



UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET

COURSE CODE	: BGE 1122 571
COURSE	: FUNDAMENTAL MATHEMATICS FOR COMPUTER SCIENCE
SEMESTER/SESSION	: 1-2024/2025
DURATION	: 3 HOURS

Instructions:

1. This booklet contains **9** questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

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

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

BGE 1122 FUNDAMENTAL MATHEMATICS FOR COMPUTER SCIENCE

INSTRUCTION: ANSWER ALL QUESTIONS. (100 MARKS)

QUESTION 1

Solve the following expression.

a) $35 - 50 \div 2 + 3[5 + (-2)(-1)]$ (3 marks)

b) $5 - 3(5x + 2) = 4(7 - 3x) + 1$ (3 marks)

QUESTION 2

a) What is the prime factorization of 162? (2 marks)

b) The ratio of female student to the number of male student in a school is 16:9.
If the total number of students in the school is 3525, find the difference between the number of female and male students.

(5 marks)

QUESTION 3

a) Solve the following inequalities.

(i) $\frac{5x+7}{2} - \frac{1-x}{3} \leq x+4$ (4 marks)

(ii) $2 + 3|4x-1| \geq 8$ (4 marks)

(iii) $3(9^{x+4}) = 27^{x+1}$ (5 marks)

b) Given that $\log_b 3 = 1.5850$, $\log_b 7 = 2.8074$ and $\log_b 12 = 3.585$, find the value of:

(i) $\log_b 21$ (4 marks)

(ii) $\log_b \sqrt[3]{4}$ (4 marks)

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QUESTION 4

- a) The price of a cell phone was discounted by 25% and then discounted an additional 10% to become as RM 455. What was the original price of the cell phone before it was discounted twice? (5 marks)

- b) Solve the following logarithmic equations.

$$\log_3(x+25) - \log_3(x-1) = 3 \quad (6 \text{ marks})$$

QUESTION 5

- a) Find the n th term of the following series.

$$1+3.5+6+8.5+\dots+101$$

(5 marks)

- b) Given that the 4th term of an arithmetic progression is 18 and the sum of the first 8 terms is 124. Find the first term and common difference.

(6 marks)

- c) Find the sum of the following geometric progression.

$$2, 6, 18, \dots, 118098$$

(6 marks)

QUESTION 6

- a) Suppose a graph has vertices of degree 1, 2, 3, 4, 4 and 6. How many edges does the graph have? (3 marks)

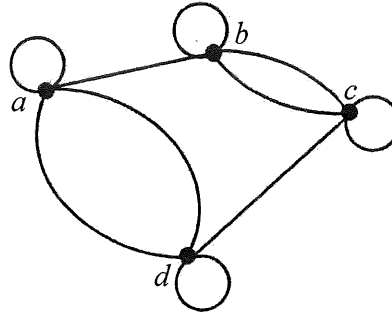


Figure 1

- b) Define the vertex set and its edge set in Figure 1. (2 marks)
- c) Find the total degree of graph in Figure 1. (2 marks)

QUESTION 7

- a) Draw an undirected graph with multiple edges and loops based on the given information.

$$V = \{P, Q, R, S, T\}$$

$$E = \{(P, T), (P, T), (P, Q), (T, S), (T, Q), (Q, R), (Q, S), (S, S), (S, R), (R, R)\}$$

(4 marks)

- b) Draw two spanning trees based on the graph in Figure 2.

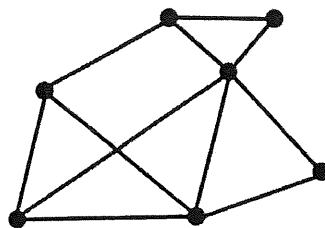


Figure 2

(6 marks)

Lily started working for a company on 1 January 2008 with an initial annual salary of RM 28800. Every January, the company increased his salary by 5% of the previous year's salary. The annual salary forms a geometric sequence with common ratio 1.05. Find:

- ### QUESTION 9

a) Draw the Minimal Spanning Tree using Kruskal's Algorithm. (8 marks)

b) Calculate the minimum total weight. (2 marks)

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FORMULA

$x^m \cdot x^n = x^{m+n}$	$\frac{x^m}{x^n} = x^{m-n}$
$(x^n)^m = x^{nm}$	$(xy)^n = x^n y^n$
$x^{1/n} = \sqrt[n]{x}$	$\sqrt[n]{xy} = \sqrt[n]{x} \sqrt[n]{y}$
$(x)^{-n} = \frac{1}{x^n}$	$x^{m/n} = \sqrt[n]{x^m}$
$\left(\frac{x}{y}\right)^n = \frac{x^n}{y^n}$	$\sqrt[n]{\frac{x}{y}} = \frac{\sqrt[n]{x}}{\sqrt[n]{y}}$
$ x = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$	$ x-a = \begin{cases} x-a & \text{if } x \geq a \\ -(x-a) & \text{if } x < a \end{cases}$
$\log_a xy = \log_a x + \log_a y$	$\log_a \frac{x}{y} = \log_a x - \log_a y$
$\log_a x^n = n \log_a x$	$\log_a a = 1$
$\log_a 1 = 0$	$\log_a (a)^x = x$
$T_n = a + (n-1)d$	$T_n = ar^{n-1}$
$S_n = \frac{n}{2} [2a + (n-1)d]$	$S_n = \frac{a(1-r^n)}{1-r}$
$\Sigma d(V) = 2(E); \quad v \in V$	