國立成功大學 108 學年度碩士班招生考試試題

系　　所：能源工程國際碩士學位學程

考試科目：科技英文

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※ 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。

Part 1: Choose one answer for each questions. 2 points for each question

Section 1—Choose the answer for each blank that best fits the meaning of the sentence as a whole.

1. A few _____, a worker at a grocery distribution facility in upstate New York strapped a sensor under his chest.
   (A) one month (B) two months (C) one day (D) months ago (E) years
2. As he ____ heavy packs around the warehouse, the device tracked how he moved.
   (A) is lugged by (B) lugged (C) was lugged (D) being lugged (E) lugging
3. Eventually, it dubbed him at risk of serious injury—in large part _____ how much stress he was putting on his spine.
   (A) because (B) as (C) when (D) although (E) because of
4. So the worker met with his manager, and together they came up with a solution: the worker was ___ a hook to help with his lugging so he wouldn't have to bend over as much.
   (A) is given by (B) have been giving (C) given (D) have taken (E) should give
5. For _____ who are blind, everyday tasks such as sorting through the mail or doing a load of laundry present a challenge.
   (A) people (B) a person (C) one person (D) an opponent (E) a young woman
6. That is the thinking behind Aira, a new subscription service (starting at $99 per month for tis standard plan) that enables its thousands of users to stream live video of their surroundings to an on-demand agent, using _____ a smartphone or Aira's proprietary glasses.
   (A) the (B) by (C) either (D) rather than (E) instead of
7. The agents, who are available 24/7, can then answer questions, describe objects or guide users ____ a location.
   (A) find (B) search for (C) change (D) determine (E) through
8. Like many business-school _____, Stephen Kuhl and Kabeer Chopra bonded over a common anguish—in their case, buying a couch.
   (A) a person (B) students (C) a young man (D) a woman (E) a fighter
9. Now they've sold more than 10,000 sofas and _____ shipping within the U.S. in as little as one week.
   (A) searches for (B) determines (C) is capable of (D) are capable of (E) creates
10. The pollutant, which _____ automotive emissions and industrial facilities, leads to the thousands of premature deaths worldwide from illness like respiratory disease.
    (A) comes largely from (B) creates (C) was determined (D) comes large from (E) purifies

Section 2—Choose one answer that contains faulty English.

11. Healthy forest (A) capture and slowly release rainwater (B) into rivers and aquifers (C)—providing reliable water (D) farmers use (E) to grow food we eat.
12. Working (A) together, we can (B) build a planets (C) where people (D) and nature thrive (E).
13. Tom Burden often found (A) his tools slide (B) off the aircraft—a result of the fact no existing (C) toolbox could stick to a curved surface (D) without scratching (E) it.
14. So he prototyped (A) his own, starting with the kind of bendable (B), nonslip mat that keeps phones from sliding (C) off car dashboards and tweaking (D) the material until it could withstanding (E) the kind of heat and chemicals he encountered on the job.
15. SweetFoam, a new material made (A) from parts of sugarcane that would otherwise (B) be discarding (C) (thereby releasing (D) climate change—causing (E) carbon dioxide into the air).
16. Unlike more traditional wireless headphones (A), they are small enough (B) (roughly 1cm in both width and height) to fit inside the ear without jut out (C) and light enough (1.4g) to feel weightless (D)—both essential for comfort while sleeping (E).
17. But those caught (A) in the act faces (B) consequences, like (C) being handcuffed (D) to the board (E).
18. The goal (A), says Hasbro's Jennifer, was to capture (B) the mischievous spirit (C) of Monoply players while keeping (D) the core game play from intact (E).
19. All (A) I wanted to doing (B) was get (C) from A to B without (D) any delay (E).
20. Minnesota-based manufacturer 3M has created (A) a material for roofing shingles that, when exposed (B) to the sun's UV rays, breaks (C) down smog particle (D) so they can be washed (E) away by rainfall, thereby reducing pollution.

Section 3—Choose the best answer to match with each underlined word.

21. Using a companion app, owners can also track their water usage, set a maximum temperature and even limit shower times, further helping to curtail costs.
(A) reduce (B) increase (C) create (D) complete (E) ratchet up

22. Most water heaters consume massive amounts of power, ratcheting up families' energy bills in the process.
(A) cutting (B) decreasing (C) increasing (D) reducing (E) shrinking

23. Unlike other heaters, which heat water in a tank using metal components, the MODEL 3 smart water heater sends electrical current through the water, heating it up quickly and only when residents actually need it.
(A) destination (B) neutrality (C) comprehension (D) despair (E) parts

24. Monopoly is hard enough when everybody plays by the rules, but cheating is infuriately common.
(A) completely (B) positively (C) annoyingly (D) sadly (E) happily

25. You can then set them up to mimic the wall on which the TV is hanging, allowing it to seamlessly blend in to your room when not in use.
(A) create (B) imitate (C) make (D) produce (E) plan

26. The flow of migrants across the Mediterranean has ebbed significantly since the peak of the crisis.
(A) rised (B) incensed (C) increased (D) despaired (E) receded

27. Other design tweaks, such as moving all necessary connectors to a separate box, means owners need not worry about a cluster of wires, uglifying an otherwise elegant piece of technology.
(A) bad (B) graceful (C) no good (D) sloppy (E) misleading

28. They found cheap models that could ship right away but were flimsy and required tedious assembly.
(A) simple (B) difficult (C) well prepared (D) well made (E) easily damaged

29. They found luxe models that were well made but couldn't be delivered without costly fees and lengthy waits.
(A) opulent (B) cheap (C) bad (D) ineffective (E) dispensable

30. The goal is to do away with fashion's long-held idea of standardized sizing, which often excludes many body types.
(A) includes (B) keeps out (C) covers (D) despairs (E) contains

Section 4—Read the follow articles and answer the questions.

I (source: TIME magazine June 11, 2018 by Alex Fitzpatrick)

When Hurricane Maria hit Puerto Rico last September, it ravaged the island's electrical grid and communications systems. For weeks, many of the approximately 5 million Puerto Rico living in the mainland U.S. were unable to reach their loved ones. While recovery groups worked to restore power and deliver aid, cell providers scrambled to repair their networks. To get its service back up and running, AT&T tried something new: the flying COW, a tethered drone that beamed mobile-data signals up to 40 miles in all directions.

"As soon as we turned it on, people just started connecting to it constantly," says Art Pregler, AT&T's Unmanned Aircraft Systems program director. His team operated the Flying COW, short for cell on wheels, from the parking lot of a Walmart on the island, which provided the Internet connection for their airborne cell tower.

With any technology, there are certain inflection points when it goes from being something perpetually in the near future to being a part of everyday life. For years, drones have been hovering on the cusp—used by militaries and relatively small numbers of hobbyists but not part of the larger culture. The U.S. military ushered in the drone age in 2001, when it began using the unmanned remotely piloted technology to target al-Qaeda leaders in the wilds of Afghanistan. Drones have since become a key part of the military's arsenal, and their uses in conflict zones around the word has expanded under both Obama and Trump Administrations. Civilian uses, however, have long been more promise than reality.

That's finally changing. Some 3 million drones were sold worldwide in 2017, and more than 1 million drones are registered for U.S. use with the Federal Aviation Administration (FAA). (Most store-bought drones have to be registered with the FAA.) These consumer drones can fly vertically, like helicopters, and are similar to remote-controlled airplanes but with more sophisticated technology such as GPS, wi-fi and obstacle-avoidance sensors. They're being used by tech-savvy farmers to monitor and spray crops, by researchers to measure environmental pollution and by Hollywood studios to capture action-packed footage for blockbuster movies. Drones are even saving lives, as first respondents in places like Menlo Park, Calif., use them to coordinate operations and search for missing hikers. (Sixty-five people have been rescued by drones, by one estimate.) And of course, drones are being flown by hundreds of thousands of amateurs, who use them for everything from taking vacation photos to buzzing around their local park.

31. Which following message this passage wants to convey mainly?
    (A) Hurricanes are terrible beasts that could damage human society.
    (B) Flying drones are a versatile tool for human society.
    (C) Al-Qaeda leaders are difficult to track so drones can be used to find them.
    (D) Flying drones are effective in providing the Internet connection in a city.

32. According to the passage, after Hurricane Maria hit Puerto Rico, how did the island resume its communication systems temporarily?

(A) The technicians at AT&T tried to repair the power station.
(B) The technicians at AT&T managed to make a bridge.
(C) The technicians at AT&T managed to repair the network.
(D) The technicians at AT&T operated the unmanned aircraft to restore the Internet connection for their airborne cell tower.

33. What can be inferred from this passage?
(A) Drones can be used to defeat terrorists in the world.
(B) Flying unmanned drones can be used almost everywhere including life-saving.
(C) People can always use flying unmanned aircraft anytime when Hurricanes arrive.
(D) Flying unmanned drones will disappear completely.

(source: TIME magazine June 11, 2018 by Aryn Baker)

For several days, Delphine Twese Hamwe's 2-year-old daughter Ghislane had been screeching in pain as fever wracked her tiny body. A nurse at the local clinic in central Rwanda told her that an acute form of malaria was attacking her daughter's red blood cells. There was nothing the clinic could do to save her life, so they called an ambulance. But by the time mother and child arrived at the district hospital in Kabgayi, Ghislane had stopping moving. "We arrived too late," Hamwe says. "There was no sign of life. I thought that she was dead." The nurses offered a blood transfusion as a last resort. Hamwe, numb and distracted, agreed. She was already on her phone, messaging the bad news to family back in the village.

Meanwhile, a technician at the hospital laboratory was typing out his own message, a request for two units of pediatric red blood cells, O+. Normally, he would have dispatched a car and driver to the central blood bank in the capital, Kigali, a three-hour round-trip. But the urgency of the case forced him to try something new. His phone flashed a confirmation message: the blood was on its way to, with an estimated delivery time of just six minutes.

Before long the high-pitched whine of a drone could be heard circling the hospital grounds. As it passed over the lab's parking lot, it released a red cardboard box attached to a paper parachute. Inside the box were two packets of blood, wrapped in insulating paper and still chilled from refrigeration. A nurse rushed the blood over to the emergency wing, and within minutes it was pumped into Ghislane's limp body through an IV. The child opened her eyes. It was Dec 21, 2016, and she had just become the first person in the world who owed her life to a drone delivery.

In March 2016, Zipline, a U.S. startup, partnered with the Rwandan government to launch the world's first commercial drone delivery service, ferrying vital medical supplies to far-flung hospitals by air. Since October of that year, the company has dispatched more than 7,000 units of blood products to 21 hospitals, including red blood cells, platelets and plasma that would have otherwise needed to travel by a treacherously tangled road network, losing precious hours in the race to save lives.

34. According to the passage, which the following statement is correct?

(A) The 2-year-old daughter Ghislane eventually died of a form of Malaria.
(B) Rwanda is the most suitable place where people can use unmanned aircraft to carry blood samples for life-saving purposes.
(C) Zipline failed to save the 2-year-old daughter Ghislane by ferrying medical supplies.
(D) Zipline has established the world's first commercial drone deliver service in Rwanda.

35. According to the passage, in which year Zipline did start to use the unmanned flying drones to deliver medical supplies to remote cities in Rwanda?
(A) 2018
(B) 2017
(C) 2016
(D) 2015

36. What can be inferred from this passage?
(A) Using the unmanned aircraft deliver service for ferrying medical supplies can extend to the entire world, as it could save precious hours in the race to save lives.
(B) Dispatching a car and driver to the central blood bank for those who need a blood transfusion is completely useful in African countries.
(C) Using an ambulance is still a good way to save lives.
(D) Unmanned flying vehicles can carry those who need a blood transfusion to a remote hospital.

Part 2:

Section 1—Fill in the following blanks with correct words from those in the box below. (2 points for each question)

constructed	wither	manifests	pristine	bewildering
faced	challenges	carrying	designed	threat
extinction	enormous	desolate	vanish	unfold

37. That highlights one of the greatest _____ to tracking and countering drones deployed by bad actors.

38. Existing radar systems are _____ to detect much bigger threats.

39. Most commercial drones are _____ of plastic and are difficult to spot electronically because they're small, fly low to the ground and don't carry a transponder to signal their positions.

40. It is only a matter of time before the threat _____ in a violent way.

41. The military has already _____ the drone danger abroad.

42. As American Special Operations Commandos fought to retake the Iraqi city of Mosul from ISIS in the fall of 2016, they faced a _____ that American ground forces hadn't dealt with: attack from the air.

43. Desperate to break the American-led siege of the city, ISIS militants sent fleets of small drones, often several at a time, _____ grenades and miniaturized explosives.

Section 2— Rearrange and numbered the following sentences in the order they should appear in the literature review of a research report. (2 points for each sentence)

A. ___ The numerical simulation of transient two-phase flow transport in heterogeneous porous media is computationally expensive, and adequate resolution of complex flow features is not always possible, thus compromising the reliability of the results.

B. ___ Another approach to adaption is the use of a moving-mesh method such as that of Tang and Tang to align the mesh with the important features of the flow.

C. ___ An alternative to global mesh refinement which demands very large computing resources, is adaptive mesh refinement (AMR).

D. ___ A variety of AMR methods have been proposed depending on the type of physical problem and associated partial differential equations (PDE), and a large body of literature exists for these methods.

E. ___ One can use a simple refinement indicator, to refine and coarsen the mesh at each time step, depending on where the discontinuities (phase boundaries in the present context) propagate.

F. ___ Recent work by Noelle et al. shows that a central scheme with AMR can be implemented on non-conforming 3D Cartesian grids to extend the classical hydrodynamics AMR framework. Smoothness indicators for conservation laws were developed by Wang et al.

G. ___ Achieving physically representative simulations that resolve all salient length and time scales and localized flow features efficiently remains a challenge.