PENINSULA COLLEGE
GEORGETOWN

FINAL EXAMINATION

Programme Name	:	**DIPLOMA IN LOGISTICS MANAGEMENT** **DIPLOMA IN BUSINESS STUDIES** **DIPLOMA OF ACCOUNTANCY**
Course Code & Name	:	**DBMT3013 BUSINESS MATHEMATICS**
Duration	:	**3 HOURS**

INSTRUCTIONS TO CANDIDATES:

1. Please read the instructions given in the question paper **CAREFULLY.**
2. The question paper consists of **FOUR (4)** questions.
3. Answer **ALL** questions in the question paper.
4. Answers to the questions are to be written into the examination booklet.
5. Electronic dictionaries, lecture notes, files or any unauthorised materials except writing equipment are strictly prohibited.

This question paper must be submitted along with all used and/or unused rough papers and/ or graph papers (if any). Candidates are **NOT ALLOWED** to take any examination paper(s) used or unused out of the examination hall.

WARNING:

The Examination Board of Peninsula College Georgetown regards cheating as a very serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed, and in the accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

(*This booklet contains 5 printed pages including this page*)

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ALLOWED TO DO SO

Answer **ALL** questions on the separate sheet provided. **[100 marks]**

1. a) Figure 1 below is a linear graph with the break-even point for a company. Answer the following questions.

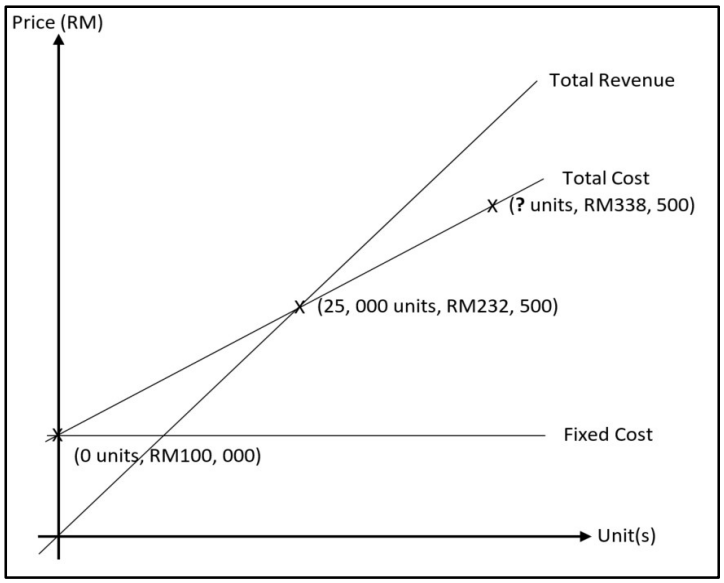

Figure 1 Break-Even Analysis of a Company

i) Calculate the selling price per unit. (3 marks)
$(Hint: BEP(RM) = BEP(unit) \times p)$

ii) Compute the variable cost per unit. (4 marks)
$\left(Hint: BEP(unit) = \frac{FC}{p - VC}\right)$

iii) Find the contribution margin ratio in decimal. Provide the answer in 4 decimal places. (3 marks)

iv) Identify the number of units if the total cost is RM338,500. (4 marks)

v) Prove and justify the break-even point on the graph in Figure 1. (6 marks)
$(Hint: Profit = TR - TC)$

b) Redraw the break-even analysis from **Question 1 (a)** and label the following items in the graph. (5 marks)

Profit, Loss, Variable Cost, Break-Even Point

Total: [25 marks]

2. ABC store can only sell a maximum of 100 packets of salt and 400 dozen eggs this month and decided to have two offers, x and y. Offer x is one bag of salt and one dozen eggs. This combination will sell for £30. Another offer is one packet of salt and six dozen eggs, which will sell for £50. XYZ store tries to sell the offers x and y as many as can maximise their sales.

   a) Formulate the objective function and constraints. (6 marks)

   b) Referring to answers in **Question 2 (a)**, convert the constraints in the matrix format. (3 marks)

   c) Using the row deduction, identify how many of each offer ABC store sells to maximise the sales. (11 marks)

   d) Calculate the maximum sales of the ABC store according to the answers in **Question 2 (c)**. (3 marks)

   e) Write a conclusion according to **Question 2 (d)** answers. (2 marks)

   Total: [25 marks]

3. a) Table 1 displays the situation of the events manager ordering food hampers. It shows different strategies and outcomes based on different weather.

Table 1: Outcomes based on Weather for Different Strategies

Strategies	**Weather Outcomes (£)**		
	Warm	**Cool**	**Cold**
Large Quantity	1,220	580	- 540
Medium Quantity	780	630	- 120
Small Quantity	610	340	130

Determine which strategies the events manager will employ by applying each decision criterion.

   i) Maximax Criterion (4 marks)

   ii) Maximin Criterion (4 marks)

   iii) Equally Likely Criterion (6 marks)

   b) Referring to Table 1 in **Question 3 (a)**, construct a decision tree if the probability of the warm and cold weather is the same, but the cool weather is 0.3. (11 marks)

   Total: [25 marks]

4. a) The quantity of vegetables consumed per day at a school canteen is recorded in Table 2:

Table 2: Quantity of Vegetables Consumed per Day at a School Canteen

Vegetables	Quantity per day in kilograms		
	2015	2016	2017
Cabbage	2.34	2.38	2.60
Lady Finger	6.00	6.50	7.00
Carrot	0.85	0.89	0.94
Long Bean	1.11	1.19	1.18

i) Compute the quantity in 2017 in terms of aggregate indexes based on 2015. Conclude on the answer calculated. (6 marks)

ii) Determine and explain the average quantity index for the vegetables consumed in 2016. (8 marks)

b) Table 3 shows the price and price index for four different types of stationeries A, B, C and D. Find the value of x, y and z. (11 marks)

Table 3: Stationeries Prices in 2021 and 2022 and its Price Index

Stationery	Price (RM) per unit		Price Index
	2021	2022	
A	2.50	2.00	z
B	2.00	y	135
C	x	5.80	116
D	3.50	4.20	120

Total: [25 marks]

- END OF QUESTIONS -

FORMULAE LIST

Break-Even Analysis

$Total\ Revenue, TR = p \times q$

$Total\ Cost, TC = FC + VC$

$Contribution\ Margin, CM = p - VC$

$Contribution\ Margin\ Ratio, CMR = \frac{p-VC}{p}$

$Break - Even\ Point, BEP = \frac{FC}{CM}$

$Break - Even\ Point, BEP = \frac{FC}{CMR} = BEP(unit) \times p$

$Profit = TR - TC$

Index Number

$Price\ Index, I = \frac{p_1}{p_0} \times 100$

$Quantity\ Index, I = \frac{q_1}{q_0} \times 100$

$Average\ of\ Price\ Index, I = \frac{\sum\left(\frac{p_1}{p_0} \times 100\right)}{k}$

$Average\ of\ Quantity\ Index, I = \frac{\sum\left(\frac{q_1}{q_0} \times 100\right)}{k}$

Decision Analysis

$Opportunity\ Loss = Best\ Payoff\ in\ the\ Column - Payoff$

$Weighted\ Average = \alpha(Maximum\ in\ Row) + (1 - \alpha)(Minimum\ in\ Row)$

$Expected\ Value, EV$

$= (Probability\ A \times Expected\ Payoff\ A) + (Probability\ B \times Expected\ Payoff\ B)$

- END OF FORMULAE LIST -