UNIRAZAK
UNIVERSITI TUN ABDUL RAZAK

FINAL EXAMINATION
NOVEMBER 2023

COURSE TITLE	**PERSPECTIVE IN MATHEMATICS**
COURSE CODE	**EMAT3163**
DATE/DAY	**16 FEBRUARY 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 3 Printed Pages including front page)

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

There are SEVEN (7) questions in this part. Answer ALL questions in the answer booklet.

[50 MARKS]

Question 1 (5 Marks)

Convert the Mayan Numbers to Hindu-Arabic Numbers system.

Question 2 (5 Marks)

Define set. Then, explain with example how are sets designated.

Question 3 (5 Marks)

Construct a truth table to determine whether the given statement is a tautology, a contingency, or an absurdity.

$$(p \vee \sim q) \vee \sim(q \wedge p)$$

Question 4 (5 Marks)

One can prove that the greatest common divisor of two (2) Fibonacci numbers is also a Fibonacci number; specifically,

$$gcd(F_n, F_m) = F_d, \quad where\ d = gcd(n, m).$$

Verify this identity in the case of $gcd(F_{15}, F_{20})$.

Question 5 (10 Marks)

Express the binary number $(111111)_2$ as a decimal number and then convert the decimal number to the octal number.

Question 6 (10 Marks)

The Lucas numbers are closely related to the Fibonacci numbers and satisfy the same recursion relation $L_{n+1} = L_n + L_{n-1}$, but with starting values $L_1 = 1$ and $L_2 = 3$. Determine the first **TEN (10)** Lucas numbers.

Question 7 **(10 Marks)**

(a) State **THREE (3)** conditions to determine a Euler circuit and Euler path.

(b) Determine with reasons whether the graph in **Figure 1** below has a Euler circuit or a Euler path. Then suggest **ONE (1)** graph of your decision. Begin at *A*.
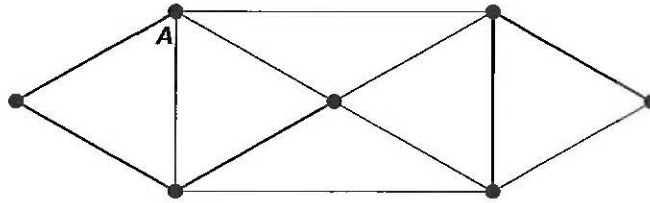

Figure 1

*** **END OF QUESTION PAPER** ***