PENINSULA COLLEGE GEORGETOWN DK266-03(P)

FINAL EXAMINATION

Semester	:	**MAY 2025 SEMESTER**
Programme Name	:	**FOUNDATION IN ARTS**
Course Code & Name	:	**FA1134 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 4 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) The *n*th term of an arithmetic sequence is given as $\frac{1}{20}(7n-2)$. Find the first term, the second term and the common difference. (9 marks)

   b) Use the properties of logarithm to find the value of the following expressions:

      i) $log_6 24 + log_6 15 - log_6 60$ (4 marks)

      ii) $\dfrac{log_7 14 - log_7 2}{log_7 98 - log_7 30 + log_7 15}$ (4 marks)

   c) Solve the quadratic equation $12x^2 = 3x + 50 + 25$ by using quadratic formula. (8 marks)

   Total: [25 marks]

2. a) The following Table 1 shows the time taken to study Mathematics by a group of student in Peninsula College.

Table 1: Time taken to study

Time spent (min)	Number of students, f
1-20	7
21-40	12
41-60	26
61-80	35

Find the standard deviation of the marks scored. (18 marks)

   b) Determine Q_1, Q_2, and Q_3 for the following data

$$3, 4, 8, 9, 10, 15, 19, 20, 21$$

(7 marks)

Total: [25 marks]

3. a) There are milk tea and coffee being sold in a shop. The numbers of drinks sold during 2 days are shown in the table below. The income received from the sale on that day 1 and day 2 was RM1250 and RM1232.00 respectively. If the price of milk tea is RM *x* and the price of coffee is RM *y*, find the values of *x* and *y*.

Drinks	Milk Tea	Coffee
Day 1	62	27
Day 2	53	37

(15 marks)

b) Given the following matrices.

$$\boldsymbol{A} = \begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix} \qquad \boldsymbol{B} = \begin{bmatrix} 1 & 4 \\ 0 & 2 \end{bmatrix}$$

Find:

i) $\boldsymbol{2A}$ (4 marks)

ii) $\boldsymbol{3A - B}$ (6 marks)

Total: [25 marks]

4. a) Find the indefinite integral for each of the following using substitution method.

i) $\int x(2x+7)^3 dx$ (6 marks)

ii) $\int \frac{1-x}{(1+x)^3} dx$ (6 marks)

b) Differentiate the following functions with respect to x using quotient rule.

$$f(x) = (2+x)^{-1}(x-4)$$

(7 marks)

c) Determine the second and third derivatives for the following function

$$g(x) = 6x^7 + 5x^2 + 5x - 25$$

(6 marks)

Total: [25 marks]

- END OF QUESTIONS –

FORMULAE LIST

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

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

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

$$Mean, \bar{x} = \frac{\sum fx}{\sum f} \quad (grouped\ data)$$

$$Mean, \bar{x} = \frac{\sum x}{N} \quad (ungrouped\ data)$$

$$\sigma^2, variance = \frac{\sum fx^2}{\sum f} - \bar{x}^2 \quad (grouped\ data)$$

$$\sigma, standard\ deviation = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2} \quad (grouped\ data)$$

$$\sigma^2, variance = \frac{\sum(X - \mu)^2}{N} \ or \ \frac{\sum(x)^2}{N} - \bar{x}^2 \quad (ungrouped\ data)$$

$$\sigma, standard\ deviation = \sqrt{\frac{\sum(X - \mu)^2}{N}} \ or \ \sqrt{\frac{\sum(x)^2}{N} - \bar{x}^2} \quad (ungrouped\ data)$$

$$A.X = B$$

$$A^{-1} = \frac{1}{ad - bc}\begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

$$x = \frac{\left(-b \pm \sqrt{(b^2 - 4ac)}\right)}{2a}$$

$$f'(x) = \frac{h(x)g'(x) - g(x)h'(x)}{\left(h(x)\right)^2} \quad (Quotient\ Rule)$$

- END OF FORMULAE LIST -