



**Association of Accounting Technicians of Sri Lanka**

**Level I Examination - July 2023**

**Suggested Answers**

**(102) BUSINESS MATHEMATICS AND STATISTICS (BMS)**

**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  
**Level I Examination - July 2023**  
**(102) BUSINESS MATHEMATICS AND STATISTICS**  
**SUGGESTED ANSWERS**

(Total 40 Marks)

**SECTION - A**

*Suggested Answers to Question One:*

1.1 (3)

$$4 + 4x = x + 16$$

$$3x = 12$$

$$\underline{\mathbf{X = 4}}$$

(03 marks)

1.2 (3)

$$\text{Interest} = Xrn \quad x = 20\,000, \quad n = 3, \quad r = 0.08$$

$$S = 250,000 \times 0.18 \times 3$$

$$S = 135,000$$

$$\text{Interest} = \underline{\mathbf{Rs. 135,000}}$$

(03 marks)

1.3 (4)

$$S = X(1 + r/N)^{n \times N} \quad S = 228,112, \quad n = 3, \quad r = 0.12, \quad N = 4$$

$$228112 = x(1 + 0.12/4)^{3 \times 4}$$

$$\mathbf{X} = \frac{228112}{(1+0.12/4)^{12}}$$

$$X = \frac{228,112}{(1.03)^{12}}$$

$$X = 160,000.00$$

(03 marks)

1.4 (1)

(03 marks)

1.5 (2)

$$L_1 = 29.5, \quad \Delta_1 = 15 - 11 = 4 \quad C = 10$$

$$\Delta_2 = 15 - 6 = 9$$

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

$$M_o = 29.5 + \left[ \frac{4}{4 + 9} \right] \times 10$$

$$M_o = \underline{\underline{32.58}}$$

(03 marks)

1.6 (2)

$$r = \frac{n \sum xy - \sum x \cdot \sum y}{\sqrt{(n \sum x^2 - (\sum x)^2) (n \sum y^2 - (\sum y)^2)}}$$
$$r = \frac{5 \times 527 - 61 \times 37}{\sqrt{(5 \times 869 - 61^2) (5 \times 321 - 37^2)}}$$
$$r = \frac{378}{\sqrt{147264}}$$
$$r = \underline{\underline{0.985}}$$

(03 marks)

1.7 (4)

$$P = \frac{P_1}{P_0} \times 100$$

$$P = \frac{28}{24} \times 100 = \underline{\underline{117\%}}$$

(03 marks)

1.8 (3)

The probability that both the husband and the wife will win this lottery =  $\frac{3}{8} \times \frac{2}{5}$

$$= \frac{3}{20}$$

(03 marks)

1.9 (1)

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

The forecasted sales for August 2023 =  $10,265 \times 1.06 = 10,881$   
= 10,881

(03 marks)

1.10 (1)

$$S = X(1 + r)^n \quad X=500,000, r = 0.18, n=3$$

$$S = 500,000 \times 1.18^3$$

$$S = \underline{821,516}$$

(03 marks)

1.11

- A → (4)
- B → (3)
- C → (2)
- D → (1)

(01 mark each, 04 marks)

1.12

$$100 - 30 = 70$$

number of students who are not studying computing =  $240 \times \frac{70}{100}$   
= 168

(02 marks)

1.13

$$S_n = \frac{n}{2} \{2a + (n - 1)d\}$$

$$S_n = \frac{12}{2} \{2 \times -7 + (12 - 1) \times 6\}$$

$$= \underline{312}$$

(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 01 – Fundamental Concepts of Mathematics**

(a)

The number of newcomers = X

The number of experienced staff = Y

$$50,000x + 125,000y = 3,875,000 \quad \text{--- (1)}$$

$$x + y = 40 \quad \text{--- (2)}$$

$$\textcircled{2} \quad 50,000(40-y) + 125,000y = 3,875,000 \quad \text{--- (3)}$$

$$2,000,000 - 50,000y + 125,000y = 3,875,000$$

$$75,000y = 1,875,000$$

$$y = \underline{25}$$

$$\textcircled{1} \quad x + y = 40$$

$$x + 25 = 40$$

$$\underline{x = 15}$$

The number of newcomers = 15

The number of experienced staff = 25

**(04 marks)**

(b)

$$\text{No. of employees using public transport} = 350 \times \frac{7}{25}$$

$$= 98$$

50 employees can be accommodated in one bus.

**There for 02 buses allocate to the transport system.****(03 marks)**

(c)

$$\text{The expected profit for 2023} = 20,000,000 \times \frac{96}{100}$$

$$= \underline{\underline{\text{Rs. 19,200,000}}}$$

**(03 marks)****(Total 10 marks)**

### Suggested Answers to Question Three:

#### Chapter 03 – Financial Operative Measures for Business

(a)

Total Revenue (TR) Function = Price × Quantity

$$TR = (30 + 2q) \times q$$

$$TR = \underline{30q + 2q^2}$$

(03 marks)

(b) At the Break Even Point;

$$TR = TC$$

$$30q + 2q^2 = 2q^2 + 2q + 5,600$$

$$30q - 2q = 5,600$$

$$28q = 5,600$$

$$\underline{q = 200 \text{ units}}$$

∴ Break-even quantity = 200 units

(04 marks)

(c)

Marginal Cost (MC) Function =  $\frac{d(TC)}{dq}$

$$\frac{d(TC)}{dq} = \frac{d(2q^2 + 2q + 5,600)}{dq}$$

$$MC = 4q + 2$$

Substitute q as 250

$$MC = 4 \times 250 + 2$$

$$= 1,002$$

Marginal Cost (MC) = Rs. 1,002

(03 marks)

(Total 10 marks)

### Suggested Answers to Question Four:

#### Chapter 05 – Comparing Two Quantitative Variables

(a)

X	Y	XY	X <sup>2</sup>
18	85	1,530	324
25	90	2,250	625
30	96	2,880	900
36	100	3,600	1,296

40	110	4,400	1,600
50	115	5,750	2,500
60	125	7,500	3,600
65	140	9,100	4,225
324	861	37,010	15,070

$$\sum X = 324, \quad \sum Y = 861, \quad \sum XY = 37,010, \quad \sum X^2 = 15,070, \quad n = 8$$

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

$$b = \frac{8 \times 37,010 - 324 \times 861}{(8 \times 15,070 - 324^2)}$$

$$b = \frac{296,080 - 278,964}{120,560 - 104,976}$$

$$b = \underline{\underline{1.0983}}$$

$$a = \bar{Y} - b\bar{X}$$

$$a = \frac{861}{8} - 1.0983 \times \frac{324}{8}$$

$$a = \underline{\underline{63.143}}$$

least square regression line,  $Y = a + bx$

$$Y = 63.143 + 1.098x //$$

Or

$$\underline{\underline{Y = 63.14 + 1.098x //}}$$

**(07 marks)**

**(b)** When age is 72yrs,

Then  $x = 72$

$$Y = 63.143 + 1.098 \times 72$$

$$Y = 142.2$$

**Expected blood sugar level is 142.2**

**(03 marks)**

**(Total 10 marks)**

**Suggested Answers to Question Five:**

**Chapter 04 – Data Presentation and Descriptive Measures**

Interval	Mid Point (x)	f	Cumulative Frequency (Cf)	fx
20 - 29	24.5	10	10	245
30 - 39	34.5	18	28	621
40 - 49	44.5	30	58	1,335
<b>50 – 59 (Median Class)</b>	54.5	45	103	2,452.50
60 - 69	64.5	17	120	1,096.50
		<b>120</b>		<b>5750</b>

(a)

(i) Median (Md)

$$\frac{n}{2} = 60, \text{ Median Class } 49.5 - 59.5(50 - 59)$$

$$L_1 = 49.5 \quad n = 120 \quad F_c = 58 \quad F_m = 45 \quad C = 59.5 - 49.5 = 10$$

$$Md = L + \frac{\left(\frac{n}{2} - F_c\right)}{f_m} \times c$$

$$Md = 49.5 + \frac{(60 - 58)}{45} \times 10$$

$$Md = 49.5 + \frac{2}{45} \times 10$$

$$\underline{\underline{Md = 49.94}}$$

(04 marks)

(ii)

$$\sum fx = 5750$$

$$\sum f = 120$$

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

$$= \frac{5,750}{120}$$

$$= \underline{\underline{47.92}}$$

(03 marks)



(b)

$$\begin{aligned}\text{Coefficient of skewness} &= \frac{3(\bar{x} - Md)}{s} \\ &= \frac{3(47.92 - 49.94)}{77.42} \\ &= \underline{\underline{-0.53}}\end{aligned}$$

**(03 marks)**  
**(Total 10 marks)**



**End of Section B**

***Suggested Answers to Question Six:***

(A)

***Chapter 02 – Financial Mathematics for Business***

$$P = 800,000, n = 5, r = 0.09$$

$$\text{Annual Installment } P = \frac{r(1+r)^n}{(1+r)^n - 1}$$

$$P = \frac{800,000 \times 0.09(1+0.09)^5}{(1+0.09)^5 - 1}$$

$$X = \underline{\underline{205,674}}$$

Annual Installment is Rs.205,674

(03 marks)

(B)

***Chapter 02 – Financial Mathematics for Business***

(a)

Year	Cash Flow		D.F. (10%)	Present Value (P)	Present Value (Q)
	P	Q			
0	(450,000)	(400,000)	1.000	(450,000)	(400,000)
1	250,000	250,000	0.909	227,250	227,250
2	200,000	200,000	0.826	165,200	165,200
3	125,000	75,000	0.751	93,875	56,325
<b>NPV</b>				<b>36,325</b>	<b>48,775</b>

Net Present Value of Project P = **36,325**Net Present Value of Project Q = **48,775**

(06 marks)

(b)

	Project P	Project Q
Investment	450,000	400,000
NPV	<b>36,325</b>	<b>48,775</b>

Net Present Values of both projects are positive.

But Project Q have a most positive NPV.

Therefore Project Q is the best investment.

(02 marks)

(C)

**Chapter 06 - Probability and its Applications**

Employment Category	Married	Unmarried	Total
Management	6	14	20
Office	25	10	35
Operations	45	30	75
Total	76	54	130

(a)  $\frac{45}{75} = \frac{3}{5} = 0.6$

(b)  $\frac{20}{130} = \frac{2}{13} = 0.1538$

(03 marks)

(D)

**Chapter 06 - Probability and its Applications**

X : The volume of a coffee jar (ml)

$\mu = 232$        $\sigma = 5\text{ml}$

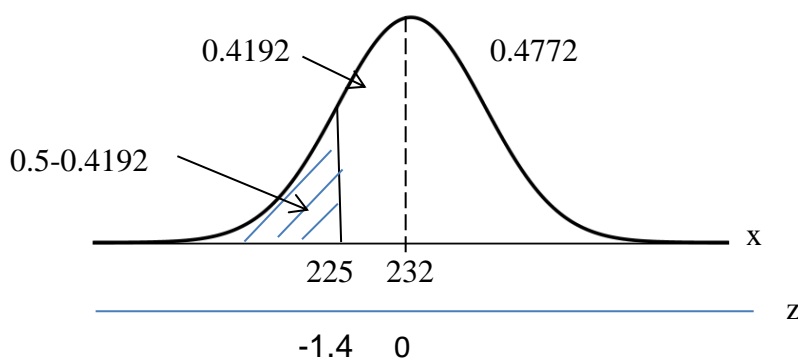
$$Z = \frac{X - \mu}{\sigma}$$

$$Z = \frac{X - 232}{5}$$

X = 225

$$Z = \frac{225 - 232}{5}$$

$$\underline{\underline{Z = -1.4}}$$



$$\begin{aligned}\Pr(x < 225) &= P(z < -1.4) \\ &= 0.5 - 0.4192 \\ &= \underline{\mathbf{0.0808 \text{ or } 8\%}}\end{aligned}$$

*(04 marks)*  
*(Total 20 marks)*

*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, designed 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.



---

*© 2021 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)*