Case Summary:

- The company is a motor carrier based in Ankara that transports full loads over long distances.
- Last December 11, four TL (truck load) transport requests were made as follows:
  - from Çanakkale to Kars on Dec. 11
  - from Adana to Malatya on Dec. 11
  - from Ankara to Çanakkale on Dec. 13 (two TLs)
- On Dec. 11, one truck was available in Çanakkale and another one was available in Kars. Another vehicle was transporting a previously scheduled shipment and would be available in Çanakkale on Dec. 12.
- The revenue provided by a truck carrying a TL is 1.8 times the transport cost of a deadheading truck which is equal to 2000 TL for each journey day; hence the revenue for a TL truck per day is 3600 TL.
- The problem to be solved is then a vehicle allocation problem (VAP) in which T = {Dec 11, Dec. 12, Dec. 13} = {1, 2, 3} and N = {Ankara, Çanakkale, Malatya, Kars, Adana} = {1, 2, 3, 4, 5}.

Table 1. Transport times (in days)

	Ankara	Çanakkale	Malatya	Kars	Adana
Ankara	0	1	2	2	2
Çanakkale		0	2	2	2
Malatya			0	2	1
Kars				0	2
Adana					0

a) Formulate this VAP as an LP in explicit form so as to maximize the profit.
b) Show that the VAP can be modelled as a minimum-cost flow problem on a time-expanded directed graph.
c) Solve for the optimum solution in the most efficient way. Discuss the solution.