National Exams December 2017

16-Civ-B17, Intelligent Transportation Systems(ITS)

3 hours duration

NOTES:

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit a clear statement of any assumptions made with the answer paper.

2. This is an OPEN BOOK examination.
   Any non-communicating calculator is permitted.

3. Please answer all 5 (FIVE) questions. All questions carry equal weight.

4. The questions require answers in essay format supplemented by illustrations (such as flow charts, process diagrams, etc.).

5. In all questions, clarity and organization of the answer are important.

Q.1
(a) Define Intelligent Transportation Systems (ITS). Identify the U.S. National ITS Architecture Interface and associated application areas. (2+8 = points)

(b) Present the most current version of ITS user service bundles and list the associated user services. (10 points)

Q.2 Research has found that the efficiency of transportation network of any urban area is depend on how the signal systems of arterials are design, implemented and managed. Identify an appropriate set of ITS technologies and develop a plan to implement them to improve the efficiency of urban traffic network. Your objectives include the followings: (20 points)

- Flow, travel time and reliability,
- Throughput, and
- Safety

Q.3 Assume that you are hired as an ITS engineer by a Municipality and asked to prepare a proposal for establishing an Advanced Traffic Management Systems (ATMS). The proposal should include the following items:

- Functions
- Components and Architecture
- Data needs
- Data acquisition technologies

Describe all of the above components in detail. (20 points)

Q.4 As an extension of the proposal in question 3, you are advised to expand the scope of the work in terms of adding the Advanced Traveller Information Systems (ATIS). Describe the following items for the ATIS in detail. (20 points)

- Functions
- Components and architecture
- Data needs
- Data acquisition technologies

Q.5
(a) What are the components, data needs, and data acquisition techniques for Advanced Public Transportation Systems (APTS). Identify the techniques and describe them in detail with necessary illustrations. (12 points)

(b) Providing priority to transit vehicles (buses, LRT vehicles, etc.) on urban streets, specially arterials, networks is one of the most common practice to improve transit flow and service reliability. Identify a set of measures and associated techniques to implement them in real world situations. (8 points)