

PART A: Determine whether each of these statements is **T** (True) or **F**(False)

- (a) If p and q are prime numbers, then $p \cdot q$ is prime number
- (b) 1 is not a composite number.....
- (c) If $x \equiv 3 \pmod{6}$, then $(x + 3) \equiv 0 \pmod{6}$
- (d) $4x \equiv 0 \pmod{2}$ for all $x \in \mathbb{Z}$
- (e) Let A be a set, where $A = \{\emptyset\}$. Therefore, A is an empty set
- (f) Given two sets, $A = \{1, 3, 5, 7, 9\}$ and $B = \{2, 4, 6, 8\}$, then $A - B = A$
- (g) If $|L \times L| = 400$, then $|P(L)| = 2^{400}$
- (h) By using division algorithm, $26 = 4 \cdot 5 + 6$
- (i) $\overline{A \cap B} = \overline{A} \cap \overline{B}$
- (j) Let two sets, J be \emptyset and K be non-empty set. Thus, $J \times K = \emptyset$

(10 marks)

PART B
Question 2

(a) Let $\text{GCD}(1545, 240) = m$. Determine the value of m using Euclidean algorithm.

(4 marks)

(b) Express m in the form of $x \cdot 1545 + y \cdot 240$ where $x, y \in \mathbb{Z}$.

(6 marks)

(c) Solve the congruence of $4x \equiv 2 \pmod{3}$ if possible. If no solution exists, explain why not.

(5 marks)

Question 3

(a) Let set $N = \{\emptyset, b, 5\}$

(a) Determine $P(N)$.

(2 marks)

(b) Determine $N \times N$.

(2 marks)

(c) Let $Z = \{x | x \in \mathbb{Z}\}$. Determine $N - Z$.

(1 marks)

(b) Let $P_i = \{-i, i\} \times \{i^2\}$. Find

(a) P_3

(2 marks)

(b) $\left| \bigcup_{i=1}^n A_i \right|$

(3 marks)

(c) There are 150 students of Bachelor of Computer Science. There are 75 students who take Applied Statistics subject, 58 students who take Discrete Mathematics subject and 32 students who take both subjects.

(a) Represent the situation using Venn diagram.

(2 marks)

(b) How many students are there who do not enroll into any of the two subjects.

(2 marks)

(c) How many students are there who only enroll in Discrete Mathematics.

(1 marks)

END OF QUESTION