

FINAL SEMESTER EXAMINATION

Programme	:	DIPLOMA IN LOGISTICS MANAGEMENT
		DIPLOMA IN BUSINESS STUDIES
		DIPLOMA OF ACCOUNTANCY
Course	:	BUSINESS MATHEMATICS
Course Code	:	DBMT3013
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

For examiner's use only

QUESTION NO.	MARKS
1	/ 25
2	/ 25
3	/ 25
4	/ 25
Total	/ 100

Answer **ALL** questions on the separate sheet provided.

[100 marks]

1. a) A manufacturing company thinks of various alternatives to increase production to meet the market demand. The alternative and states of nature are shown below.

Alternative	State of Nature (Product Demand)			
	High	Moderate	Low	Nil
Expand	50,000	25,000	- 25,000	- 45,000
Construct	70,000	30,000	- 40,000	- 80,000
Subcontract	30,000	15,000	- 1,000	- 10,000

Determine which alternative the company will employ by applying each following decision criterion.

- i) Maximax Criterion (4 marks)
- ii) Minimax Regret Criterion (12 marks)

- b) Below is a decision table. Based on the data in the decision data, answer the following questions.

Decision Alternatives	Profits (RM)	
	Growing	Declining
Stocks	70	30
Mutual Funds	50	10

- i) Construct a decision tree if the probability of growing and declining are the same. (6 marks)
- ii) Calculate the expected value of the “stocks” decision alternative. (3 marks)
- Total: [25 marks]

2. Bernard has an E-store that sells handmade soaps. He sells one handmade herbal soap for ¥5 and one rose soap for ¥2. Making a herbal soap takes 20 minutes, while only 5 minutes for a rose soap. Bernard is a full-time lecturer. So, he makes handmade soaps in his free time. Bernard cannot spend more than 5 hours per week making handmade soaps. Moreover, he cannot make more than 27 bars of handmade soap in one week. He makes handmade soaps every week as much as he can to maximise his sales.

- a) Create an objective function. (2 marks)
- b) Formulate the inequalities on the two constraints. (3 marks)
- c) Referring to the answers in **Question 2 (b)**, find and plot the two points, then draw a straight line through points for two equations on graph paper. (13 marks)

- d) Identify how many bars for each flavour of handmade soap should be made by Bernard every week to maximise his sales on the graph drawn in **Question 2 (c)**.
(2 marks)
- e) According to inequalities identified in **Question 2 (b)**, shade the region(s) on the graph drawn in **Question 2 (c)**.
(1 mark)
- f) Calculate the maximum sales based on the answer in **Question 2 (d)**. Make a conclusion on the maximum sales.
(4 marks)
Total: [25 marks]
3. a) Draft a break-even analysis graph with proper labels on the graph paper.
(11 marks)

- b) The following information about the company Dotcom:

Fixed Office Overheads Cost	: RM60,000
Fixed Selling Overheads Cost	: RM12,000
Variable Manufacturing Cost Per Unit	: RM12
Variable Selling Cost Per Unit	: RM3
Selling Price Per Unit	: RM24

Compute the:

- i) Contribution Margin (CM) (4 marks)
- ii) Break-Even Point (BEP) in quantity, unit(s) (4 marks)
- iii) Number of units to be sold to earn a profit of RM90,000 (6 marks)
Total: [25 marks]

4. The following tables show the sales (in RM thousands) for a winter wear manufacturer from 2004 to 2006.

Year	Spring	Summer	Fall	Winter
2004	920	1085	1241	446
2005	1035	1180	1356	541
2006	1299	1324	1450	659

- a) Complete the table below to find the specific seasonal index. (17 marks)

Year	Quarter	Sales (in RM thousands)	Four- Quarter Moving Total	Four- Quarter Moving Average	Centred Moving Average	Specific Seasonal Index
2004	Spring	920				
	Summer	1085				
	Fall	1241				
	Winter	446				
2005	Spring	1035				
	Summer	1180				
	Fall	1356				
	Winter	541				
2006	Spring	1299				
	Summer	1324				
	Fall	1450				
	Winter	659				

- b) Calculate the correction factor according to answers in **Question 4 (a)**. (8 marks)
Total: [25 marks]

- END OF QUESTIONS -

FORMULAE LIST

Time Series Analysis and Forecasting

Least Squares Trend Line Equation $Y' = a + bt$

$$b = \frac{\Sigma tY - (\Sigma Y)\left(\frac{\Sigma t}{n}\right)}{\Sigma t^2 - \frac{(\Sigma t)^2}{n}}$$

$$a = \frac{\Sigma Y}{n} - b\left(\frac{\Sigma t}{n}\right)$$

$$\text{Correction Factor} = \frac{4}{\text{Total of Mean of Specific Seasonal Index for Four Seasons}}$$

Break-Even Analysis

Total Revenue, TR $TR = P \times Q$

Total Cost, TC $TC = FC + VC$

Contribution Margin, CM $CM = P - VC$

Contribution Margin Ratio, CMR $CMR = \frac{P-VC}{P} \times 100\%$

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

Break – Even Point, BEP $BEP = \frac{FC}{CMR} = BEP(\text{unit}) \times P$

Profit $Profit = TR - TC$

Decision Analysis

Opportunity Loss $= \text{Best Payoff in the Column} - \text{Payoff}$

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

Expected Value, EV

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

- END OF FORMULAE LIST -