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國立成功大學 104 學年度碩士班招生考試試題

系所組別：太空與電漿科學研究所

考試科目：科學英文

考試日期：0211，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。

I. Vocabulary test (20%, 1% each) **本大題於答案卷作答，並請清楚標示題號**

1. The best synonym for **preference**:
   (a) first choice (b) reputation (c) early arrival (d) first idea
2. The best synonym for **celebrity**:
   (a) famous person (b) funny person (c) religious person (d) young child
3. The best synonym for **speculate**:
   (a) cry (b) guess (c) bite into (d) cover in spots
4. The best synonym for **collapse**:
   (a) fall (b) bring together (c) crash (d) extend
5. The best synonym for **demonstration**:
   (a) passion (b) slow music (c) ghost (d) protest
6. The best synonym for **firmly**:
   (a) daily (b) businesslike (c) strongly (d) quietly
7. The best synonym for **promise**:
   (a) say you can't (b) say no (c) say you will (d) say goodbye
8. The best synonym for **concentrate**:
   (a) enter (b) focus (c) circle (d) break
9. The best synonym for **myth**:
   (a) story (b) container (c) freedom (d) bad person
10. The best synonym for **tissue**:
    (a) hair (b) glass (c) thin paper (d) shy person
11. The best synonym for **interior**:
    (a) support (b) knowledge (c) inside (d) ground
12. The best synonym for **anecdote**:
    (a) argument (b) story (c) medicine (d) unwanted gift
13. The best synonym for **concede**:
    (a) admit (b) make up (c) finish (d) do badly
14. The best synonym for **rival**:
    (a) competitor (b) water plant (c) large ship (d) website
15. The best synonym for **intimate**:
    (a) scared (b) clothed (c) early (d) private
16. The best synonym for **hostile**:
    (a) comforting (b) unfriendly (c) weak (d) dirty
17. The best synonym for **scrutinize**:
    (a) plan ahead (b) obey (c) hit hard (d) examine carefully
18. The best synonym for **sacrifice**:
    (a) get dressed (b) give up (c) arrive (d) pray
19. The best synonym for **seize**:
    (a) take (b) sell (c) draw (d) break
20. the best synonym for **enigma**:
    (a) game (b) mystery (c) machine (d) disease

II Cloze test (30%, 1% each) 本大題於答案卷作答，並請清楚標示題號

Part 1

How do you turn something from yellow to green? Your art teacher would tell you to add blue, but American Kevin Newman would disagree. He would point to the pair of water heaters installed in his garage, which, **(21)** with a hose and some chemicals, turn the fast-food by-product yellow grease into 'green' biodiesel.

21. (a) also (b) along (c) although (d) among

Yellow grease is waste cooking oil from restaurant fast food fryers. It is a marginally valuable commodity, **(22)** its use as an additive in animal feeds and cosmetics, but it can only be sold if it **(23)** a certain standard. In the past, a lot of yellow grease went **(24)** waste, to the **(25)** that restaurants had to pay for it to be taken away. This was ideal for home-brewers like Kevin Newman, who picked up gallons of grease from their local fast food **(26)** , and turned it to clean fuel at a cost of about $1 a gallon.

22. (a) becasue (b) despite (c) since (d) due to
23. (a) touches (b) makes (c) catches (d) reaches
24. (a) to (b) at (c) for (d) in
25.(a) problem (b) level (c) extent (d) amount
26 (a) channel (b) outlet (c) merchant (d) conveyor

These days, governments are **(27)** to find alternatives to petroleum, and waste vegetable oil has become highly **(28)** after. That's great news for the restaurants, **(29)** can sell to the highest bidder. It's good for the environment too, as the fuel is renewable, local, and gives **(30)** far less pollution than petroleum. It isn't great for Kevin though, as he loses his cheap **(31)** of yellow grease to the bigger companies. It's **(32)** to make much difference to the general public either. Biofuels may be cheap, but currently only 150 million gallons of them are produced per year, **(33)** diesel consumption is a staggering 38 billion gallons.

27. (a) dedicated (b) fond (c) keen (d) wholehearted
28. (a) sought (b) desired (c) craved (d) requested
29. (a) that (b) where (c) which (d) what
30.(a) away (b) off (c) in (d) up
31.(a) origin (b) foundation (c) source (d) base
32.(a) unlikely (b) doubtful (c) improbable (d) unexpected
33.(a) as well as (b) in fact (c) indeed (d) while

Thankfully, there is now another option - brown grease. **(34)** yellow grease is pure oil mixed with food pieces, brown grease is made from pan scrapings which have been poured down a sink and caught in a grease trap. Brown grease is contaminated and very smelly. Until now, it had no commercial **(35)** . However, researchers have recently discovered how to **(36)** these dregs into biofuel. A grease-to-biodiesel production **(37)** has been constructed in San Francisco, and the fuel is being used to power the city's bus **(38)** . If the technology is successful, it may become available to everyone. Since twice as much brown grease is produced **(39)** yellow grease, households across the world could soon **(40)** the benefits of the technology.

34.(a) Whereas (b) Nevertheless (c) Although (d) Otherwise
35.(a) value (b) cost (c) rate (d) merit
36.(a) after (b) renovate (c) convert (d) transfer
37.(a) feature (b) supply (c) provision (d) facility
38.(a) brigade (b) fleet (c) rank (d) assembly
39.(a) from (b) than (c) as (d) with
40.(a) collect (b) reap (c) pick (d) gain

Part 2

In summer people **(41)** to grill because the sun is high and the days are much longer. Grill safety is an important element to having a great grill party. There are many important **(42)** to remember. The first is **(43)** a grill that is safe and will last at long time outdoors. Buying a grill can be a challenging but it can also be fun. There are gas grills and charcoal grills as well. For safety, be sure to keep all the grill supplies away from children if you get a charcoal or a gas grill. Gas grills **(44)** cost more money over time since you need to buy more gas. The food made with a gas grill also has a different flavor. The good news is that many modern grills work both with charcoal or gas! The second factor is to make sure you have cleaning supplies and the right tools for your grill. You should have **(45)** tools that keep your hands and arms safe from getting burnt. You should also have supplies that allow you to keep your grill clean after use. This summer, enjoy grilling with safety and fun.

41. (a) hate (b) enjoy (c) love (d) passionate (e) loathe
42. (a) goodies (b) particular (c) influence (d) factors (e) aid
43. (a) getting (b) losing (c) grab (d) get (e) acquire
44. (a) largely (b) normally (c) never (d) exactly (e) seldom
45. (a) the common (b) silly (c) the wrong (d) the incorrect (e) the right

Part 3

A century ago the process of choosing a career was a much simpler matter than it is today. A boy often followed in his father's footsteps. His sister learned the household skills that **(46)** her to become a wife and mother. Nowadays young people grow up in a much freer society **(47)** they enjoy almost unlimited career opportunities. In recent years there **(48)** an enormous increase in the kinds of vocations from which it is possible to choose. In addition, many of the barriers to career opportunity that existed only a few decades ago, such as **(49)** based on sex or religion or ethnic origins, are **(50)** disappearing.

46. (a) had prepared (b) may prepare (c) was prepared (d) would prepare (e) preparing
47. (a) where (b) when (c) why (d) whom (e) whose
48. (a) had been (b) has been (c) will be (d) would have been (e) was
49. (a) judgment (b) perception (c) goodwill (d) devotion (e) discrimination
50. (a) rapidly (b) incessantly (c) categorically (d) vigilantly (e) straightforwardly

III Reading Test (20%, 2% each) **本大題於答案卷作答，並請清楚標示題號**

Part I

Watch the Rosetta Mission's Historic Comet Landing by Stav Ziv (Newsweek)

Just over a decade ago, in March 2004, the International Rosetta Mission launched an orbiter that would make its way through the solar system, crossing the asteroid belt and venturing into deep space.

The destination: 67P/Churyumov-Gerasimenko, a comet that measures roughly 4 kilometers, or nearly 2.5 miles, in diameter, and is traveling up to 135,000 kilometers per hour.

On Wednesday, the orbiter, which has been following the comet since August, released a robotic lander that touched down on the comet's surface around 11 a.m. EST, or 4 p.m. GMT, making history as the "first controlled touchdown on a comet nucleus," according to the European Space Agency's (ESA) website.

Watch highlights from the ESA's coverage through the separation of the lander from the spacecraft:
"We have waited over 10 years for this day, but with the comet being over 317 million miles away, all we can do now is cross our fingers and hope," Alan Fitzsimmons of the Astrophysics Research Center at Queen's University in Belfast, Ireland, said in a statement released by the university. Fitzsimmons has been studying 67P/Churyumov-Gerasimenko

from Earth for years. "The Rosetta mission realizes the ambition of mankind to explore our origins and discover what is out there," he says.

The mission has the potential to reveal important information about the formation of the Earth and its life forms.

"Comet impacts are thought to have been one of the principal means by which water was delivered to the early Earth, around 3.6 billion years ago, possibly contributing half the water in our oceans. The other half would have come from the Earth's interior," said Stanley Cowley, a professor at the University of Leicester's Department of Physics and Astronomy who has studied comets, including this one. "Furthermore, the comet material is also known to contain simple organic molecules which may also have seeded Earth with the material from which life emerged," Cowley said in a press release issued by the British university.

According to the ESA, previous research has shown that comets contain complex organic molecules rich in carbon, hydrogen, oxygen and nitrogen, which are the building blocks of nucleic acids and amino acids, "the essential ingredients for life as we know it."

The name Rosetta reflects this aspect of the mission, harking back to the Rosetta Stone, a slab of stone covered in hieroglyphs discovered in 1799, which helped shed light on the ancient Egyptians' civilization and culture.

"Just as the Rosetta Stone provided the key to an ancient civilisation," reads an explanation on the ESA's website, "so ESA's Rosetta spacecraft will unlock the mysteries of the oldest building blocks of our solar system—the comets."

51. Why does this mission named as "Rosetta"?
    (a) The mission is going to observe comet Rosetta.
    (b) This mission will helped to reveal great secrets as Rosetta stone.
    (c) This mission is founded by a great person named Rosetta.
    (d) This mission will help to discover more Resetta stones.
52. Why does the Rosetta mission attract attentions from the public?
    (a) It is an international space mission.
    (b) It is the first spacecraft to observe the comet closely.
    (c) It is the first spacecraft to bring stones from a comet back to the earth.
    (d) It is the first spacecraft to land over a comet.
53. Please pick up the importances of the comet exploration.
    (a) Comet impacts brought water to the earth.
    (b) The comet material contain simple organic molecules which may seed the life on the earth.
    (c) Comet will evolve to be a small planet.
    (d) Comet is great helpful to the space journey.
54. According to the text, please choose the molecule which may not be detectable in a comet.
    (a) water (b) methane (c) Sodium chloride (d) ammonia
55. The Rosetta mission is sponsored by
    (a) USA (b) European Union (c) Japan (d) Egypt

Part II

Aurora (from wiki)

An aurora is a natural light display in the sky (from the Latin word aurora, "sunrise" or the Roman goddess of dawn), predominantly seen in the high latitude (Arctic and Antarctic) regions. Modern style guides recommend that the names of meteorological phenomena, such as aurora borealis, be uncapitalized. Auroras are caused by charged particles, mainly electrons and protons, entering the atmosphere from above causing ionisation and excitation of atmospheric constituents, and consequent optical emissions. Incident protons can also produce emissions as hydrogen atoms after gaining an electron from the atmosphere.

Most auroras occur in a band known as the auroral zone which is typically 3° to 6° wide in latitude and between 10° and 20° from the geomagnetic poles at all local times (or longitudes), most clearly seen at night against a dark sky. A region displaying an aurora at any given time is known as the auroral oval, a band which is displaced towards the nightside of the Earth. The day-to-day positions of the auroral ovals are posted on the internet. A geomagnetic storm causes the auroral ovals (north and south) to expand, and bring the aurora to lower latitudes. Early evidence for a geomagnetic connection comes from the statistics of auroral observations. Elias Loomis (1860) and later in more detail Hermann Fritz (1881) and S. Tromholt (1882) established that the aurora appeared mainly in the "auroral zone", a ring-shaped region with a radius of approximately 2500 km around the Earth's magnetic pole. It was hardly ever seen near the geographic pole, which is about 2000 km away from the magnetic pole. The instantaneous distribution of auroras ("auroral oval") is slightly different, being centered about 3–5 degrees nightward of the magnetic pole, so that auroral arcs reach furthest toward the equator when the magnetic pole in question is in between the observer and the Sun. The aurora can be seen best at this time, which is called magnetic midnight.

Auroras take many different visual forms. The most distinctive and brightest are the curtain-like auroral arcs. They eventually fragment or 'break-up' into separate, and rapidly changing, often rayed features which may fill the whole sky. These are the 'discrete' auroras which are at times bright enough to read a newspaper by at night. The 'diffuse' aurora, on the other hand, is a relatively featureless glow sometimes close to the limit of visibility. It can be distinguished from moonlit clouds by the fact that stars can be seen undiminished through the glow. Diffuse auroras are often composed of patches whose brightness exhibits regular or near-regular pulsations. The pulsation period can be typically many seconds, so is not always obvious. Occasionally there is a fast, sub-second, flickering. A typical auroral display consists of these forms appearing in the above order throughout the night.

Red: At the highest altitudes, excited atomic oxygen emits at 630.0 nm (red); low concentration of atoms and lower sensitivity of eyes at this wavelength make this colour visible only under more intense solar activity. The low amount of oxygen atoms and their gradually diminishing concentration is responsible for the faint appearance of the top parts of the "curtains".
Green: At lower altitudes the more frequent collisions suppress this mode and the 557.7 nm emission (green) dominates; fairly high concentration of atomic oxygen and higher eye sensitivity in green make green auroras the most common. The excited molecular nitrogen (atomic nitrogen being rare due to high stability of the N_2 molecule) plays its role here as well, as it can transfer energy by collision to an oxygen atom, which then radiates it away at the green wavelength. (Red and green can also mix together to produce pink or yellow hues.) The rapid decrease of concentration of atomic oxygen below about 100 km is responsible for the abrupt-looking end of the lower edges of the curtains. Yellow and pink are a mix of red and green or blue.
Blue: At yet lower altitudes atomic oxygen is, uncommon, and ionized molecular nitrogen takes over in producing visible light emission; it radiates at a large number of wavelengths in both red and blue parts of the spectrum, with 428 nm (blue) being dominant. Blue and purple emissions, typically at the lower edges of the "curtains", show up at the highest levels of solar activity.

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56. Please choose correct description(s):
    (a) Aurora is easily seeable in Taiwan.
    (b) The emission of auroras are produced by the excitations of the atoms and molecules in the upper atmosphere.
    (c) Aurora exhibits in a shape of oval.
    (d) The Earth's geographic pole is identical with the magnetic pole.
57. The strong solar activity will turn aurora to be:
    (a) redder (b) bluer (c) greener (d) yellower
58. Accoring to the text , yellow and pink colors of the aurora contributed by the excitation of the molecules of:
    (a) O (b) N_2^+ (c) N (d) H_2O
59. Auroras are caused by energetic of:
    (a) electrons (b) protons (c) photons (d) neutral particles
60. From the descriptions in the text, please estimate the closet scale of one degree in latitudinal direction near the geomanetic pole:
    (a) 50 km (b) 10 km (c) 120 km (d) 250 km

IV Translation Test (30%, 10% each) **本大題於答案卷作答，並請清楚標示題號**

61. 電漿是由自由電子和帶電離子為主要成分的物質形態，廣泛存在於宇宙中。

62. 綠色能源是指不排放污染物的能源，或是原材料可以再生的能源。

63. 太陽是位於太陽系中心的恆星，它幾乎是熱電漿與磁場交織著的一個理想球體。