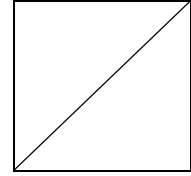




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Question 1

- [a] Cycling and jogging are both popular exercises in Malaysia. However, some of the individuals used the main roads to carry out these exercises. As an engineer, you are instructed to design proper lanes that separate cyclists and runners from main traffic.

SKETCH a typical un-dimensioned small bridge cross-section with sidewalk and cycle lane, serving a residential area including a single pavement layer and bridge deck. LABEL all the bridge cross-section components in the sketch. **[6 Marks]**

- [b] Traffic islands refer to the area bounded by traffic lanes designed to control traffic movements. Describe **THREE** main functions of traffic island. **[6 Marks]**

- [c] There are four basic types of intersection maneuvers such as diverging, merging, crossing and weaving. Provide **THREE** factors that determine the number of potential conflict points at an intersection. Additionally, RE-SKETCH the 3-legged intersection (Figure 1) and classify the crossing conflicts, diverging conflicts, and merging conflicts based on the given legends. **[8 Marks]**

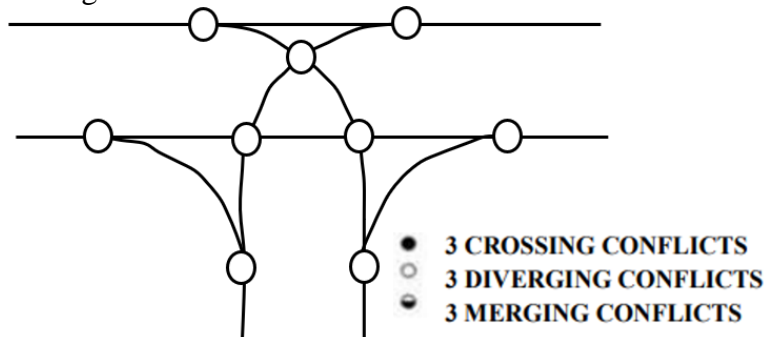


Figure 1. Three-legged intersection

Question 2

- [a] Several facilities can be considered during the design stage to ensure safety, comfort, and help pedal cyclists and pedestrians to cross busy roads. With the aid of appropriate SKETCHES, suggest and DISCUSS **TWO** facilities that designers could be taken into account for the pedal cyclists and pedestrians. **[8 Marks]**

- [b] Pedestrian bridges are built to help pedestrians to cross a busy road safely. However, based on observations, there is a pattern in the usage of pedestrian bridges that are influenced by age factor. DISCUSS this situation and RECOMMEND **THREE** possible measures (with the aid of SKETCHES) that could be considered to ensure that the pedestrian bridges are efficiently used. **[12 Marks]**