Association of Accounting Technicians of Sri Lanka

Level I Examination - January 2025

Suggested Answers

(102) BUSINESS MATHEMATICS AND STATISTICS (BMS)

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THE ASSOCIATION OF ACCOUNTING TECHNICIANS OF SRI LANKA

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(102) BUSINESS MATHEMATICS AND STATISTICS

SUGGESTED ANSWERS

(Total 40 Marks) **SECTION - A**

Suggested Answers to Question One:

1.1 (2)

$16X^2 - 81 = (4x-9)(4x+9)$

(03 marks)

1.2 (4)

Year	Cash Flow	D.F. (10%)	Present Value (A)
0	(100,000)	1	(100,000)
1	50,000	0.909	45,450
2	50,000	0.826	41,300
3	50,000	0.751	37,550
NPV			**24,300**

(03 marks)

1.3 (2)

P(XUY) = P(X) + P(Y) –P(X∩Y)

P(XUY) = 2/3 + 1/4 – 1/6

P(XUY) = 9/12//

(03 marks)

1.4 (1)

$Q = \frac{q_1}{q_0} \times 100$

$Q = \frac{305}{265} \times 100 = 115\%$

(03 marks)

1.5 (1)

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

$$r = \frac{10 \text{ X } 42070 - 375 \text{ X } 997}{\sqrt{(10 \text{ X } 16125 - 375^2)(10 \text{ X } 111277 - 997^2)}}$$

$= -0.9461$ //

(03 marks)

1.6 (3)

$L_1 = 29.5, \quad \Delta_1 = 19 - 15 = 4 \quad C = 10$

$\Delta_2 = 19 - 14 = 5$

$$M_o = L_i + \left[\frac{\Delta_1}{\Delta_1 + \Delta_2}\right] \times C$$

$$M_o = 29.5 + \left[\frac{4}{4+5}\right] \times 10$$

$$M_o = 33.94 \cong 33.9//$$

(03 marks)

1.7 (3)

E(X) = (-5x0.2 + -3x0.15 + 0x0.15 + 1x0.22 + 2x0.28) = - 0.67**//**

(03 marks)

1.8 (2)

165000 x 0.08 x 3 = Rs.39,600 **//**

(03 marks)

1.9 (4)

$$\hat{Y} = \hat{T} \times \hat{S}$$

$$\hat{Y} = 7{,}520 \times 0.85$$

$$\hat{Y} = 6{,}392$$

(03 marks)

1.10 (4)

42/*70* = 6/10**//**

(03 marks)

1.11

A ⟶ 2
B ⟶ 3
C ⟶ 1

(01 mark each, 03 marks)

1.12

$$LP = \frac{\sum p1q0}{p0q0} \times 100$$

$$= \frac{140\times130+250\times240}{130\times80+120\times240} \times 100 = 199.49\ //$$

(03 marks)

1.13 $T_n = a + (n-1)d$

$T_n = 5{,}000 + 7 \times 500$

$T_n = 5{,}000 + 3{,}500$
$T_n = 8{,}500\ //$

Alternative Answer

5,000, 5,500, 6,000, 6,500, 7,000, 7,500, 8,000, **8,500**

(02 marks)

1.14

False

(01 mark)

1.15 True

(01 mark)

(Total 40 marks)

End of Section A

Suggested Answers to Question Two:

Chapter 1.3 /01.4

(a)

2023

Material Cost :		Labour Cost	= 800
1	:	3	= 800
200	:	600	= 800

2024

200 x 1.2 : 600 x 1.6

240 + 960 = **Rs. 1,200**

(02 marks)

(b) The number of male dancers =*X*

The number of female dancers =Y

$3500x + 5000y = 135,000$ ——— ①

$x + y = 30$ ——— ②

② x 3,500 => 3,500x + 3,500y = 105,000

② - ③ => 1,500y = 30,000

Y = 20

① => x + 20 =30

X = 10

The number of male dancers =10

The number of female dancers =20 ***(04 marks)***

(c)

(i)

$4x + 3y \leq 12$ ——— ①

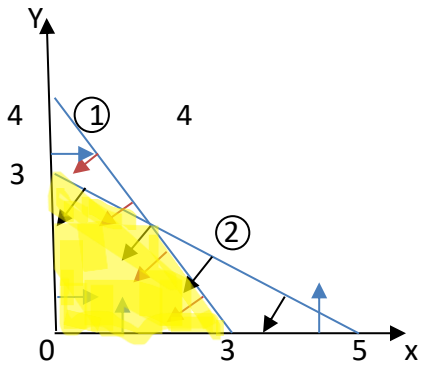
X	0	3
Y	4	0

(0,4) , (3,0)

$3x + 5y \leq 15$ ——— ②

X	0	5
Y	3	0

(0,3) , (5,0)



(03 marks)

(ii)

The relevant area is shaded in the graph.

(01 marks)

(Total 10 marks)

Suggested Answers to Question Three:

Chapter 03

(a)

$TR = Demand\ Function \times Quantity$

$TR = (23 - 4q) \times q$

$\boldsymbol{TR = -4q^2 + 23q}$ //

TC= $FC + VC$

TC= $\mathbf{15,000 + q^2 + 3q}$ //

TC= $\mathbf{q^2 + 3q + 15,000}$ //

(04 marks)

(b)

TP= $TR - TC$

TP= $(-4q^2 + 23q) - (\ q^2 + 3q + 15\ 000)$

TP= $23q - 4q^2 - q^2 - 3q - 15{,}000$

TP= $\mathbf{-q^2 + 4q - 3,000}$ //

(03 marks)

(c)

$TR = -4q^2 + 23q$

$\boldsymbol{MR} = \frac{dTR}{dq}$

$\boldsymbol{MR} = -8q + 23$

TC= $q^2 + 3q + 15\ 000$

$\boldsymbol{MC} = \frac{dTC}{dq}$

$\boldsymbol{MC}$ =2q + 3

When profit is maximized

$$MR = \text{MC}$$

$$-8q + 23 = 2q + 3$$

$$10q = 20$$

$$\underline{q = 2}$$

The number of units that maximizes profit is 2,000. //

(03 marks)
(Total 10 marks)

Suggested Answers to Question Four:

Chapter 5.7.2

(a)

x	y	xy	X^2
10	4	40	100
12	5	60	144
8	3	24	64
14	6	84	196
15	7	105	225
16	8	128	256
11	4	44	121
18	9	162	324
104	**46**	**647**	**1,430**

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

$$b = \frac{8 \text{ X } 647 - 104 \text{ X } 46}{(8 \text{ X } 1430 - 104^2)}$$

$$b = \frac{5176 - 4784}{11{,}440 - 10{,}816}$$

$$\underline{b = 0.6282 \cong 0.63}$$

$$a = \bar{Y} - b\bar{X}$$
$$a = \frac{46}{8} - 0.63 \times \frac{104}{8}$$
$$\boldsymbol{a = -2.44}$$

least square regression line Y = -2.44 + 0.63x //

(07 marks)

(b) Substitute, x = 40

$$Y = -2.44 + 0.63x$$
$$Y = -2.44 + 0.63 \times 90$$
$$Y = 22.76$$

The expected tax amount is Rs. Million 22.76//

(03 marks)
(Total 10 marks)

Suggested Answers to Question Five:

Chapter **4.6 / 4.7**

No. of days	***Mid Point*** (x)	No of teachers	Cumulative Frequency (Cf)
0 - 9	4.5	8	8
10 - 19	14.5	18	26
20 – 29 (Median Class)	24.5	15	41
30 - 39	34.5	14	55
40 - 49	44.5	3	58
50 - 59	54.5	2	60
		60	

(a) Median (Md)

$\frac{n}{2} = 30$, Median Class 19.5 – 29.5(20 – 29)

$L_1 = 19.5$ $n = 60$ $F_c = 26$ $f_m = 15$ $C = 29.5 - 19.5 = 10$

$$\text{Md} = L + \frac{(\frac{n}{2} - Fc)}{fm} \times c$$

$$\text{Md} = 19.5 + \frac{(30-26)}{15} \times 10$$

$$\underline{\textbf{Md} = \textbf{22.17}}$$

(03 marks)

(b)

Class Interval	Mid-Point (X)	No. of Teachers (f)	F(x)	$F(x^2)$
0-9	4.5	8	36	162.00
10-19	14.5	18	261	3,784.50
20-29	24.5	15	367.50	9,003.75
30-39	34.5	14	483	16,663.50
40-49	44.5	3	133.50	5,940.75
50-59	54.5	2	109	5,940.50
		60	**1,390**	**41,495**

$\sum f X = 1{,}390$ $\sum f X^2 = 41{,}495$ $\sum f = 60$

Mean $= \frac{\sum fx}{\sum f}$

$= \frac{1390}{60}$

= 23.17

(03 marks)

(c)

Standard Deviation $= \sqrt{\frac{\sum fx^2}{\sum f} - \left[\frac{\sum fx}{\sum f}\right]^2}$

Standard Deviation $= \sqrt{\frac{41{,}495}{60} - \left[\frac{1390}{60}\right]^2}$

=12.44 //

(04 marks)

(Total 10 marks)

End of Section B

(Total 20 Marks)

SECTION - C

Suggested Answers to Question Six:

(A)

Chapter 02.9

(a)

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

$$= \frac{600{,}000x(1+0.1)^3(1+0.1-1)}{(140.1)^3-1}$$

$$= \frac{600{,}000\ x\ 1.331\ x\ 0.1}{1.331-1}$$

= Rs. 241, 268.88

Annual installment = Rs. 241 255. 00 //

(03 marks)

(b)

Year	Amount outstanding at the beginning	Interest payable (10%)	Repayment	Amount outstanding at the end
1	600,000	60,000	241,269	418,731
2	418,731	41,873	241,269	219,335
3	219,335	21,934	241,269	0
	Total	123,807	723,807	

(03 marks)

(B)

Chapter 02.3 /02.2

(a)

$EIR = [(1 + r)^n - 1]\ x\ 100\%$ r=0.12 ,N=4

$EIR = [(1 + 0.03)^4 - 1]$ x 100%

$\boldsymbol{EIR = 0.1255 = 12.55\%}$ **//**

(02 marks)

(b)

$S = X(1 + r/f)^{n\times f}$ x= 8 000 000, n = 3, r = 0.12, $N = 4$

$S = 8{,}000{,}000 \times (1 + 0.12/4)^{3\times4}$

$= 8{,}000{,}000\ x\ 1.426$

S $= 11{,}408{,}000$

Total amount end of 3rd year =Rs. 11,408,000

(03 marks)

(c)

Total interest earned by Riza = 11,408,000 – 8,000,000

= **Rs. 3,408,000**

(02 marks)

(C)

Chapter 06.3

(a)

No. of students have at least two pets = 10+6+2+2 =**20 //**

(02 marks)

(b)

Probability (The student has a dog at home) = **19/40**

(02 marks)

(D)

Chapter 06.6

X : Time taken to finish the race (Min)

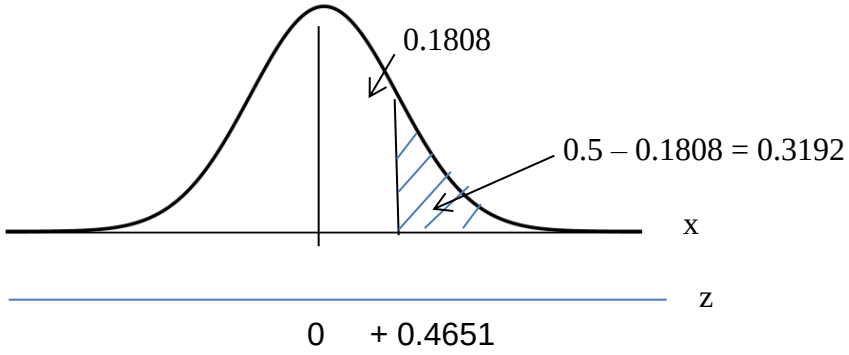
μ= 112 σ = 17.2

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

$$Z = \frac{X - 112}{17.2}$$

$$Z = \frac{120 - 112}{17.2}$$

Z = + 0.4651



Pr(X > 120) = 0.3192 or 31.92%

P(x<120) = P (x > - 0.46)

= 0.5 – 0.1772

= 0.3228

(03 marks)

(Total 20 marks)

End of Section C

Notice:

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