UNIRAZAK
UNIVERSITI TUN ABDUL RAZAK

FINAL EXAMINATION

MARCH 2024

COURSE TITLE	**DISCRETE MATHEMATICS**
COURSE CODE	**EMAT3133**
DATE/DAY	**20 JUNE 2024 / THURSDAY**
TIME/DURATION	**02:00 PM - 04:00 PM / 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

SECTION A

There are FOUR (4) questions in this question paper. Answer ALL questions in the answer booklet. [50 MARKS]

1. Given the following statement:

"If the Covid 19 prevent myself from learning or the economic recession prevent myself from learning, then I will start my home cooked lunch business".

a) List all the single statements (using variables a, b and c). (6 marks)

b) State the compound statement using the logical notation. (3 marks)

c) State the converse, inverse and contrapositive using the logical notation. (3 marks)

2. Justify this logical equivalence regarding statement formulas is **Tautology**

$$p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$$

and

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

(8 marks)

3. Give the accurate justification and example for the equivalence relation properties of

a) Symmetric
b) Transitive
c) Reflexive

(6 marks)

4. By using mathematical induction prove the following statements are true for all positive integer n:

$$\sum_{i=1}^{n} (2i-1)^2 = \frac{n(2n-1)(2n+1)}{3}$$

(8 marks)

5. By using the vertical line test approach,draw the graph and justify the equation below is a function

a) $x^2 + 9x - 7 = 0$ (8 marks)

b) $(x-3)^2 + (y-9)^2 = 9$ (8 marks)

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