UNIRAZAK
UNIVERSITI TUN ABDUL RAZAK

FINAL EXAMINATION
MARCH 2024

COURSE TITLE	CALCULUS
COURSE CODE	EMAT3113
DATE/DAY	21 JUNE 2024 / FRIDAY
TIME/DURATION	09:00 AM - 11:00 AM / 02 Hour(s) 00 Minute(s)

INSTRUCTIONS TO CANDIDATES :

1. Please read the instruction under each section carefully.
2. Candidates are reminded not to bring into examination hall/room any form of written materials or electronic gadget except for stationery that is permitted by the Invigilator.
3. Students who are caught breaching the Examination Rules and Regulation will be charged with an academic dishonesty and if found guilty of the offence, the maximum penalty is expulsion from the University.

(This Question Paper consists of 2 Printed Pages including front page)

DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

SECTION A (50 Marks)

There are FIVE (5) questions in this section. Answer ALL questions in the answer booklet.

1. Differentiate the following function using chain rule

   a. $y = (4x^3 + 5x^2 - 2x + 1)^4$ (5 Marks)

   b. $y = (3x - 2)^3$ (5 Marks)

2. Find the critical points of the following functions

   a. $f(x) = x^2 - 2x^2 - 4x + 6$ (5 Marks)

   b. $f(x) = 4x + \frac{1}{x}$ (5 Marks)

3. Let $P(x) = 3x^5 + 5x^4 - 4x^3 + 7x + 3$ then,

   a. Find the quotient and remainder when P(x) is divided by x + 2 (6 Marks)

   b. Use the Remainder Theorem to find P (-2) (4 Marks)

4. Using the power rule, differentiate the following function:

   a. $f(x) = (3x^5 + 1)^5$

   b. $f(x) = (x^2 - 2x)^4$ (10 Marks)

5. Given that $f(x) = \frac{2}{3}x^3 + \frac{3}{2}x^2 - 2x + 5$ then, by using the First Derivative Test, find the relative (local) maximum point and relative (local) minimum point. (10 Marks)

*** END OF QUESTION PAPER ***