Q.32. (AMIE W05, S2007, 10 marks): Solve the following linear programming problem using Simplex method.

$$Max\, z = 5x_1 + 4x_2$$

subject to

$$6x_1 + 4x_2 \le 24$$
$$x_1 + 2x_2 \le 6$$
$$-x_1 + x_2 \le 1$$
$$x_2 \le 2 \qquad x_1, x_2 \ge 0$$

Answer: $x_1 = 3$, $x_2 = 3/2$, $z_{max} = 21$

Q.33. (AMIE S10, 20 marks): Solve the following LP problems by simplex method:

Maximise $z = x_1 + 2x_2$

subject to $x_1 + 3x_2 \le 6$

$4x_1 + 3x_2 \le 12$

$3x_1 - x_2 \le 36$

$x_1, x_2 \ge 0$

Answer: $x_1 = 2$, $x_2 = 4/3$, Max Z = 14/3

Q.34. (AMIE S11, 12 marks): Solve the following linear programming problem using the simplex method:

Maximise $Z = 3x_1 + 5x_2$

subject to $x_1 \le 4$

$2x_2 \le 12$

$3x_1 - 2x_2 \le 18$

$x_1 \ge 0, x_2 \ge 0$

Answer: $x_1 = 10$, $x_2 = 6$, Max Z = 60

Q.35. (AMIE S10, 20 marks): Consider the following LP problem

Minimise $z = x_1 + 4x_2$

subject to $3x_1 + x_2 \ge 24$

$3x_1 + 4x_2 \le 60$

$2x_1 + x_2 \le 48$

$x_1, x_2 \ge 0$

(a) Determine the optimal solution by any suitable simplex method and (b) by looking at the optimal solution, how do you classify it?

Answer: (a) $x_1 = 8$, $x_2 = 0$, Min Z = 8 (b) solution is non degenerate

Q.36. (AMIE W08, 20 marks): The objective function and the constraints of a water resources project are linearized as follows:

Minimise $x_0 = 10x_1 + 20x_2$

subject to $0.2x_1 + 0.1x_2 \le 10$