BERJAYA
UNIVERSITY COLLEGE

FACULTY OF BUSINESS

FINAL EXAMINATION

Student ID (in Figures) :

Student ID (in Words)   :

Subject Code & Name   : **MAT1513 MATHEMATICS FOR BUSINESS**
Semester& Year   : September – December 2023
Lecturer/Examiner   : Suhada Binti Ishak
Duration   : 3 Hours

INSTRUCTIONS TO CANDIDATES

1. **This question paper consists of 2 parts:**
    PART A (30 marks) : THIRTY (30) multiple choice questions. Answer ALL questions. Shade your answers in the Multiple Choice Answer Sheet provided.
    PART B (70 marks) : FOUR (4) problem solving questions. Answer ALL questions. Answers are to be written in the Answer Booklet provided.

2. **Candidates are not allowed to bring any unauthorized materials except writing equipment and scientific calculator into the Examination Hall. Electronic dictionaries are strictly prohibited.**

3. **This question paper must be submitted along with all used and/or unused rough papers and/or graph paper (if any). Candidates are NOT allowed to take any examination materials out of the examination hall.**

4. **Only ballpoint pens are allowed to be used in answering the questions, with the exception of multiple choice questions, where 2B pencils are to be used.**

WARNING: The University Examination Board (UEB) of BERJAYA University College of 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 accordance with the clauses stipulated in the Students' Handbook, up to and including expulsion from BERJAYA University College of Hospitality.

Total Number of pages = 9 (Including the cover page)

PART B   **: PROBLEM SOLVING QUESTIONS (70 MARKS)**

INSTRUCTION(S)   **: FOUR (4)** problem solving questions. Answer **ALL** questions. Answers are to be written in the Answer Booklet provided.

QUESTION 1

a) En. Rahman is planning to invest RM 35,000 in two projects, A and B. The two projects will gain an annual income of RM 1,900. Project A will pay back 5% per year while Project B will pay back 6% per year due to a higher level risk involved. Hence, determine how much should Encik Rahman invest for each project.

(5 marks)

b) By using the graph paper, sketch and shade the region that satisfies the following inequalities:

$$5x + 3y < -15$$

(5 marks)

[Total: 10 marks]

QUESTION 2

a) Evaluate $\displaystyle\lim_{x \to \infty} \frac{2x + 3}{x^2 + 1}$ (5 marks)

b) Given $f(x) = \begin{cases} \dfrac{x^3 - 216}{x - 6} & , x \neq 6 \\ 100 & , x = 6 \end{cases}$

    i.   Find $\displaystyle\lim_{x \to 6} f(x)$ (5 marks)

    ii.   Is $f(x)$ continuous at $x = 6$? Give your reason.   (2 marks)

c) Nouman pays RM200 for 2 pair of shirts and 2 pair of trousers while Nawal pays RM 500 for 1 shirt and 6 trousers for Hari Raya. If x and y represent the price of a shirt and a trouser respectively, write a system of linear equation in matrix form based on the information given. Using inverse matrix, $X = A^{-1}b$, determine the price of a shirt and a trouser.

(8 marks)

[Total: 20 marks]

Question 3

a) Differentiate the following with respect to x

   i. $y = (x+3)^6$

(4 marks)

   ii. $f(x) = (3x^2 + 7)(6 - 5x)$ (4 marks)

 b) Differentiate the following function to 3 higher order derivatives, $f^{(3)}(x)$:
$$f(x) = 5x^3 + 3x^2 + 2x + 5$$

(3 marks)

 c) Find the critical point(s) by using second derivative test of the curve $f(x) = 2x^3 - 3x^2 - 12x + 2$. Hence, by using the graph paper, sketch the graph.

(14 marks)

[Total 25 marks]

QUESTION 4
a) Using basic rules of integration, find

   i. $\int \dfrac{3}{x^5} dx$ (2 marks)

   ii. $\int \sqrt[3]{x^5} dx$ (2 marks)

   iii. $\int \dfrac{2x^5 - 3}{x^2} dx$ (2 marks)

   iv. $\int (3x + 2)x^2 dx$ (2 marks)

   v. $\int \dfrac{5}{2 - 6x} dx$ (2 marks)

b) Integrate $\int x^{-2} \ln x \, dx$ by using integration by part. (5 marks)

[Total: 15 marks]

END OF QUESTIONS