Final Exam Practice Problems

Also review the practice problems that were provided for Exams 1 and 2.

1. Bryant and Harmon Co. is a grain wholesaler. The company recently purchased three railcars of grain in Muncie, Indiana; six railcars in Brazil, Indiana; and five railcars in Xenia, Ohio. BHC has sold contracts to deliver two railcars of grain to Macon, Georgia; four railcars to Greenwood, South Carolina; three railcars to Concord, South Carolina; and three railcars to Chatham, North Carolina. All of these shipments must be routed through a terminal in Louisville or Cincinnati. The table below provides the freight rates (cents per bushel) from Muncie, Brazil, and Xenia to these two transit points.

	Louisville	Cincinnati
Muncie	8	6
Brazil	3	8
Xenia	9	3

The table below provides the freight rates (cents per bushel) from Louisville and Cincinnati to each of the delivery locations.

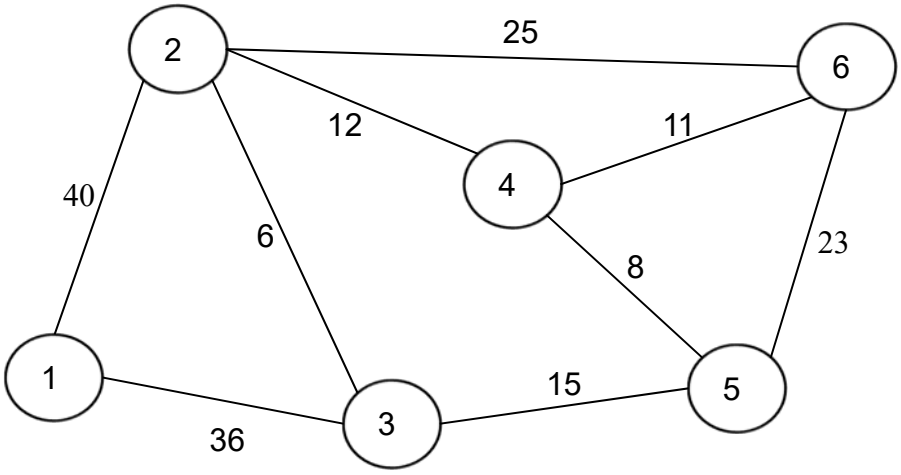
	Macon	Greenwood	Concord	Chatham
Louisville	44	34	34	32
Cincinnati	57	35	28	24

   a. Determine the best shipment plan for B&H.
   b. Are there any additional railcars of grain left available for future deliveries? If there are, where and how many?
   c. In which location would it be most beneficial to have an additional railcar of grain and why?

2. Federated Express Service (FES) uses large quantities of packing materials at its four distribution hubs. FES has identified six potential vendors to supply these packing materials to each of the hubs with each hub being supplied by a different vendor. The table below lists the bids received (thousands of dollars) from the six vendors to supply each of the four hubs. Which vendor should be selected to supply each hub, and what is the total cost for supplying these packing materials to all the hubs?

Vendor	Distribution Hub			
	1	2	3	4
Martin Products	190	175	125	230
Schmidt Products	150	235	155	220
Miller Containers	210	225	135	260
D&J Burns	170	185	190	280
Larbes Furnishings	220	190	140	240
Lawler Depot	270	200	130	260

3. Gorman Construction Co. needs to find the quickest route between its corporate office and a major construction project site. In the network below, Gorman's office is located at node 1 and the construction site is located at node 6. The number associated with each edge in the network indicates the travel time (minutes). Find the best route for GCC to use between its office and the construction site.



4. An automobile manufacturer has five plants in Michigan, Ohio, California, and two in New York. Management is considering modernizing some of these plants to produce engine blocks and transmissions for a new model car. The cost (in millions of dollars) to modernize each plant and the production capacity (in thousands) after modernization are provided in the table below.

		Capacity	
Plant	**Cost**	**Engine Blocks**	**Transmissions**
Michigan	25	500	300
New York 1	35	800	400
New York 2	35	400	800
Ohio	40	900	600
California	20	200	300

The company will need a total capacity to produce 900,000 engine blocks and 900,000 transmissions. Develop a model to determine which plants the company should select for modernization.

Answers:

1. Optimal Cost = $419; two rail cars held in Muncie
2. Optimal Cost = $695,000
3. Optimal Time = 63 minutes; Optimal Route = 1-2-4-6
4. Select Michigan and NY2.