



PENINSULA
COLLEGE
GEORGETOWN DK266-03(P)

FINAL EXAMINATION

Semester	:	JANUARY 2025 SEMESTER
Programme Name	:	DIPLOMA IN LOGISTIC MANAGEMENT DIPLOMA IN BUSINESS STUDIES
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 accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from Peninsula College Georgetown.

(This booklet contains 6 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) A sequence is given as 6 18 30...
- i) Identify the progression. (3 marks)
 - ii) Compute T_7 and S_{15} . (10 marks)
- b) Shopee Express has invested RM30,000 to buy a van for delivery. The van is projected to have a useful life of ten years, with an estimated salvage value of RM8,500 at the end of the ten year period. Using the straight-line depreciation method compute:
- i) the annual depreciation. (4 marks)
 - ii) the annual rate of depreciation. (4 marks)
 - iii) the book value of the vehicle at the end of the fifth year. (4 marks)
- Total: [25 marks]
2. a) The following Table 1 represents the prices and quantity of four types of imported fruits.

Imported Fruits	Price (RM per kilogram)		Quantity (kilogram)	
	2019	2020	2019	2020
Grapes	9	10.2	300	380
Oranges	3	3.8	2000	2500
Blue berry	10.6	14.2	100	200
Strawberry	12	13	250	210

Table 1

- i) Determine the Paasche's price index for year 2020. (14 marks)
 - ii) From **Q2(a)(i)**, find the value price index for year 2020. (6 marks)
- b) Given the linear programming as follows:
Maximize
- $$5x + 6y$$
- Subject to:
- $$12x + 6y \leq 70$$
- $$x, y \geq 0$$
- Determine the feasible region by using **graphic method**.

(5 marks)
Total: [25 marks]

3. a) The sales of a textile company from 2002 to 2018 are recorded in Table 2.

Year	2002	2003	2004	2005	2006	2007
Sales (RM mil)	5	6	8	10	5	2
Year	2008	2009	2010	2011	2012	2013
Sales (RM mil)	7	10	12	11	9	13
Year	2013	2015	2016	2017	2018	
Sales (RM mil)	15	18	15	11	14	

Table 2

Construct a 5 year moving average table based on data above. (13 marks)

- b) Table 3 shows the specific seasonal index for a winter wear manufacturer from 2004 to 2009.

Year	Spring	Summer	Fall	Winter
2004			1.1799	1.5030
2005	0.7715	0.5404	1.1297	1.5499
2006	0.7753	0.5533	1.1413	1.5347
2007	0.7527	0.5812	1.1265	1.5584
2008	0.7329	0.5899	1.1429	1.4665
2009	0.8010			

Table 3

- i) Refer to the data in Table 3, find the correction factor. (8 marks)
- ii) Based on **Q3(b)**, compute the first and second typical index. (4 marks)
- Total: [25 marks]

4. Table 4 displays the situation of Annuar planning to buy books for his friend's birthday. It shows his survey and outcomes based on different shops.

Survey	Price of Item (RM)			
	Shop A	Shop B	Shop C	Shop D
Buy 5 books	1243	260	590	870
Buy 10 books	450	550	350	434
Buy 15 books	500	264	1500	2254
Buy 20 books	650	153	1950	300

Table 4

4. a) Develop a table to for the following criterion:
- i) Maximax criterion (4 marks)
 - ii) Maximin criterion (4 marks)
 - iii) Minimax regret criterion (4 marks)
 - iv) Equally likely criterion (4 marks)
 - v) Criterion of Realism (4 marks)
(*Coefficient of realism, $\alpha = 0.5$*)
- b) Based on the data obtained from **4(a)**, provide justification for each criterion. (5 marks)
- Total: [25 marks]

- END OF QUESTIONS -

FORMULAE LIST

Financial Mathematics

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

$$d = a_2 - a_1 = a_3 - a_2$$

$$r = \frac{a_2}{a_1} = \frac{a_3}{a_2}$$

$$T_n = a_1 + (n - 1)d$$

$$\text{Term} = T_n = ar^{n-1}$$

$$\text{Sum of infinity, } S_\infty = \frac{a}{1 - r}$$

$$\text{Annual Depreciation} = \frac{\text{Cost} - \text{Salvage Value}}{\text{Useful Life}}$$

$$\text{Depreciation Rate, } r = \frac{1}{\text{Useful life}} \times 100\%$$

$$\text{Accumulates depreciation} = \text{Annual depreciation} \times \text{Numbers of years}$$

$$\text{Book Value, } BV = \text{Cost} - \text{Accumulated Depreciation}$$

$$\text{Book Value, } BV = C(1 - r)^n$$

$$\text{Interest, } I = Prt$$

$$\text{Simple interest, } A = P(1 + rt)$$

$$\text{Compounded Amount, } A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Times Series

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

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

$$\text{Correction Factor, } CF = \frac{4.00}{\text{Total Means}}$$

Break Even Analysis

$$\text{Total Revenue, } TR = P \times Q$$

$$\text{Total Cost, } TC = FC + VC$$

$$\text{Contribution Margin, } CM = P - VC$$

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

$$\text{Break - even Point, } BEP(\text{Unit}) = \frac{FC}{CM}$$

$$\text{Break - even Point, } BEP(\text{Price}) = \frac{FC}{CMR} = BEP(\text{unit}) \times P$$

$$\text{Profit} = TR - TC$$

Index Number

$$\text{Price Index, } I = \frac{P_1}{P_0} \times 100$$

$$\text{Average of Price Index} = \frac{\sum \frac{P_1}{P_0} \times 100}{k}$$

$$\text{Aggregate of Price Index} = \frac{\sum P_1}{\sum P_0} \times 100$$

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

$$\text{Average of Quantity Index, } I = \frac{\sum \frac{q_1}{q_0} \times 100}{k}$$

$$\text{Aggregate of Quantity Index} = \frac{\sum q_1}{\sum q_0} \times 100$$

$$\text{Paasche's Price index} = \frac{\sum P_1 Q_1}{\sum P_0 Q_1} \times 100$$

$$\text{Laspeyres's Price index} = \frac{\sum P_1 Q_0}{\sum P_0 Q_0} \times 100$$

$$\text{Value Price index} = \frac{\sum P_1 Q_1}{\sum P_0 Q_0} \times 100$$

Decision Analysis

$$\text{Weighted average} = \alpha(\text{maximum in row}) + (1 - \alpha)(\text{minimum in row})$$

- END OF FORMULAE LIST -