Association of Accounting Technicians of Sri Lanka

July 2018 Examination - AA1 Level

Questions and Suggested Answers
Subject No : AA12

QUANTITATIVE METHODS FOR BUSINESS (QMB)

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A publication of the Education and Training Division

THE ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

EDUCATION AND TRAINING DIVISION

AA1 Examination - July 2018
(AA12) Quantitative Methods for Business

SUGGESTED ANSWERS

SECTION – A

Fifteen (15) compulsory questions
(Total 40 marks)

Suggested Answers to Question One:

1.1 $6x + 4 = 4x + 16$
$2x = 12$
$x = 6$

Answer (2) ***(03 marks)***

1.2 The number of adults who attended the concert is = x
The number of children's who attended the concert is = $40 - x$
Total tickets sales income = Rs. 5,000

$200x + 100(40 - x) = 5000$
$200x + 4000 - 100x = 5000$
$100x = 1000$
$x = 10$

Answer (2) ***(03 marks)***

1.3 $0.35 + 0.25 + x = 1.00$
$X = 1.00 - 0.60$
$X = 0.40$

Answer (3) ***(03 marks)***

1.4 $A = P(1 + r)^n$
$P = 100 \quad r = 0.1 \quad n = 3$
$A = 100X1.1^3$
$A = 133.1$
Total amount available in bank is 133.1 Million.

Answer (1) ***(03 marks)***

1.5 TC $= q^3 - 10q^2 + 25q + 10$

$\frac{dTC}{dq} = 3q^2 - 20q + 25$

MC $= 3q^2 - 20q + 25$ **Answer (2)**

(03 marks)

1.6

Cost	Profit	Selling price
100	20	120
2400		?

Selling price is $= \frac{2400 \text{ X } 120}{100} =$ Rs. 2,880.00

Answer (2)

(03 marks)

1.7 $r = \frac{n \sum XY - \sum X . \sum Y}{\sqrt{(n \sum X^2 - (\sum X)^2)(n \sum Y^2 - (\sum Y)^2)}}$

$r = \frac{15 \text{ X } 9915 - 177 \text{ X } 679}{\sqrt{(15 \text{ X } 2576 - 177^2)(15 \text{ X } 39771 - 679^2)}}$

$=$ **0.9068**

Answer (1)

(03 marks)

1.8 If the base year is changed to year 2014.

Then the indx number for year 2017 $= \frac{130 \text{ X } 100}{90}$

$= 144.44$

$= 144\%$

Answer (1)

(03 marks)

1.9

0 X 0.45	= 0
1 X 0.22	= 0.22
2 X 0.19	= 0.38
3 X 0.08	= 0.24
4 X 0.06	= 0.24
The expected number of accidents	**= 1.08**

Answer (2)

(03 marks)

1.10 $S = \frac{A(R^n - 1)}{R - 1}$

$S = \frac{A[(1.03)^8 - 1]}{1.03 - 1}$

$75{,}000 = \frac{A[(1.03)^8 - 1]}{0.03}$

$2{,}250 = 0.2667A$

A = <u>8,434</u>

Answer (4)

(03 marks)

1.11 I = prt p = 200,000 r = 0.12 t = 3

I = 200,000 X 0.12 X 3

I = 72,000

Total interest = **<u>Rs. 7, 000</u>**

(02 marks)

1.12 $A = P(1 + r)^n$

P = 200,000 r = 0.12 n = 3

$A = 200{,}000 \times 1.12^{3}$

A = 280,985.60

Total interest = **<u>Rs. 80,985.60</u>**

(02 marks)

1.13 $A = P(1 + r/N)^{nxN}$

P = 200,000 r = 0.12 n = 3 N=4

$A = 200{,}000 \times (1+0.12/4)^{3X4}$

$A = 200{,}000 \times 1.03^{12}$

A = **<u>285 152.18</u>**

Total amount he should be paid = **<u>Rs. 285,152.18</u>**

(02 marks)

1.14 Statement is True.

(02 marks)

1.15 Statement is False.

(02 marks)

(Total 40 marks)

End of Section A

SECTION –B

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

Suggested Answers to Question Two:

(a) (i) C $= x^2 - 90x + 4800$

X $= 60$

C $= x^2 - 90x + 4800$

C $= 60^2 - 90 \times 60 + 4800$

C $= 3000$

Total cost at the break even point is Rs. 3,000 Million

(03 marks)

(ii) At the break even point

TR = TC

Their for TR = 3000

TR = p x q

P x q = 3000

P x 60 = 3000

P = 3000/60

P = 50

Selling price is Rs. 50 Million *(02 marks)*

(b) (i) Profit function

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

$P(x) = (36x - 4x^2) - (24x - 3x^2 + 1200)$

$P(x) = 12x - x^2 - 1200$

(02 marks)

(ii) $R(x) = 36x - 4x^2$

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

$MR = 36 - 8x$

$C(x) = 24x - 3x^2 + 1200$

$MC = 24 - 6x$

At maximum profit

$MR = MC$

$36 - 8x = 24 - 6x$

$2X = 12$

$X = 6$

No. of units 6 (for the maximum profit) *(03 marks)*

(Total 10 marks)

Alternative Answer

b) ii)

At maximum point

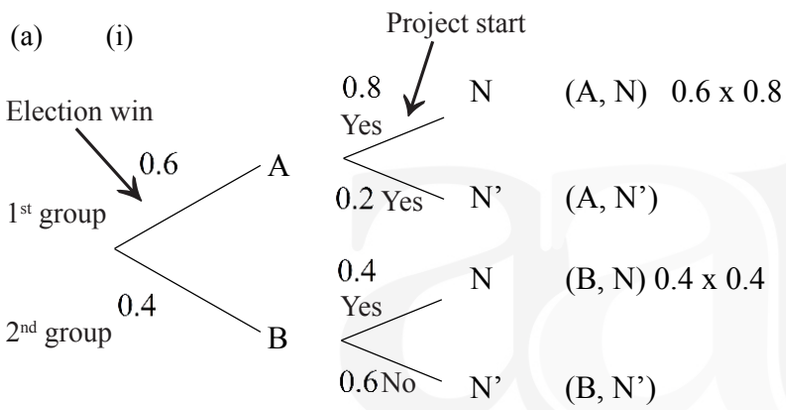
$$\frac{dP}{dx} = -2x + 12$$

$$2x = 12$$

$$\mathbf{x = \underline{\underline{6 \text{ units}}}}$$

Suggested Answers to Question Three:

(a) (i)



(03 marks)

A – 1st group win

B – 2nd group win

N – Starting new project

(ii) Probability of starting new project = o.48 + 0.16

= **0.64**

(03 marks)

(b) (i) Probability = 75/98 *(02 marks)*

(ii) Probability = 15/98 *(02 marks)*

(Total 10 marks)

Suggested Answers to Question Four:

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

$$b = \frac{6\,(990) - (30)\,(180)}{6\,(190) - 30^2}$$

$$b = \underline{\mathbf{2.25}}$$

$$a = \overline{y} - b\,\overline{x}$$

$$a = 180/6 - 2.25 \text{ X } 30/6$$

$$a = 18.75$$

Regression line = $Y = a + bx$

$$\underline{\mathbf{Y = 18.75 + 2.25x}}$$

(07 marks)

(b) When x = 7

$$Y = 18.75 + 2.25 \text{ X } 7$$

$$= 34.5$$

Annual income Rs.34.5 million ***(03 marks)***

(Total 10 marks)

Suggested Answers to Question Five:

(a)

(i) Mean (x) $= \frac{\sum X}{n}$

$= 455/7$

$= \underline{\underline{\mathbf{65}}}$ ***(02 marks)***

(ii)

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

Standard Deviation $= \sqrt{\frac{31\,605}{7} - \left(\frac{455}{7}\right)^2}$

$= \underline{\underline{\mathbf{17.02}}}$

(04 marks)

Alternative Answer

a) ii)

Standard Deviation of $= \sqrt{\frac{\Sigma (x^2 - x)^2}{n}}$

$= \sqrt{\frac{(60 - 65)^2 + (92 - 65)^2 + (84 - 65)^2 + (66 - 65)^2 + (54 - 65)^2 + (37 - 65)^2 + (62 - 65)^2}{7}}$

$= \sqrt{\frac{25 + 729 + 361 + 1 + 121 + 784 + 9}{7}}$

$= \sqrt{\frac{2030}{7}}$

$= \sqrt{290}$

$= \underline{\underline{\mathbf{17.02}}}$

b)

Year	Quarter	Quarterly Sales (Rs. '000)			Moving Average
2015	1	20			
	2	30			
			149		37.25
	3	40			
			168	**(a)**	**42**
	4	59			
2016			181	**(b)**	**45.25**
	1	39			
			203	**(c)**	**50.75**
	2	43			
			225	**(d)**	**56.25**
	3	62			
			238	**(e)**	**59.5**
	4	81			
2017			260	**(f)**	**65**
	1	52			
			273	**(g)**	**68.25**
	2	65			
			286	**(h)**	**71.5**
	3	75			
	4	94			

(04 marks)

(Total 10 marks)

End of Section B

SECTION –C

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

Suggested Answers to Question Six:

(A)

	Product	**Product in degrees**
	P	$40 \times \frac{360}{170} = \underline{\underline{\mathbf{84.7^0}}}$
	Q	$45 \times \frac{360}{170} = \underline{\underline{\mathbf{95.3^0}}}$
	R	$50 \times \frac{360}{170} = \underline{\underline{\mathbf{105.8^0}}}$
	S	$35 \times \frac{360}{170} = \underline{\underline{\mathbf{74.2^0}}}$

(04 marks)

(B)

	P_0	q_0	p_1	p0q0	p1q0
A	850	1100	1150	935,000	1,265,000
B	600	500	610	300,000	305,000
C	450	1400	350	630,000	490,000
				1,865,000	**2,060,000**

$$\text{Laspeyre's Price Index } (LP_{1/0}) = \frac{\sum(p_1 \times q_0)}{\sum(p_0 \times q_0)} \times 100$$

$$= \frac{2{,}060{,}000}{1{,}865{,}000} \times 100\,\%$$

$$= \underline{\underline{\mathbf{110.45\%}}}$$

(05 marks)

(C)

	$4x + 2y$	$= 40$	——— ①
	$2x + 5y$	$= 60$	——— ②
②×2	$4x + 10y$	$=120$	——— ③
③-①	$8y$	$= 80$	
	$\underline{\underline{y}}$	$\underline{\underline{= 10}}$	

(05 marks)

Substituting x = 10,in ② "

$2x + 50 = 60$

$2x = 10$

$x = 5$

$$\left\{\begin{matrix} \mathbf{x = 5} \\ \mathbf{y = 10} \end{matrix}\right\}$$

d) i)

Year	C.F.	D.F.	PV
0		1	(500,000)
1	150,000	0.909	136,350
2	220,000	0.826	181,720
3	260,000	0.751	195,260
NPV			**13,330**

(04 marks)

ii) NPV is positive.
So the company can invest in this project.

(02 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.