Operations research assignment

The Ace Manufacturing Company has orders for three similar products: Orders Product (units) A 2000 B 500 c 1200 Three machines are available for the manufacturing operations. All three machines can produce all the products at the same production rate. However, due to varying defect percentages of each product on each machine, the unit costs of the products vary depending on the machine used. Machine capacities for the next week, and the unit costs, are as follows: Capacity Machine (units) 1 1500 21500 3 1000 Product Machine A BC 1 $1. 00 $1. 20 $0. 90 2 $1. 30 $1. $1. 20 3 $1. 10 $1. 00 $1. 20 Use the transportation model to develop the minimum-cost production schedule for the products and machines. Show the linear programming formulation. 2. Scott and Associates, Inc. Is a consulting firm that has 4 new clients. Based on different background and experiences of the leaders, the various leader-client assignments differ in terms of projected completion times. The possible assignments and estimated completion times in days are Client Project Leader 1 2 3 4 Jackson 10 1632 10 Ellis 14224022 smith 22 24 34 34 Burton 14 183624

What is the optimal assignment? 3. Wilson Distributors, Inc. Is opening two new sales territories in the western states. Three individuals currently selling in the Midwest and the East are being considered for promotion to regional sales manager positions in the new sales territories. Management has estimated total annual sales (in thousands of dollars) for the assignment of each individual to each sales territory. The management sales projections are as follows: Sales Region Regional Managers Northwest Southwest Boston $100 $95 McMahon $ 85 $80 Miller $ 90 $75

Formulate and solve a linear programming model to obtain the optimal solution. 4. Fowl Marketing Research has four project leaders available for assignment to four clients. Find the assignment of project leaders to clients that will minimize the total time to complete all projects. The estimated project completion times in days are as follows: Clients Terry 10 1599 Carla 9 18 58 Uncommonly 6 14 3 7 Fleetly 8 1669 5. Adirondack Paper Mills, Inc. Has paper plants in Augusta, Maine and Topper Lake, New York. Warehouse facilities are located in Albany, New York, and Portsmouth, New

Hampshire. Distributors are located in Boston, New York, and Philadelphia. The plant capacities and distributor demands for the next month are as follows: Capacity Demand Plant (units) Distributor (units) Augusta 300 Boston 1 50 Tipper Lake 100 New York 100 Philadelphia 150 The unit transportation costs ($) for shipments from the two plants to the two warehouses and from the two warehouses to the three distributors are as follows: Warehouse Distributor Plant Albany Portsmouth Warehouse Boston New York Philadelphia Augusta 7 5 Albany 8 5 7 Tipper Lake 3 4 Portsmouth 5 6 10 a.

Draw the network representation of the Adirondack Paper Mills problem. B. Formulate the Adirondack Paper Mills problem as a linear programming problem. C. Determine the minimum-cost shipping schedule for the problem. 6. Consider a transshipment problem consisting of three origin nodes, two transshipment nodes, and four destination nodes. The supplies at the origin nodes and the demands at the destination nodes are as follows: Origin Supply Destination Demand 1 400 1 200 2 450 2 500 3 3503300 4 200

Shipping cost per unit are provided in the following table: Destinations From 1 234 1681210 297610 37968 7.

The Moore & Herman Company is in the business of buying and selling grain. An important aspect of the company’s business is arranging for the purchased grain to be shipped to customers. If the company can keep freight costs low, profitability will be improved. Currently, the company has purchased three rail cars of grain at Muncie, Indiana, six rail cars at Brazil, Indiana; and five rail cars at Xenia, Ohio. Twelve carloads of grain have been sold. The locations and the amount sold at each location are as follows: Number of Location Rail Car Loads Macon, Ga. 2 Greenwood, S. C. 4 concord, S. C. 3 Chatham, N.

C. 3 All shipments must be routed through either Louisville or Cincinnati. Shown are the shipping costs per bushel (in cents) from the origins to Louisville and Cincinnati and the cost per bushel to ship from Louisville and Cincinnati to the destinations. TO From Louisville Cincinnati Muncie 8 6 Brazil 38 xenia 9 3 – – – (Cost per bushel from Muncie to Cincinnati is 6 cents) From Macon Greenwood Concord Chatham Ultraviolet 44 34 34 32 Cincinnati 57 35 28 24 ! Cost per bushel from Cincinnati to Greenwood is 35 cents Determine shipping schedule that will minimize freight cost necessary to satisfy demand.