PENINSULA COLLEGE GEORGETOWN

# TAKE HOME EXAMINATION

**Student NRIC** : _____

**Student ID** : _____

| | | |
|---|---|---|
| Programme | : | **DIPLOMA IN LOGISTICS MANAGEMENT (MQA/FA9212)** |
| | | **DIPLOMA IN BUSINESS STUDIES (MQA/FA9259)** |
| | | **DIPLOMA OF ACCOUNTANCY (MQA/FA10069)** |
| Intake | : | **MAY 2021 (YEAR 1 SEMESTER 1)** |
| | | **JAN 2021 (YEAR 1 SEMESTER 2)** |
| 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.
4. Answers to the questions are to be written into own A4 sized papers.
5. Please write your NRIC number or student ID number on every page of your answer script. **Do NOT** write your name.
6. Please write a page number on every page of your answer script.
7. Please **KEEP** the hardcopy of your answer script.

**WARNING:**

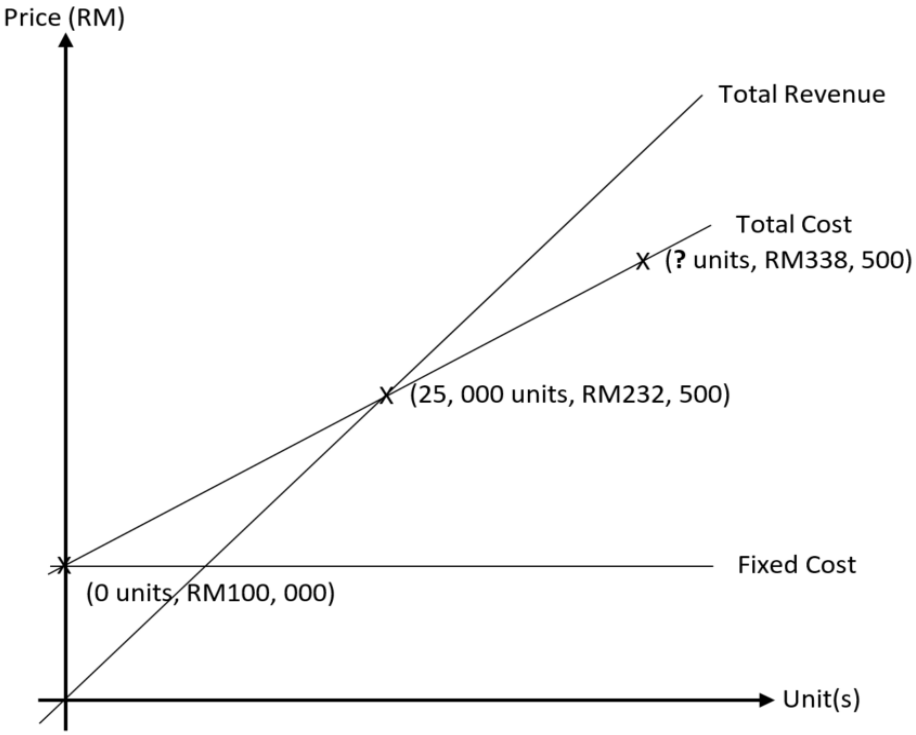
The Examination Board of Peninsula College Georgetown regards cheating as a most serious offence and will not hesitate to mete out the appropriate punitive actions according to the severity of the offence committed and in the accordance with the clauses stipulated in the Students' Handbook, up to and 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 own A4 sized papers. **[100 marks]**

1. a) Below is a linear graph with the break-even point of a company. Answer the following questions.




i) Calculate the selling price per unit. (4 marks)

ii) Compute the variable cost per unit. (4 marks)

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

iv) Get the number of units if the total cost is RM 338, 500. (4 marks)

v) Prove and justify the break-even point on the graph. Justify the solution also. *(Hint: Profit = TR - TC)* (5 marks)

b) The following tables show the specific seasonal index for a winter wear manufacturer from 2004 to 2009. Refer to the data below, find the correction factor. (5 marks)

| 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 | | | |

2. XYZ store wants to sell 100 packets of salt and 400 dozen eggs this month. The management has decided to has two offers, $x$ and $y$. Offer $x$ is a combination of 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.

   a) Create an objective function and two constraints. (3 marks)

   b) According to **Question 2 (a)** answers above, rewrite them into equations by variables, $a$ and $b$. (2 marks)

   c) Refer to answers in **Question 2 (b)** above, construct a simplex tableau. (2 marks)

   d) Using answers in **Question 2 (c)** above, identify how many of each offer XYZ store have to sell to maximise the sales. (16 marks)

   e) Write a conclusion based on **Question 2 (d)** answers. (2 marks)

3. a) Galvin's shopping cart contains three items: face masks, face shields and sanitisers with the following prices and quantities in 2020 and 2021:

| Items | Quantity | Price (RM) | |
|---|---|---|---|
| | | 2020 | 2021 |
| Face Masks | 5 boxes | 20 / box | 25 / box |
| Face Shields | 10 pieces | 5 / piece | 5.50 / piece |
| Sanitisers | 2 bottles | 50 / bottle | 60 / bottle |

   Compute the price index for the shopping carts in 2021. Interpret the result computed. (8 marks)

   b) The quantity of vegetables consumed per day at a school canteen is recorded as below:

| 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 |

   Express the quantity in 2017 in terms of aggregate indexes. Comment the answer calculated. (5 marks)

c) The prices per 400 grams of canned food for the years 2018 and 2019 were as follow:

| Canned Food | Price in RM | |
|---|---|---|
| | 2018 | 2019 |
| Chick Peas | 3.20 | 3.80 |
| Kidney Beans | 3.00 | 3.40 |
| Chopped Tomatoes | 4.00 | 4.30 |
| Sweet Kernel Corn | 2.80 | 3.10 |
| Baked Bean | 3.40 | 3.90 |

Calculate and explain the average relative price index for the canned food stated above. (7 marks)

d) Determine whether it is possible to get the sum to infinity, $S_\infty$, in the geometric progression below. Justify your answer with the help of a solution. (5 marks)

$$10, 5, \frac{5}{2}, \frac{5}{4}, \frac{5}{8}$$

4. a) Bernard has an E-store that sells handmade soaps. He sells one handmade herbal soap for ¥5 and rose soap for ¥2. Making a herbal soap takes 20 minutes while only 5 minutes for a rose soap. Lecturer as Bernard full-time job, thus he makes handmade soaps in his free time only. He cannot spend more than 5 hours per week making handmade soaps. Moreover, he should make not more than 27 bars of handmade soaps in a week.

i) Create an objective function. (2 marks)

ii) Formulate the inequalities on the two constraints. (3 marks)

iii) According to answer **Question 4a (ii)**, find and plot the two points and draw the straight line through points for two equations on the graph paper. (8 marks)

iv) At the answer to **Question 4a (iii)** on the graph paper, identify how many each flavour of handmade soaps should he make every week to maximise his sales. (2 marks)

v) Refer to answer **Question 4a (ii)**, shade the region(s) at the answer **4a (iii)** on the graph paper. (1 mark)

vi) Conclude with a simple calculation based on **Question 4a (iv)** answers. (3 marks)

b) Below is a decision table. Assuming that the probability of the growing and declining are the same, construct a decision tree based on the following data. (6 marks)

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

***- END OF QUESTIONS -***