

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination

Date: 23 February 2010

Subject: 220-571 Traffic Engineering Characteristics I

Academic Year: 2009

Time 13.30 – 16.30

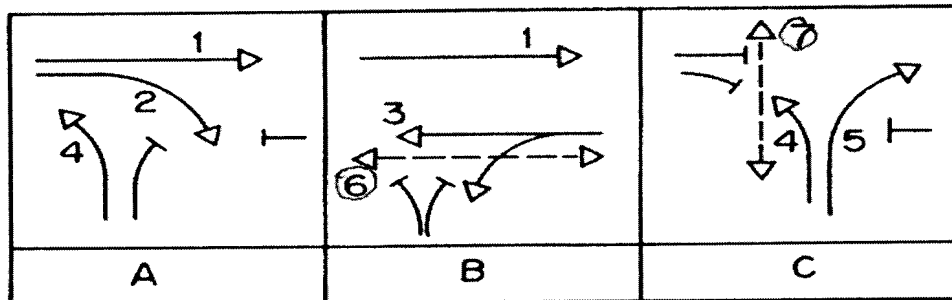
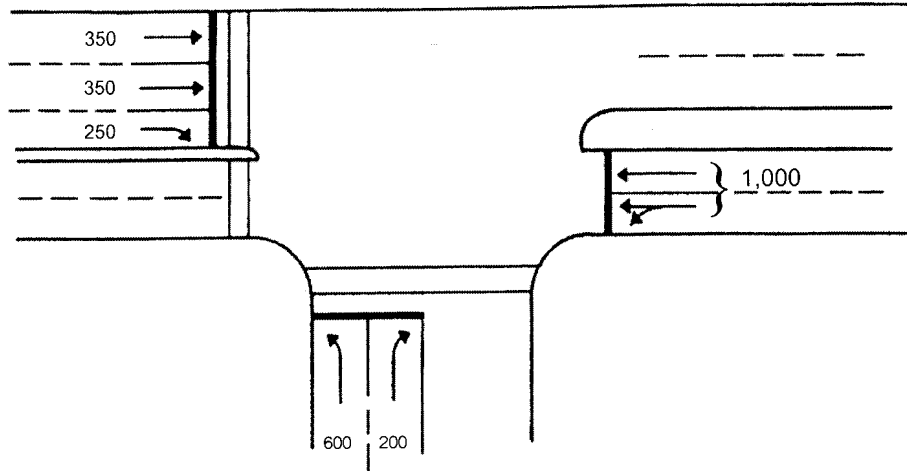
Room : S 201

- 1) There are 5 questions in this paper.
- 2) This is an open book exam.

Set by Pichai Taneerananon

1. Assuming a linear speed – density relationship, the mean free speed is observed to be 100 kph near zero density, and the corresponding jam density is 90 veh/km. Assume that the average length of vehicles is 5 metre.
 - (a) Write down the speed – density and flow – density equations.
 - (b) Draw the v-k, v-q, and q-k diagrams indicating critical values
 - (c) Compute speed and density corresponding to a flow of 1000 veh/hr.
 - (d) Compute the average headways, spacings, clearances, and gaps when the flow is maximum.
2. Describe the principal factors that influence the design of an intersection.
3. Describe the principles of safe intersection design.
4. A one-way street carrying 700 vehicles per hour crosses a two-way collector street carrying 800 vehicle per hour in the same period. Assume there are two traffic lanes on the collector street which has right-of-way. The intersection is unsignalised. Determine:
 - Number of lanes required on the one-way street.
 - Average delay to one-way street traffic.
 - Average queue length on the one-way street approach.
 - Queue length on the one-way street approach that is unlikely to be exceeded 98% of the time.

5. The figures below shows layout of a T - junction. With the indicated flows (veh./hr) and the phasing A,B,C.



Calculate

- 1). Practical cycle time
- 2). Optimal cycle time which minimises both delay and fuel consumption
- 3). Effective greetimes for critical movements
- 4). Degree of saturation of each movement
- 5). Intersection degree of saturation
