

FINAL EXAMINATION

Semester	:	JANUARY 2026 SEMESTER
Programme Name	:	CERTIFICATE IN BUSINESS STUDIES
Course Code & Name	:	CBS1034 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 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]

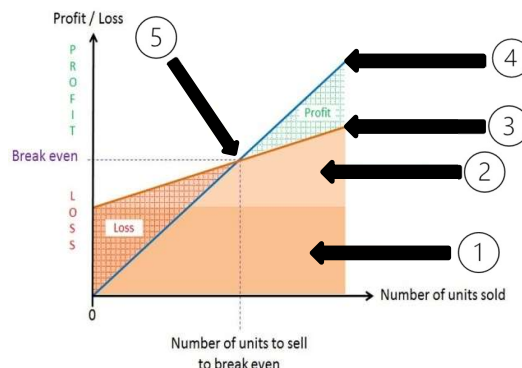
1. a) Based on the following situations, write the proportion in the form of " $a:b = c:d$ or $a:b::c:d$ ".
- i) In two different bakeries, the number of chocolates to vanilla cakes follows a proportional relationship. The first bakery has a ratio of 5 chocolate cakes to 15 vanilla cakes, and the second bakery has a ratio of 10 chocolate cakes to 30 vanilla cakes. (2 marks)
 - ii) David invested RM15,000, Olivia RM20,000, and Emily RM30,000 in a start-up. Their profit was shared based on their investments. Find the proportion of the profit shared between Olivia and Emily based on their investments. (2 marks)
 - iii) The recipe calls for 150 grams of butter for every 400 grams of sugar. Another recipe calls for 300 grams of butter for every 800 grams of sugar. What is the proportional relationship between butter and sugar in both recipes? (2 marks)
- b) Convert the following linear equation into the slope-intercept form ($y = mx + c$).
- i) $2x + 3y = 6$ (3 marks)
 - ii) $y - 3 = 2(x + 4)$ (3 marks)
 - iii) $3y = 5(x + 2) - 4$ (3 marks)
- c) A company is analyzing the profit equation for a new product, where the quadratic equation representing the relationship between the profit and the number of units sold is given by:
- $$x^2 + 6x - 7 = 0$$
- The company wants to find the values of x (the number of units sold) using both the **completing the square** method and the **quadratic formula** method. The company also needs to compare the solutions for each method. (10 marks)
- Total: [25 marks]
2. a) For the software development company, identify **THREE (3)** examples of **fixed costs** and **THREE (3)** examples of **variable costs**. (6 marks)

2. b) A retail company is evaluating two different suppliers and their associated cost structures for a new product line. The company plans to sell a total of 3,000 units of a new item throughout the next month. The selling price per unit is fixed at RM 120. The cost structures for the two suppliers are as follows:

- Supplier A:
 - Monthly fixed overhead costs: RM 25,000
 - Variable cost:
 - Raw material cost: RM 30 per unit
 - Labor cost: RM 40 per unit
- Supplier B:
 - Monthly fixed overhead costs: RM 18,000
 - Variable cost:
 - Raw material cost: RM 35 per unit
 - Labor cost: RM 45 per unit

- i) Calculate the **total sales revenue** from selling 3,000 units. (2 marks)
- ii) Calculate the **total cost** for both supplier lines. (6 marks)
- iii) Determine the **profit** or **loss** for both supplier lines. (4 marks)
- iv) **Justify your decision** on which supplier line is the best to use. (2 marks)

- c) Identify the components labelled 1 to 5 in the provided break-even analysis chart. (5 marks)



Total: [25 marks]

3. a) Tectonic Innovations bought a piece of machinery for RM 8,000. The company estimates that the machinery's useful life will be 6 years. After 6 years, the machinery will have a residual value of RM 1,000.

Prepare a **depreciation schedule** for the first 4 years (**Starting with year 1**).

(13 marks)

- b) A company uses the declining-balance method to calculate depreciation for its assets. The company purchased several assets over the years and is now evaluating their depreciation after a certain period. The declining-balance method uses the formula:

$$\text{Book Value} = \text{Original Cost} (1 - \text{rate})^n$$

- i) Scenario 1: A manufacturing company bought a machine for RM 100,000 and applied a 15% annual depreciation rate using the declining-balance method.

3. Calculate the machine's **book value** and **accumulated depreciation** at the end of **3 years**. (4 marks)
- ii) Scenario 2: A company purchased an asset with an original cost of RM 50,000. After 2 years, the book value of the assets is RM 30,000. Calculate the **annual depreciation rate** used for this asset. (4 marks)
- iii) Scenario 3: An office equipment was purchased for RM 12,000. After 5 years, the accumulated depreciation is RM 6,000. Using the declining-balance method, determine the **book value** of the asset and the **annual depreciation rate** used (4 marks)
- Total: [25 marks]

4. a) The following table shows the average price (RM) of five types of electronics of an electronic company in 2020 and 2021:

Type of Electronics	Price (2020)	Price (2021)
Laptops	RM 3,500	RM 4,000
Smartphones	RM 1,800	RM 2,200
Headphones	RM 300	RM 350
Tablets	RM 1,200	RM 1,400
Smartwatches	RM 1,000	RM 800

- i) Using 2020 as the base year, find the **simple aggregate price index** for the electronics. (3 marks)
- ii) Using 2020 as the base year, compute the **price relative** for each electronic item. (10 marks)
- iii) From your answers in **3(a)(ii)**, determine the **average of the relative price index**. (2 marks)
- b) The electronics company is now tracking the sales of five different types of electronics in 2020 and 2021. The company has calculated the relative quantity index for the electronics based on their sales volume, using 2020 as the base year.

Type of Electronics	Sales (2020)	Sales (2021)
Laptops	500 units	600 units
Smartphones	700 units	850 units
Headphones	1,200 units	1,500 units
Tablets	800 units	900 units
Smartwatches	400 units	500 units

Calculate the **relative quantity index** for each electronic item using **2020 as the base year**. (10 marks)

Total: [25 marks]

- END OF QUESTIONS -

FORMULAE LIST

Financial Mathematics

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

- END OF FORMULAE LIST -