1. Solve the following Integer Linear Programming Problems (ILPP) by Branch and Bound Algorithm as well as Gomory's cut algorithm:

(i) $Max\ z = 3x_1 + 2\ x_2$, $s/t\ 2x_1 + 5x_2 \le 9$, $4x_1 + 2x_2 \le 9$, $x_1, x_2 \ge 0$ and integer.

(ii) $Max\ z = 2x_1 + 3\ x_2$, $s/t\ 5x_1 + 7x_2 \le 35$, $4x_1 + 9x_2 \le 36$, $x_1, x_2 \ge 0$ and integer.

(iii) $Max\ z = 5x_1 + 7\ x_2$, $s/t\ 2x_1 + x_2 \le 13$, $5x_1 + 9x_2 \le 41$, $x_1, x_2 \ge 0$ and integer.

(iv) $Max\ z = 7x_1 + 9\ x_2$, $s/t - x_1 + 3x_2 \le 6$, $7x_1 + x_2 \le 35$, $x_1 \le 7$, $x_2 \le 7$, $x_1, x_2 \ge 0$ and integer.

(v) $Max\ z = 3x_1 + 4\ x_2$, $s/t\ 7x_1 + 16x_2 \le 52$, $3x_1 - 2x_2 \le 9$, $x_1, x_2 \ge 0$ and integer.

(vi) $Min\ z = 5x_1 + 4\ x_2$, $s/t\ 3x_1 + 2x_2 \ge 5$, $2x_1 + 3x_2 \ge 7$, $x_1, x_2 \ge 0$ and integer.

(vii) $Min\ z = -3x_1 - 4\ x_2$, $s/t\ 3x_1 - x_2 \le 12$, $3x_1 + 11x_2 \le 66$, $x_1, x_2 \ge 0$ and integer.

(viii) $Max\ z = 2x_1 + 3x_2$, $s/t\ 6x_1 + 5x_2 + x_3 = 25$, $x_1 + 3x_2 + x_4 = 10$, $x_1, x_2, x_3, x_4 \ge 0$ and x_1, x_2 are integers.

Solutions:

(i) $Max\ z = 6$, $x_1 = 2$, $x_2 = 0$.
(iv) $Max\ z = 55$, $x_1 = 4$, $x_2 = 3$.
(v) $Max\ z = 14$, $x_1 = 2$, $x_2 = 2$.
(vi) $Min\ z = 12$, $x_1 = 0$, $x_2 = 3$.
(vii) $Min\ z = -31$, $x_1 = 5$, $x_2 = 4$.
(viii) $Max\ z = 11$, $x_1 = 1$, $x_2 = 3$.