本試題是否可以使用計算機： ☑可使用 ， □不可使用 （請命題老師勾選）

1. Please calculate the allowable speed for a narrow-gauge railway with the following parameters. (15 %)

    superelevation c = 105 mm;　　　　　　curve radius R = 700 m
    Safety factor = 4;　　Height of center of gravity of the cart = 2500 mm

2. According to Problem 1, if tilting train was introduced on the line with maximum tilting 5°, please calculate the speed limit of this train. (10%)

3. Please broadly compare the efficiency between highway transportation and rail transportation. (15%)

4. Please <u>translate</u> and <u>comment</u> the paragraph below. (10% + 5%)

    ITS technologies may be grouped together into functional systems, such as advanced traffic management systems (ATMS), advanced traveler information systems (ATIS), and advanced vehicle control systems (AVCS). In this classification, ATMS includes systems intended to manage the flow of traffic, such as coordinated traffic signal systems, ramp metering systems, and incident management systems; ATIS includes systems intended to disseminate information to the public (traffic condition information, route guidance, etc.); and AVCS includes automated highway systems and onboard control systems (collision avoidance, vision enhancement, etc.) intended to promote safety. ITS may also be seen as including traffic surveillance systems, communications systems, and traffic control system.

5. Please <u>translate</u> and <u>comment</u> the paragraph below. (10% + 5%)

    Most civil engineering activity related to the provision of physical facilities is what might be called *physical civil engineering*. This includes the design, construction, and maintenance of fixed transportation facilities and involves the full spectrum of civil engineering specialties. A major highway project, for instance, will involve not only the sizing and geometric design of the roadway, which is normally thought of as a part of transportation engineering, but also the design and construction of bridges and other structures, which requires structural engineering; drainage design, which requires hydraulic and hydrological engineering; consideration of earthwork compaction and slope stability, which require geotechnical engineering; construction management; and surveying.

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6. Please <u>translate</u> and <u>comment</u> the paragraph below. (10% + 5%)

　　　Traffic flows are subject to three basic types of variation. There are trends, which are nonrepetitive changes over time; peaking patterns, which are repetitive changes over extended periods of time intervals such as a day, week, or year; and random variations. A major objective of the analysis of flow data is often to separate the effects of these different types of variations.

7. Please <u>translate</u> and <u>comment</u> the paragraph below. (10% + 5%)

　　　Most civil engineering activity related to planning and operation of the transportation system, on the other hand, is what might be called *system engineering*. This involves transportation planning, including the analysis of transportation demand; the analysis of system capacity and operation characteristics; and the design of traffic control and operation strategies. The design of traffic control and operation strategies includes highway traffic engineering and operational design (that is , design of operating strategies) of freight and mass transit systems. Transportation engineering is probably unique among the civil engineering specialties in the importance of its systems engineering aspects.