(50 Points)

1) $A=\{1,4,9,15\}$ Let the universe be the set $U=\{1,2,3,\ldots 10\}$

$B=\{2,4,7,5\}$

$C=\{1,5,6,7,9\}$

Given the above information find the following:

(i) $A \cup B$

(ii) $B \cap A$

(iii) $A-C$

(iv) $B-A$

(v) $\bar{B}$

(vi) $U-C$

(vii) $\bar{U}$

(viii) $A \cap (B \cup C)$

(ix) $A \cap B \cap C$

(x) $(A \cup B)-(C-B)$

(15 Points)

2) Write the truth table for the following proposition:

(i) $-q \vee p$

(ii) $(p \vee q) \wedge -p$

3) Determine whether the following is true or false, (15 Points)

p is false

q is true

(i) $p \vee q$

(ii) $p \vee -q$

4) For the sequence defined by (20 Points)

$$a_n = n^2 + 2n + 2, \quad n \geq 1$$

(i) $\sum_{i=1}^{5} a_i$

(ii) $\prod_{i=1}^{4} a_i$