

※ 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。

I. 單選 (30 分，每題 3 分)

1. \_\_\_\_\_ all cherry trees are very attractive when in bloom, some species with inferior fruit are cultivated especially for flowers.  
(A) Although (B) There are (C) It is (D) That (E) Not
2. If volcanoes erupt explosively and cast fluid lava high into the air, \_\_\_\_\_, dispersed by the wind, gives rise to particles of various sizes.  
(A) by which the lava (B) and lava (C) when lava (D) which lava is (E) the lava
3. Including land and water, the New Taipei City \_\_\_\_\_ an area of 2,053 square kilometers, equal to about one-seventeenth of the size of Taiwan.  
(A) having (B) has (C) where there is (D) which is (E) of.
4. \_\_\_\_\_ vary greatly in shape and form, depending upon both the growth pattern and the arrangement of polyps within the colony.  
(A) Since coral colonies (B) Coral colonies that (C) Coral colonies (D) Coral colonies, although they (E) Usually when.
5. A condenser is a heat exchanger \_\_\_\_\_ steam or vapor loses heat and returns to liquid form.  
(A) what (B) in whose (C) in which (D) that (E) such that.
6. A common way to produce x-rays is \_\_\_\_\_ electrons into a copper target.  
(A) fires (B) fired (C) by firing (D) how to fire (E) firing.
7. \_\_\_\_\_ until the twelfth century that the magnetic compass was used for navigation.  
(A) It was not (B) It's not being (C) Not (D) Surprisingly (E) Yet.
8. Located at the upper end of each \_\_\_\_\_ an adrenal gland, an integral part of the endocrine system.  
(A) kidney which is (B) kidney consisting of (C) kidney being (D) kidney (E) kidney is.
9. North America displays more \_\_\_\_\_ than any other continent except Asia; only a true tropical environment is absent.  
(A) vary climate (B) climate varied (C) climatically varied (D) climatic variation (E) climate changes
10. Almost \_\_\_\_\_ countries use the decimal system.  
(A) all (B) all of (C) all of which (D) of all (E) all that

## II. 閱讀 (30 分，每題 3 分)

## 文章一 (source: voicetube, Oct. 2014)

Most parents to be assumed that the sex of their child comes down to a flip of the chromosomal coin with an equal chance at having a boy or girl. But in reality, the odds aren't even. For every 100 girls born, the world comes about 106 baby boys. Currently that skewed sex ratio comes out to roughly ten million more baby boys than girls born worldwide each year. There are some countries where human meddling stacks are even higher in favor of boys, but that doesn't explain the fixed odds everywhere else. The intrinsic boy-girl ratio is created by mother nature. In fact, it even more raked than birth rates show.

Human conception results in about 150 male zygotes for every 100 females. But there's a rather tragic reason for this big biological boy bias early on— male fetuses are much more likely to be miscarried or stillborn than female fetuses. And boys that do make it out of the womb suffer more fatal diseases, take more moral risks and fall prey to more violence than girls. So by the time kids grow up and reach baby making age, the ratio of males to females is just about one to one. But the likelihood of a boy even making it to birth is also influenced by his moms living conditions during pregnancy. For example, when a massive famine struck China in nineteen sixties, the relative likelihood of having a son suddenly dropped until the famine ended. And male Americans born to billionaires seem to have higher than average odds of fathering sons. Somehow, female biology suppresses boy's survival in the womb during tough times, and boosts it when times are good.

We've seen same pattern in other mammals too. When resources are scarce, mothers give birth to fewer males than normal. When resources are plentiful, baby are more. The best explanation we have for this has to do with sex. The other kind, in biological terms, the whole goal of copulation is to reproduce to pass on your genes to someone who will someday pass them on again. Female offspring are almost guaranteed to reproduce, famine or no famine because male mammals are pretty much always willing to mate. Males on the other hand have to compete for mating privileges. A Willner chase hunt has a good chance of mating with lots of females, while a male weakened by famine might not score at all. Some male offspring are at bigger risk in general, at all stages they're more likely to die and even if they live they may not reproduce but when times are good.

11. Which of the following statement most properly serves as the title of this article?

- (A) The interesting role of gender equality in different cultures
- (B) Myths of biology
- (C) Why boys are stronger than girls in nature
- (D) Why do we have more boys than girls

12. The article mentions several reasons that cause biological boy bias EXCEPT:
- (A) birthplace
  - (B) living conditions of expectant mothers
  - (C) higher death rate of boys
  - (D) sex
13. According to the article, the connection of human meddling with sex ratio is
- (A) strong
  - (B) weak
  - (C) undetermined
  - (D) negligible
14. How does the occurrence of "famine" affect the boy-girl ratio?
- (A) making it even
  - (B) causing a larger bias
  - (C) no impact
  - (D) not mentioned in the article

文章 B (source: IEEE Spectrum, Nov. 24, 2014)

A growing fleet of smart cars may add their street camera views to those of the surveillance camera networks already covering many major cities. That could open the door for a new technology that enables different video cameras to "talk" with one another and track the same individual person across many different camera views—possibly giving rise to Google Earth style maps that can display pedestrian and vehicle traffic.

The technology is based on a computer algorithm that can compare different camera views of the same person and learn to recognize the same individuals across many camera views by focusing on body color, texture and movement. Researchers envision a large-scale version of the system tracking pedestrian traffic on a virtual map—perhaps displayed on a car's GPS screen—or enabling police to easily track fleeing suspects across multiple surveillance camera views.

But the technology does not have to work with only car-mounted cameras. A research team has experimented with using their algorithm on cameras carried by flying drones. There is also no reason such an algorithm couldn't eventually extend to existing surveillance camera systems in big cities such as New York City and London. The algorithm could also aid law enforcement in tracking individuals across multiple surveillance cameras scattered across a city. Such capability could have come in handy for U.S. detectives hunting the Boston Marathon bombing suspects last year.

The number of cameras usable by the algorithm will likely only grow in the near future as flying drones fill the skies, car-mounted cameras continue to proliferate, and a growing number of pedestrians may walk around with smartphones in hand or smart glasses on their faces. A technology that enables cameras to more easily track individual people could easily raise new privacy concerns.

15. The word "fleet" can be replaced by which of the following word?

- (A) demand
- (B) hope
- (C) population
- (D) size

16. The article mentions all of the following EXCEPT:

- (A) The tracking algorithm can identify the human target even the person is moving.
- (B) The new tracking technology can be useful to police officers.
- (C) The tracking algorithm relies on GPS to work.
- (D) The new tracking technology might expose individual people to privacy threats.

17. The success of the new tracking technology may depend on various factors excluding

- (A) More users carrying smart devices
- (B) Dense deployment of quadcopters
- (C) Glasses integrated with surveillance cameras
- (D) Privacy protection strategies

文章 C (source: The New York Times, Dec. 30, 2014)

Along with stock and real estate portfolios, the rich are now buying a new form of economic security: passport portfolios. Wealthy investors from around the world are shopping for visas or citizenship in other countries, hoping to protect against volatile governments or economies. A majority are new millionaires and billionaires from emerging-market countries, especially China, Russia and nations in the Middle East. Often, they're shopping for entree into Europe, the United States, Canada and Australia.

Experts estimate that these "economic citizens" are spending \$2 billion a year on second or third passports and visas. Demand is so strong that governments around the world have started an arms race of sorts for V.I.P. visas, offering ever-faster residencies and passports for ever-higher prices. Over the past year, Australia, Canada, and several European countries have raised the prices or investment requirements of their so-called golden visas and created a new fast lane for citizenship.

Opponents, however, say the programs have the potential to offer safe harbor to people who made their fortune through illegal activities. Others say they amount to selling citizenship to the rich. “These programs bring huge benefits to the Russian oligarchs or the various Chinese wanting to benefit from the rule of law, good educations and robust capital markets,” said David Metcalf, chairman of the British government’s Migration Advisory Committee. “But the fundamental question is, What does everyone else get out of it?”

Consultants, lawyers and advisers to the wealthy say golden visas bring many benefits to host countries, like skills and investment. But critics like Mr. Metcalf argue that the benefits are often offset by the overseas rich bidding up prices for real estate and services. And, he contends, because most of the investments go into government bonds that pay interest, “we are essentially paying oligarchs to come to the U.K.”

18. The author mentioned David Metcalf (last line, third paragraph) in order to
- (A) give an example that supports the investment of passport portfolios
  - (B) criticize the legitimacy of selling V.I.P. visas
  - (C) identify the benefit to countries offering golden visas
  - (D) point out the potential risks of forbidding trading passports
19. It can be inferred from the passage that for countries that plan to create the V.I.P. visa program, what consequence is mostly likely caused by the program?
- (A) economic recession because less investments from the rich
  - (B) deteriorating law and order due to the Russian oligarchs
  - (C) higher inflation rate
  - (D) tense situation between China and U.S. militaries
20. Which of the following, if true, would be the reason for an investor to buy a second citizenship?
- (A) don't put all your eggs in one basket
  - (B) have a better education and capital market
  - (C) more stable political situations countries like Canada and Australia
  - (D) the price of the second citizenship raises up fast

## III. 英翻中 (40%)

(Source: "Cognitive Radio: Brain-Empowered Wireless Communications", Simon Haykin, IEEE Journal on Selected Areas in Communications, vol. 23, no. 2, February 2005.)

註：FCC 為美國聯邦通信委員會

The electromagnetic radio spectrum is a natural resource, the use of which by transmitters and receivers is licensed by governments. In November 2002, the Federal Communications Commission (FCC) published a report prepared by a special team, aimed at improving the way in which this precious resource is managed in the United States. The team was made up of a group of high-level, multidisciplinary professional FCC staff—economists, engineers, and attorneys. Among the team major findings and recommendations, the second finding on page 3 of the report is rather revealing in the context of spectrum utilization:

“In many bands, spectrum access is a more significant problem than physical scarcity of spectrum, in large part due to legacy regulation that limits the ability of potential spectrum users to obtain such access.”

Indeed, if we were to scan portions of the radio spectrum including the revenue-rich urban areas, we would find that:

- 1) some frequency bands in the spectrum are largely unoccupied most of the time;
- 2) some other frequency bands are only partially occupied;
- 3) the remaining frequency bands are heavily used.

The underutilization of the electromagnetic spectrum leads us to think in terms of spectrum holes, for which we offer the following definition:

*A spectrum hole is a band of frequencies assigned to a primary user, but, at a particular time and specific geographic location, the band is not being utilized by that user. Spectrum utilization can be improved significantly by making it possible for a secondary user (who is not being serviced) to access a spectrum hole unoccupied by the primary user at the right location and the time in question.*

Cognitive radio, inclusive of software-defined radio, has been proposed as the means to promote the efficient use of the spectrum by exploiting the existence of spectrum holes.