1. Please read the following paragraphs, and then select the correct answers for the following questions. For each question, please write the letter answers (A, B or C) along with the question numbers in your answer sheet. (30%, 5% for each question)

Getting lost is a hazard firefighters accept with the job. They know that most times, someone will rescue them before their air tanks run out or flames engulf them. But they also know there’s a fair chance they will inhale smoke or get burned waiting. Each year in the United States, hundreds of firefighters suffer injuries, and a handful die because they can’t get out of burning buildings. You might think there’s an easy tech fix. After all, satellite-based navigation systems do a fine job of maneuvering you left in a cab. But creating a system for navigating indoors, where satellite signals don’t easily penetrate, is much tougher. Yes, consumer products already exist for airports, malls, and museums. But most of these require prior surveys of Wi-Fi signals, which aren’t present everywhere, especially if access points or power sources go up in flames.

Dozens of engineers have joined the race to build an indoor navigation system that can track firefighters to within a meter. One of these groups was founded by a professor of electrical and computer engineering at Worcester Polytechnic Institute. An early scheme the team devised called for three stationary radio transceivers that fire crews would set up outside a burning building. These would link wirelessly to one another and to a laptop-size base station, which would house an atomic clock and orient itself and the transceivers using GPS signals. The transceivers would listen for transmissions from small radios carried by the firefighters and pass those signals to the base station. By timing the signals’ arrival from each portable radio, the base station could determine their ranges and then calculate their three-dimensional positions using basic geometry. This location data would stream wirelessly to the incident commander’s computer display, which could be loaded with floor plans if any were available. Then if a firefighter got lost or injured, the commander could dictate an escape route or direct rescuers over voice radios.

(These paragraphs were extracted from an article published in the IEEE Spectrum, September 2013.)

(1) The general topic of these paragraphs is
   A. satellite-based navigation systems are useful
   B. firefighter is a dangerous job
   C. development of indoor navigation

(2) What does “hazard” mean in the first paragraph?
   A. good and fortunate thing
   B. probable dangerous thing
   C. bold and adventurous thing
(3) What does “a handful” mean in the first paragraph?
A. exactly five
B. a few of
C. few of

(4) From the second paragraph, which of the following is NOT a reason why navigation does not work?
A. satellite signal cannot penetrate
B. prior studies of the wireless signals
C. power failure

(5) From the third paragraph, what is a transceiver?
A. a GPS-like device
B. a radio player
C. a mobile clock

(6) From the third paragraph, what does the commander need to plan an escape route?
A. radio signal from the firefighter
B. display with the floor plans
C. all of the above

2. The following paragraph was extracted from IEEE Spectrum, October 2013. The underlined words are either misspelled or missing. Please correct these words and put all the responses along with the question numbers on the answer sheet. (20%, 2% for each question)

Google Glass is a polarizing device. Positive opinions have often (1) focus on the possibilities for augmented reality (AR), (2) which the negative ones tend to focus on the privacy ramifications. I am going to focus on what makes the current Glass (3) hardwire groundbreaking, and what we can expect from Glass-like devices in the near future. Glass XE is not a consumer product. It is an experimental, voice-activated wearable computer equipped (4) a camera and a head-up display. Glass’s brilliance lies (5) its form factor and multi-modal natural interface, (6) that translates into a user experience fundamentally different from anything I (7) experienced before. Wearing and interacting (8) the Glass doesn’t feel anything like using a conventional mobile device. Rather, it feels more like having a computer inside my head or having (9) artificial senses spliced into my existing ones. Our brains are eager to incorporate new information into our mental models of the world. After a period of adaptation, these (10) stream of information fade into the background as conscious attention is replaced with mostly automatic behavior.
3. Please translate the English text into Chinese. (25%)

(1). In 1796, a young German named Carl Friedrich Gauss showed that a circle could be divided into 17 equal parts by “purely geometric means” (i.e. by compass and straight edge). (5%)

(2). Newton’s second law of motion, which says that force equals mass times acceleration, is probably the most famous equation in the history of science. (5%)

(3). In recent years, the sales in desktop and notebook computers have been slipping consistently, partly due to the growing popularity of tablet computers. (5%)

(4). The basic principle of 3D printing is that hundreds of very thin layers of material are stacked on top of each other by a machine to eventually form a solid, 3D object. (5%)

(5). Maxwell’s Equations are a set of four differential equations that describe how electric and magnetic fields propagate, interact, and how they are influenced by objects. (5%)

4. Please translate the Chinese text into English. (25%)

(1). 一張數位影像其實就是一個矩陣，其各個元素的值就是代表像素的亮度。 (5%)

(2). 根據定義，一個線性系統必須要合乎重疊性與齊次性這兩個要求。 (5%)

(3). 兩個隨機變數若是獨立則必不相關，但反之並不必然成立。 (5%)

(4). 所謂綠色科技就是強調節能與環保的科技。 (5%)

(5). 下星期二的英文期末考將會如期舉行。 (5%)