Northern Borders University Faculty of Engineering First Semester 1434/1435, Final Term Exam		Subject: Operations Research IE311 Date: 25/2/1435, Time allowed: 2 Hrs Total Marks: 60 Points Instructors: Dr. **Mohamed Mostafa**

Solve the Following Problems

Problem # 1 (20 Points)

Solve the following linear program using both the graphical and the simplex methods:

$$\text{Max} \quad 2x_1 + 8x_2$$

s.t.

$$3x_1 + 9x_2 \leq 45$$
$$2x_1 + 1x_2 \geq 12$$
$$x_1, x_2 \geq 0$$

Problem # 2 (20 Points)

Consider the following minimum-cost transportation problem.

a. Use the minimum-cost method to find an initial feasible solution.
b. Use the transportation simplex method to find an optimal solution.

Origin	Destination: Los Angeles	San Francisco	San Diego	Supply
San Jose	4	10	6	100
Las Vegas	8	16	6	300
Tucson	14	18	10	300
Demand	200	300	200	700

Problem # 3 (20 Points)

The 3M Cable Company has just received approval to begin providing cable television service to a suburb of Memphis, Tennessee. The nodes of the following network show the distribution points that must be reached by the company's primary cable lines. The arcs of the network show the number of miles between the distribution points. **Determine the solution that will enable the company to reach all distribution points with the minimum length of primary cable line**.