編號： 156

國立成功大學 105 學年度碩士班招生考試試題

系　　所：測量及空間資訊學系

考試科目：科技英文

考試日期：0227，節次：1

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、英翻中（把握文意，無須逐字翻譯；括號內文字無須翻譯）

1. （12 分）

Big data transforms how we understand and explore the world. In the age of small data, we were driven by hypotheses about how the world worked, which we then attempted to validate by collecting and analyzing data. In the future, our understanding will be driven more by the abundance of data rather than by hypotheses. These hypotheses have often been derived from theories of the natural or the social science, which in turn help explain and/or predict the world around us. As we transition from a hypothesis-driven world to a data-driven world, we may be tempted to think that we also no longer need theories. (adapted from Dig Data, 2013, by Viktor Mayer-Schönberger and Kenneth Cukier)

2. （12 分）

The external gravity field plays a fundamental role in geodesy. This is because the figure of the earth has evolved under the influence of gravity. Modeling of the geodetic observations thus requires knowledge of the gravity field. In addition, the analysis of the gravity field yields information on the structure of the earth's interior; in this way geodesy contributes to geophysics. The geometry of the gravity field is especially important for local applications, while the spherical harmonic expansion provides a powerful too for a global gravity-field representation. The geoid, as a physically defined reference surface for heights, is of basic interest in geosciences and engineering. (adapted from Geodesy, 2001, by de Gruyter)

3. （12 分）

Geographic analysis is only as good as the geographic database on which it is based, and a geographic database is only as good as the geographic data model from which it is derived. Geographic data modeling begins with a clear definition of the project goals and progresses through an understanding of user requirements, a definition of the objects and relationships, formulation of a logical model, and then creation of a physical model. These steps are a prelude to database creation and, finally, database use. No step in data modeling is more important than understanding the purpose of the data-modeling exercise. This understanding can be gained by collecting user requirements from the main users. Initially, user requirements will be vague and ill-defined, but over time they will become clearer. (adapted from Geographic Information Science and Systems, 2015, by Paul Longley, Michael Goodchild, David Maguire, and David Rhind)

4. （12 分）
We begin our study of landscape evolution with the elementary facts of any terrain that are obvious as one looks at Earth's surface: the height and ruggedness of mountains and lowlands. But, today, looking is not enough; for such as study, we need to take photographs from the ground, and airplane, or a satellite and use them to make maps. Accurate maps of Earth's surface are critical for studies of hydrology (where and how big surface reservoirs are), ecology (how forests and farmlands are distributed), glaciology (where and how big glaciers are), atmospheric circulation (how the shape of the ground surface affects winds), and most other aspects of Earth sciences. (adapted from Understanding Earth, 2001, by Frank Press and Raymond Siever)

5. （12 分）
Urban and regional planners require nearly continuous acquisition of data to formulate governmental policies and programs. The role of planning agencies is becoming increasingly more complex and is extending to a wider range of activities in the social, economic, and environmental domains. Consequently, there is an increased need for these agencies to have timely, accurate, and cost-effective sources for spatial information. For example, thermal imagery has been used to assess the intensity of urban heat islands, area in which dense coverage of pavement, concrete, and other nonvegetated surfaces leads to the buildup of higher temperatures than in surrounding less urbanized areas. (adapted from Remote Sensing and Image Interpretation, 2015, by Thomas Lillesand, Ralph Kiefer, and Jonathan Chipman)

二、短文寫作（40 分）
In recent years, disastrous events (natural or man-induced) have become more large scale and complex. For example, in December 2015, a landslide of excavated dirt and construction debris in Shenzhen (深圳) destroyed more than 33 buildings and caused at least 91 people missing. For the whole year of 2015, the Syria (敘利亞) refugees, fled from the civil war in their country, caught international attention. With your knowledge in Geomatics, please write a 300 - 500 words proposal to Red Cross (國際紅十字會) officials to offer humanitarian aid (人道救援) for one disastrous event in 2015, not limited to the above mentioned examples. In the proposal, assuming Geomatics is unfamiliar to Red Cross officials, please explain the benefits of Geomatics for humanitarian aid and provide at least one scenario for which Geomatics technologies can be used for. You can focus on one particular Geomatics technology or several of them.

The definition of humanitarian aid from Wikipedia:
Humanitarian aid is material and logistic assistance to people in need. It is usually short-term help until the long-term help by government and other institutions replaces it. The primary purpose of humanitarian aid is to save lives, reduce suffering and respect to human dignity.