underline{71.5 \text{ kg}}}
 \end{aligned}$$

Answer (4)

$$1.8 \quad \text{Adjusted frequency} = \frac{\text{Class Frequency}}{\text{Actual Class Width}} \times \text{Common Class width}$$

$$75 = \frac{25}{5} \times \text{Common Class width}$$

$$\text{Common Class width} = 15$$

$$X = 30 \times 15/10 = \underline{45}$$

$$Y = 15 \times 15/15 = \underline{15}$$

Answer (1)

$$1.9 \quad \frac{480}{1.1} + \frac{480}{1.21} + \frac{480}{1.331}$$

$$= \underline{\underline{\text{Rs. } 1,193,688.95}}$$

Answer (3)

$$\begin{aligned}
 1.10 \quad 1000 \times 0.05 &= 50.00 \\
 250 \times 0.03 &= 7.50 \\
 50 \times 0.02 &= 1.00 \\
 0 \times 0.90 &= \underline{0.00}
 \end{aligned}$$

The expected value of the prize is (Rs.) = 58.50

Answer (3)

1.11 The probability that a family planned to purchase a television. = 0.25 (250/1000)

1.12 The probability that a family actually purchased a television given that they had planned to purchase a television. = 0.80 (200/250)

1.13 The probability that a family actually purchased a television. = 0.30 (300/1000)

1.14 statements is **True**.

1.15 statements is **True**.

End of Section A

Four (04) compulsory questions.

(Total 40 marks)

Suggested Answers to Question Two:

(a) $R(x) = p(x)$

$$R(x) = (-2x + 500)(x)$$

$$R(x) = \underline{\underline{-2x^2 + 500x}}$$

(02 marks)

(b) At the break even point,

$$TR = TC$$

$$-2x^2 + 500x = 300x + 450$$

$$x^2 - 100x + 2400 = 0$$

$$(x - 60)(x - 40) = 0$$

$$x = 60 \text{ or } x = 40$$

(02 marks)

Therefore break even quantity is 40 or 60

(c) Profit function (P)

$$P(x) = R(x) - C(x)$$

$$P(x) = (-2x^2 + 500x) - (300x + 4800)$$

$$P(x) = \underline{\underline{-2x^2 + 200x - 4800}}$$

(02 marks)

(d)

$$R(x) = -2x^2 + 500x$$

$$MR = \frac{dP}{dx}$$

$$MR = -4x + 500$$

$$C(x) = 300x + 4800$$

$$MC = 300$$

At maximum profit

$$MR = MC$$

$$-4x + 500 = 300$$

$$4x = 200$$

$$x = 50$$

(03 marks)

No. of units 50 (for the maximum profit)

(Total 10 marks)

Suggested Answers to Question Three:

(a)

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

$$\text{Standard Deviation} = \sqrt{\frac{605}{8} - \left(\frac{61}{8}\right)^2}$$

$$= \underline{\underline{4.18}}$$

(03 marks)

(b)

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

$$r = \frac{8 \times 1279 - 61 \times 128}{\sqrt{(8 \times 605 - 61^2) (8 \times 2724 - 128^2)}}$$

$$= \frac{10,232 - 7,808}{\sqrt{(4,840 - 3,721) (21,792 - 16,384)}}$$

$$= \frac{2,424}{\sqrt{1,119 \times 5,408}}$$

$$= \frac{2,424}{\sqrt{6,051,552}}$$

$$= \frac{2,424}{2,459.99}$$

$$= \underline{\underline{0.98}}$$

(05 marks)

(ii) There is a **Strong Positive Correlation** between sales and advertising cost.

(02 marks)

(Total 10 marks)

Suggested Answers to Question Four:

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

$$b = \frac{5 \times 27,498 - 373 \times 362}{(5 \times 29,385 - 373^2)}$$

$$= \frac{137,490 - 135,026}{146,925 - 139,129}$$

$$= \frac{2,464}{7,796}$$

$$b = \underline{\underline{0.3161}}$$

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

$$a = 72.4 - 0.3161 \times 74.6$$

$$a = \underline{\underline{48.8220}}$$

(07 marks)

Regression line

$$\underline{\underline{Y = 48.8220 + 0.3161x}}$$

(b) When $x = 85$

$$Y = 48.8220 + 0.3161 \times 85$$

$$= \underline{\underline{75.6870}}$$

76 marks for the aptitude test

(03 marks)

(Total 10 marks)

Suggested Answers to Question Five:

(a) $A = P(1 + r)^n$ $A = 107\,180, \quad P = 50\,000, \quad n = 6$

$$107,180 = 50,000 \left(1 + \frac{r}{100}\right)^6$$

$$\left(\frac{107,180}{50,000}\right)^{1/6} - 1 = \frac{r}{100}$$

$$1.1355 - 1 = \frac{r}{100}$$

$$r = \underline{\underline{13.55\%}}$$

(03 marks)

(b) (i) (Rs. '000)

Years	Cash Flow	Discount Factors	Present value	Present value
0	(500)	1	-500	-500
1	200	1/1.11 ¹ or 0.9009	180.18	180.18
2	180	1/1.11 ² or 0.8116	146.092	146.088
3	150	1/1.11 ³ or 0.7312	109.679	109.68
4	50	1/1.11 ⁴ or 0.6587	32.937	32.935
5	10	1/1.11 ⁵ or 0.5935	5.935	5.935
NPV			-25.177	-25.182

(06 marks)

(ii) This project is **not** recommended (i.e. NPV is a negative value)

(01 mark)

(Total 10 marks)

End of Section B

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

Suggested Answers to Question Six:

(A)

$$\begin{aligned}
 6x + 2y &= 40 && \text{--- ①} \\
 3x + 5y &= 40 && \text{--- ②} \\
 \text{②} \times 2 & \quad 6x + 10y = 80 && \text{--- ③} \\
 \text{③} - \text{①} & \quad 8y &= & 40 \\
 & \quad \underline{\underline{y}} &= & \underline{\underline{5}}
 \end{aligned}$$

Substituting $y = 5$, in ② "

$$\begin{aligned}
 3x + 25 &= 40 \\
 3x &= 15 \\
 \underline{\underline{x}} &= \underline{\underline{5}}
 \end{aligned}$$

(04 marks)

(B)

q_0	q_1	P_0	P_1	$q_1 P_0$	$q_0 P_0$
10	15	1,000	1,200	15,000	10,000
5	8	2,000	2,500	16,000	10,000
100	120	500	550	60,000	50,000
				91,000	70,000

$$\text{Laspeyre's Quantity Index} = \frac{\sum q_1 P_0}{\sum (P_0 \times q_0)} \times 100$$

$$\begin{aligned}
 \text{L.Q.I.} &= \frac{91,000}{70,000} \times 100 \\
 &= \underline{\underline{130\%}}
 \end{aligned}$$

(05 marks)

(C) (a)

x	$P(x)$	$X^2 \cdot P(x)$
0	0.2	0
1	0.4	0.4
2	0.3	1.2
3	0.1	0.9
	1.0	2.5

$$\begin{aligned}
 V(x) &= \sum x^2 \cdot P(x) - E(x)^2 \\
 &= 2.5 - 1.69 \\
 &= \underline{\underline{0.81}}
 \end{aligned}$$

(D)

Year	Production (’000)	3 year moving average	Trend
2010	70	---	---
2011	74	233	77.67
2012	89	251	83.67
2013	88	261	87.00
2014	84	261	87.00
2015	89	273	91.00
2016	100	---	---

(05 marks)

(Total 20 marks)

aat
SRI LANKA

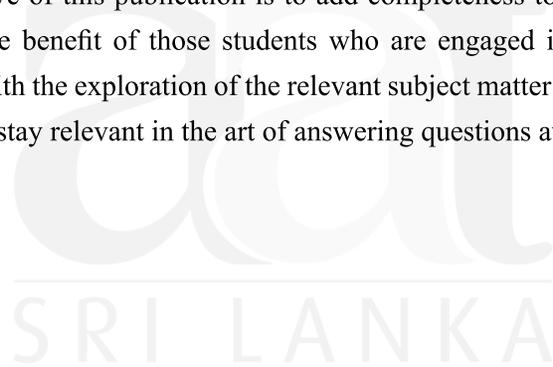
End of Section C

Notice :

These answers compiled and issued by the Education and Training Division of AAT Sri Lanka constitute part and parcel of study material for AAT students.

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.



© 2017 by the Association of Accounting Technicians of Sri Lanka (AAT Sri Lanka)

All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior written permission of the Association of Accounting Technicians of Sri Lanka (AAT Sri Lanka)