Part I (30 points)

Researchers associated with the international motor vehicle industry first identified the “lean manufacturing” paradigm, which is a philosophy intended to significantly reduce cost and cycle time throughout the entire value chain while continuing to improve product performance. Airlines, like the automotive industry, strive for leanness, because being lean means being competitive by eliminating the non-value added practices. The implementation of complex lean initiatives is critical for quality improvement and survival. In order to compete in this new economy companies must have: (1) quality beyond the competition; (2) technology before the competition; and (3) costs below the competition (Gregory Watson, 1993). In other words, many companies must strive to be better, faster, and cheaper than their competitors. These are some of the characteristics of a “lean” enterprise.

(Adopted from Less is More: The Concept of a “Lean” Airline by Dennis F.X. Mathaisel and Clare L. Comm.)

Part II (30 points)

Hubs are likely to be more successful if they have a large local traffic base, minimal existing competition, room for expansion, good weather and a spatial geography suited to aircraft schedules and to being a natural waypoint (Wheeler, 1989; Huston and Butler, 1991). Several types of hubs have developed. 'Hourglass' hubs (Doganis and Dennis, 1989) serve directional traffic, the waves alternating in direction. The East-West flows have particularly peaky daily characteristics due to the time zone changes along the routes. 'Gateway' hubs (e.g. New York Kennedy or London Heathrow) also exhibit this peaky characteristic as they link long haul with domestic traffic. The effective city pair markets are only approximately half the theoretical n(n + 1)/2 in the case of these directional hubs. Alternatively, hubs can be more omnidirectional. These may be called 'hinterland' or 'speciality' hubs (Horner, 1989). In the latter, the airlines hubbing there will specialise in linking secondary cities to primary cities. In the former, regional feeder airlines will have close relationships with the trunk carriers, adding to the trunks' own through traffic.

(Adopted from European airline networks and their implications for airport planning by Robert E Caves)
二、請將下列中文翻譯成英文

Part III (40 points)

駕駛者對於擁擠之反應，可透過改變路徑或出發時間因應之，因此，如何分散時間與空間上需求之集中，使車流量能隨時隨處保持於臨界流量之下，即成為交通管理之要務與努力達成之目標。

各類疏解尖峰擁擠的策略雖不斷被提出，也或多或少獲致某一程度的效果，但即使採用最先進的駕駛資訊系統亦無法明確掌握估出於駕駛者自由意志的出發時間與路徑選擇，此仍因面對各式各樣的資訊，使用者之反應與行動為一相當複雜且難以了解的過程。

關鍵詞：交通管理、駕駛資訊。